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LOCAL RESIDENTS' WILLINGNESS TO DONATE FOR LOW CARBON CITY INITIATIVES IN TAIPING, PERAK: PROPOSED E-BIKE-SHARING PROJECT

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Abstract

The transport sector in Malaysia ranked second in the country's total energy consumption for 2021, thereby contributing to greenhouse gas emissions. Numerous cities strive to attain low-carbon urban environments. E-bikes, as environmentally friendly vehicles, have the potential to play a significant role in urban transportation by contributing to the creation of low-carbon cities. Taiping, Perak, has been recognised as one of the world's top 3 most sustainable cities for 2019. This prestigious accolade positions it as an ideal location for an e-bike project, further solidifying its commitment to maintaining its status as a sustainable city. This study seeks to evaluate the awareness and attitudes of Taiping residents towards e-bikes, determine the factors that influence their willingness to donate, and ascertain the average amount they are willing to contribute to the e-bike-sharing development project in Taiping, Perak. A survey was conducted with 385 respondents using the Contingent Valuation Method, employing stratified random sampling. The findings indicated a notable level of awareness and favourable attitudes towards e-bikes. Factors such as bid, age, education, income, and awareness impact the willingness to donate. On average, each person contributes RM10.40 towards the proposed e-bike-sharing project in Taiping. The discovery offered valuable insights to the Taiping Municipal Council regarding securing financial support and better understanding residents' perspectives on e-bike sharing.

Keywords: Low carbon city, E-bike, Transportation, Willingness to Donate

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INTRODUCTION

About 75% of worldwide CO_2 emissions come from cities. The primary sources of these emissions are human activities, concrete constructions, and transportation (Abdul & Umar, 2022). "Low Carbon City" refers to an urban sustainability strategy that reduces carbon emissions, primarily from human activity. To create a low-carbon society, public, economic, and community collaborations are needed (Abdullah et al., 2022). A low-carbon city addresses environmental, social, and economic needs using low-carbon methods. According to the 2021 National Low Carbon Cities Masterplan, the city monitors, regulates, and reduces greenhouse gas emissions to mitigate climate change. Low-carbon city projects will help maintain urban growth, infrastructure, and transportation (Ministry of Energy, Green Technology, and Water Malaysia, 2017). It might drastically reduce urban greenhouse gas emissions.

Taiping Municipal Council aims to make the city low-carbon by 2030 (Portal Rasmi Majlis Perbandaran Taiping, 2024). Taiping placed third in the International Tourismus-Börse "Best of Cities" category in 2019. Taiping's municipal government wants to be low-carbon by 2030. E-bike-sharing services help low-carbon cities meet their goals and enhance award rankings (Ministry of Energy, Green Technology and Water Malaysia, 2017).

Due to the building of Jalan Tasik Lestari, a 750-m road connecting Jalan Pekeliling and Jalan Saw Ah Choy near the Taiping Lake Garden, Taiping is experiencing traffic congestion (Loh, 2022). The Road Transport Department Malaysia reported a 0.96% rise in Taiping motor vehicle registrations from 432,425 to 436,565 between 2020 and 2021. Vehicle registrations are rising, which increases the number of cars on the road and greenhouse gas emissions. Therefore, Taiping must develop e-bike services as an alternative option to reduce automobile greenhouse gas emissions.

Understanding Taiping citizens' awareness, attitudes, and willingness to contribute to e-bike-sharing services is vital for building a low-carbon city. However, after reviewing the literature, it is evident that this information is notably lacking for Taiping. Malaysian research attempts to fill this gap by examining public awareness, attitudes, and readiness to support e-bike-sharing services. Rosnan and Abdullah (2018) found that Malaysia's bicycle-sharing culture is still in its infancy. A lack of citizen awareness and positive opinion may hamper Taiping's e-bike-sharing plan. Thus, this research sought to bridge these information gaps and provide vital insights to help Taiping create and implement a successful e-bike-sharing programme. This research assessed the Taiping population's awareness and attitudes regarding e-bikes, identified the elements that impact their readiness to contribute to the planned e-bike-sharing scheme, and estimated their potential contribution to its development.

LITERATURE REVIEW

Past studies on willingness to pay for green transportation

Some Previous studies have examined the willingness of individuals to pay for transport to promote a low-carbon city. In Solo, Indonesia, Guerra (2019) assessed the potential replacement value of gasoline-powered motorcycles with electric motors. Respondents were willing to pay an additional 35,000 to 40,000 rupiah for motorcycles with a 10 km greater range and 10 km/h quicker speed. Respondents were willing to pay an additional 65,508 rupiah to acquire the feature that reduced the charge time by an hour.

Zhu et al. (2019) utilised a questionnaire survey based on the contingent valuation method to gather data. A total of 413 valid responses were obtained. Data were analysed using a binary logistic regression model. The respondents' income, education, and familiarity with Electric Motorcycles significantly influenced their willingness to pay (WTP) and willingness to buy (WTB) behaviours. After careful analysis, the average WTP for electric motorcycles is determined to be 1315.54 Macau Pataca (MOP). Zhang et al. (2023) conducted a study in China and found that 90.14% of respondents expressed a strong desire to purchase an electric vehicle. The participants' willingness to buy was positively correlated with the environmental benefits, battery range, charging convenience, and safety of electric vehicles. The estimated value of the WTP was 15041.10 Macanese Pataca (MOP).

Li et al. (2020) sought to address the lack of information regarding fuel cell electric vehicles (FCEVs) in China. Their objective was to analyse public perceptions of the main features of FCEVs. Data were collected using a choice experiment questionnaire, with 1,072 respondents being interviewed. The results showed that respondents expressed a willingness to pay for specific features: (i) a 200 km increase in driving range, costing Renminbi (China Currency), RMB49,091, (ii) a 5 min reduction in refuelling time, costing RMB12,727, (iii) an RMB 0.5/kilometre reduction in fuel cost, costing RMB3818, (iv) a 20% reduction in emissions, costing RMB47,818, and (v) a 20% improvement in refuelling accessibility, costing RMB12,909.

Son et al. (2022) utilised a double-bound contingent valuation approach (CVM) to evaluate the willingness to pay (WTP) of 500 residents in Pokhara Metropolitan City, Nepal, regarding the implementation of electric buses in the city. Based on the findings, the average WTP per person was 758.6 Nepalese Rupee (NPR). Age, bid value (price), and average usage of the main transport per week were found to have positive correlations with the willingness to pay (WTP). In their study, Bera and Maitra (2021) analysed the decision-making process of potential owners regarding plug-in hybrid electric vehicles (PHEVs) in a typical Indian context. The researchers employed a preference questionnaire to gather data, with 1500 responses recorded. The data was analysed using mixed logit.

The values for the choice attribute are as follows: (i) reduced tailpipe emissions - 5216 Indian rupee (INR), (ii) shorter battery recharge times - 48,541 INR, (iii) longer electric range - 3351 INR.

Previous literature reviews have identified a scarcity of studies investigating Taiping residents' inclination to support the development of e-bike-sharing initiatives. Research on residents' awareness and attitudes towards e-bikes is limited, and e-bikes are not widely studied in Malaysia.

RESEARCH METHODOLOGY

Study area

The research location was situated in Taiping, Perak, Malaysia. Taiping City serves as the capital of the Larut, Matang, and Selama districts in the state of Perak. Taiping spans an area of 186.5 square kilometres. The legislative body of Taiping is the Taiping Municipal Council (The official portal of the Perak government, n.d.; Official website of the Larut Matang & Selama District and Land Office, n.d.). Taiping City was selected as the study area due to its recognition by the International Tourismus-Börse (ITB) in 2019, where it was ranked third in the 'Best of Cities' category (Arif, 2019). This global recognition at the ITB event held in Berlin, Germany, is a significant achievement for Taiping.

Method

Data were collected using the single-bound contingent valuation method, which considers consumers' willingness to pay for a specific environmental service (Nautiyal & Goel, 2021). Respondents were asked to indicate their preferences using this approach, allowing analysts to determine the demand for non-market goods and services (Markandya et al., 2019). The single-bound dichotomous choice method was chosen for its ability to mitigate potential response bias, its minimal information requirements, and its ease of implementation during both data collection and estimation (Calia & Strazzera, 2000).

Model specification

The logit regression method was employed for model specification in this research.

$$\mathrm{WTD}ij = \beta_0 + \beta_1 Bid + \beta_2 Gen + \beta_3 Age + \beta_4 Edu + \beta_5 Mar + \beta_6 Inc + \beta_7 Awa + \beta_8 Att + \varepsilon$$

Where,

i	=	Origin (city of respondents)
j	=	Taiping
WTD	=	Willingness to donate for proposed e-bike-sharing service initiatives in Taiping, Perak (Yes:1, No:0)
Bid	=	Bid price
Gen	=	Gender of respondents, (1=Male, 0=Female)
Age	=	Age of respondents (Years)
Edu	=	Education level of respondents
Mar	=	Marital status
Inc	=	Income
Awa	=	Awareness respondents related to e-bikes (Likert scale: 1: Strongly disagree to 5: Strongly agree)
Att	=	The attitudes of local residents at Taiping, Perak (Likert scale: 1: Strongly disagree to 5: Strongly agree)
β1-β8	=	Coefficients to be estimated
ε	=	Random error

Questionnaire design

The questionnaire consisted of four parts: A, B, C, and D. Part A involved the demographic questions. Section B inquired respondents about their awareness of e-bikes, while Section C focused on their attitudes regarding the use of e-bike-sharing services. Section D of the questionnaire asked respondents about their willingness to contribute to the development of the e-bike-sharing project. The questionnaire was designed to be bilingual, with both English and Malay options. This allowed respondents who were not proficient in either language to answer more easily. Five sets of questionnaires with starting bids of RM5, RM10, RM15, RM20, and RM25 were distributed to the respondents during data collection. The bid price for the WTP section of each questionnaire was established using data from a pilot study, which included an open-ended question about the maximum amount respondents were willing to donate for the e-bike sharing project. The mode for willingness to donate was utilised to determine the range of bid values.

In the previous section, we inquired about the willingness to donate using the Single-Bound Contingent Valuation Method (CVM) format.

Data collection

A stratified random sampling technique was employed, dividing Taiping based on parliament constituency boundaries provided by the government website. The Taiping parliament constituency, coded as P.060, comprises of three state legislative assemblies (DUN): DUN Kamunting, DUN Pokok Assam, and DUN Aulong. The participants in the sample were selected randomly from all the DUNs. The survey was conducted in Taiping using a face-to-face method. The population of Taiping's parliamentary constituency was 130,712, according to the latest data from the Department of Statistics Malaysia. The final sample size was 384, calculated using the formula by Krejcie and Morgan (1970).

Table 1: Sample size per DUN

DUN	Population	Respondent number
Kamunting	40,215	118
Pokok Assam	36,444	107
Aulong	54,053	158

Source: Department of Statistics Malaysia

Kamunting DUN had a population of 40,215, Pokok Assam DUN had 36,444, and Aulong DUN had 54,053. The population of each DUN was divided by a total population of three DUNs, multiplied by a sample size of 384. The formula was as follows:

$$\frac{Population\ DUN}{Total\ population\ of\ 3\ DUNs} \text{ x } 384$$

Questionnaire validation and reliability

The validity of the questionnaire was assessed by three lecturer-experts in the field of Environmental Studies. The questionnaire utilised a validation format, with each statement being evaluated on a 4-point scale: 1=Not relevant, 2=Medium, 3=Relevant, 4=Very relevant. The statement that scored 1 or 2 on the scale was deemed irrelevant to the study and should be eliminated (Wynd et al., 2003). Following the feedback from the validators, the questionnaire was revised accordingly. The questionnaire was distributed to 38 respondents, accounting for 10% of the total respondents in the pilot study, to assess its reliability. Reliability tests were conducted on Sections B and C of the questionnaire, which consisted of Likert scale questions. The awareness score was 0.701, and the attitude score was 0.711. The collected data was analysed using Cronbach's alpha in SPSS

software. Questions with a reliability coefficient above 0.70 were deemed acceptable (Hair et al., 2021).

Data analysis

Descriptive analysis was conducted to analyse the first objective, followed by inferential analysis for the second and third objectives of the research using the STATA software. The analysis involved conducting logit regression to examine the dependent variable, which was a (dummy: 1, 0) (1 for willing, 0 for not willing to donate).

ANALYSIS AND DISCUSSION

Respondent socio-demographic

Table 2 presents an overview of the socio-demographic characteristics of the respondents. The age range of the respondents began at 16 years old, as previous studies on e-bikes have indicated that the youngest participants typically fall within the 16 to 18 age group (Yang et al., 2018; Zheng et al., 2023). Out of the total respondents, 197 (51.2%) were female, while 188 (48.8%) were male. The majority of respondents fell within the age range of 16-24 (41.8%), representing the younger generation. This was followed by the age groups of 25-32 (29.9%), 33-40 (14.5%), 41-48 (5.7%), above 56 (4.9%), and the least represented group 49-56 (3.1%). The majority of respondents, 203 individuals (52.7%), held a bachelor's degree as their highest level of education. This was followed by those with STPM or A-level education (25.7%), a diploma (11.4%), secondary school education (9.1%), and a small percentage with a master's degree or PhD (0.8%) or primary school education (0.3%). The respondents' marital status was as follows: 61.8% were single, while 38.2% were married.

The majority of respondents, specifically those aged between 16 and 24, identified themselves as students (42.9%). This was followed by individuals working in the private sector (27.3%), government sector, and self-employed individuals, accounting for 11.4% of respondents. A smaller percentage of respondents identified as retired (4.7%), housewives (2.1%), and unemployed (0.3%). Approximately 47.8% of the respondents did not report any income, as the majority of them were students. Out of the total respondents, 34.8% fall within the income range of RM2501 to RM5000. The next highest income range is RM1500 to RM2500, accounting for 11.4% of the respondents. Following that, 3.1% fall within the RM5001 to RM7500 range, while only 2.6% have an income below RM1500. Lastly, a mere 0.3% of the respondents have an income between RM7501 and RM10000. The distribution of respondents' residences is as follows: 36.9% in Pokok Assam, 33.2% in Kamunting, and 29.9% in Aulong.

Table 2: Overview of respondents' socio-demographic

Item	Frequency	Percentage (%)
Gender		
Male	188	48.8
Female	197	51.2
Age		
16-24	161	41.8
25-32	115	29.9
33-40	56	14.5
41-48	22	5.7
49-56	12	3.1
Above 56	19	4.9
Highest Education Attainment		
Primary school	1	0.3
Secondary school	35	9.1
Pre-U (STPM, A-level)	99	25.7
Diploma	44	11.4
Bachelor's Degree	203	52.7
Master's Degree/ PhD	3	0.8
Marital Status		
Single	238	61.8
Married	147	38.2
Occupation		
Student	165	42.9
Unemployed	1	0.3
Government sector	44	11.4
Private sector	105	27.3
Self-employed	44	11.4
Housewife	8	2.1
Retired	18	4.7
Individual Gross Monthly Income		
No income	184	47.8
Below RM1500	10	2.6
RM1500-RM2500	44	11.4
RM2501-RM5000	134	34.8
RM5001-RM7500	12	3.1
RM7501-RM10,000	1	0.3
Residential Location		
Kamunting	128	33.2
Pokok Assam	142	36.9
Aulong	115	29.9

Awareness towards the benefits of e-bike-sharing

Table 3 presents an overview of the respondents' awareness regarding the advantages of e-bike-sharing. In general, the statements were highly recognised by the respondents, with a mean score exceeding 3.67. Apostolou et al. (2018) supported the B2 statement that e-bike sharing alleviated traffic congestion by offering an alternative transportation option, with an average score of 4.23. E-

bikes can serve as a viable alternative to conventional modes of transportation, such as cars or buses, particularly for short distances and during periods of high travel demand. The study found that e-bikes had the ability to cover greater distances compared to pedal bicycles, with a mean score of 4.23. Apostolou et al. (2018) found that utilising the battery for robust acceleration in demanding biking situations, like uphill climbs and battling wind resistance, can extend the travel range.

The statement regarding the potential contribution of e-bikes to the development of a sustainable city received a mean score of 4.10. According to Dora and Gouse (2023), e-bikes are more energy-efficient, cost-effective, and widely available. Additionally, it served as a quiet, clean, and eco-friendly means of transportation. The study found that the e-bike-sharing programme significantly raised community environmental awareness, with a mean score of 3.97. Bai et al. (2020) found that individuals with a strong environmental awareness were more likely to choose zero-emission transportation options. E-bike sharing has the potential to enhance environmental awareness within the community.

The B1 statement, which claimed that e-bikes were the most suitable means of transportation for the "last mile" between public transit stations and final destinations, received a mean score of 3.95. According to the research conducted by Bielinski and Wazna (2020), e-bikes were predominantly used for commuting to various destinations and for first and last-mile transportation. The mean score for the B6 statement, which suggested that e-bike sharing promoted a healthful lifestyle in the community, was 3.95, the same as the B1 statement. Azevedo et al. (2023) provided evidence supporting the positive impact of e-bike sharing on sustainable transportation, sports participation, and healthy living. The mean score for the last statement in the awareness section, B4, which suggested that e-bikes had health benefits for users, was 3.86. According to a study conducted by Gojanovic et al. (2011), electric-assisted bicycles have been shown to encourage physical activity and raise heart rate, leading to improved health.

Table 3: Awareness towards the benefits of e-bike-sharing

Item	Likert Scale Frequency					Mean	Level*
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)		
B2	0	0.5	8.6	58.2	32.7	4.23	3
B5	0	0.8	4.4	66.2	28.6	4.23	3
B3	0	0	12	66.2	21.8	4.10	3
B7	0	0	12.5	78.2	9.4	3.97	3
B1	0	1	18.4	65.5	15.1	3.95	3
B6	0.3	1	12.7	75.8	10.1	3.95	3
B4	0.3	0.5	23.4	64.9	10.9	3.86	3
Average overall mean						**4.04**	**3**

*For a 5-point Likert scale, using the formula (highest value – lowest value)/no. of categories in statistics calculation: low (1) = 1 to 2.339, medium (2) = 2.34 to 3.669, and high (3) = 3.67 to 5.00.

Note: B1: E-bikes are the ideal mode of transportation for the "last mile" from public transit stations to final destinations. B2: E-bike-sharing reduces traffic congestion by providing an alternative mode of transportation. B3: E-bikes as renewable vehicles contribute to the development of a sustainable city. B4: E-bikes are beneficial to the user's health. B5: E-bikes can cover greater distances than pedal bicycles. B6: E-bike-sharing promotes a healthful lifestyle in the community. B7: E-bike-sharing increases community environmental consciousness.

Attitude toward e-bike-sharing

Table 4 shows the respondents' attitudes towards e-bike-sharing. In general, the participants expressed a highly positive attitude towards e-bike-sharing, with a strong agreement to all statements. The e-bike-sharing service received the highest mean score of 4.15 in the attitude section, indicating that respondents would highly recommend it to their friends. The mean score for the C5 statement, indicating respondents' willingness to share information on e-bike-sharing with their peers, family, and social media platforms, was 4.14. In their study, Handy and Fitch (2020) provided support for these two statements. They concluded that there has been a significant increase in e-bike awareness in the research study area following the introduction of the e-bike-sharing programme.

The C2 statement indicating that the use of e-bikes would reduce their carbon footprint received a mean score of 4.03. These findings aligned with the research conducted by McQueen et al. (2020), which demonstrated that individuals can effectively reduce their carbon emissions by transitioning from private cars to e-bikes. The mean score for the statement regarding the potential utilisation of an e-bike-sharing service after the project's implementation was 4.00. Li et al. (2022) provided evidence that individuals were inclined to use e-bike-sharing services based on their attitudes, social norms, perceived control, utility, and ease of use.

The mean score for C7's statement regarding their willingness to pay for e-bike-sharing services was 3.96. Research conducted by Jaensirisak et al. (2017) revealed that individuals in Thailand demonstrated a willingness to pay

for the utilisation of the recently introduced public transport system. The mean score for respondents who expressed their willingness to use the e-bike-sharing service provided it was conveniently accessible, was 3.95. Chen and Chao (2011) discovered that individuals' decisions to utilise public transit were significantly impacted by their perception of its usefulness and ease of use. The mean score for C1's statement, which proposes the use of e-bikes as a solution to city traffic congestion, was 3.75. Li et al. (2022) found that individuals used shared e-bikes for various reasons, including exercise, cost savings, environmental protection, traffic relief, and improved travel efficiency. The study also revealed that perceived usefulness played a significant role in influencing their behavioural intention.

Table 4: Attitude towards e-bike-sharing

Item	Likert Scale Frequency					Mean	Level*
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)		
C4	0	0.5	5.2	73.5	20.8	4.15	3
C5	0	0.8	5.7	72.5	21.0	4.14	3
C2	0	0.8	15.6	63.1	20.5	4.03	3
C6	0	0.5	9.4	80	10.1	4.00	3
C7	0	0.8	9.4	82.6	7.3	3.96	3
C3	0	1.3	14.6	72.2	12	3.95	3
C1	0	7.0	20.8	62.9	9.4	3.75	3
Average overall mean						**4.00**	**3**

*For a 5-point Likert scale, using the formula (highest value – lowest value)/no. of categories in statistics calculation: low (1) = 1 to 2.339, medium (2) = 2.34 to 3.669, and high (3) = 3.67 to 5.00.
Note: C1: I will advocate for the use of e-bikes to avoid traffic congestion in Taiping City. C2: E-bikes will reduce my carbon footprint. C3: I will utilise an e-bike-sharing if the service is convenient to access. C4: If an e-bike-sharing service were implemented in the Taiping area, I would recommend it to friends. C5: I will share information about the e-bike-sharing service with my peers, family, and even on social media platforms. C6: I would consider utilising an e-bike-sharing service. C7: I am willing to pay for an e-bike-sharing service.

Willingness To Donate

Table 5 summarises the independent variables that will impact the dependent variable, namely willingness to donate. The resulting pseudo R^2 value was 0.3458 upon inputting the independent variables, indicating an explanation of 34.58% for the dependent variable. After careful analysis, it was found that the bid, age, education, income, and awareness variables had a significant impact. In contrast, the variables of gender, marital status, and attitude were found to be insignificant. It was observed that the bid variable had a negative coefficient value, suggesting an inverse relationship between the bid amount and the likelihood of respondents donating. The presence of a negative coefficient aligns with the principles of demand theory. A P-value of 0.000 indicates a high level of significance. Respondents' willingness to donate decreased as age increased, as evidenced by the negative coefficient value of the age variable. Age had a P-value of 0.045,

indicating its significance in influencing the dependent variable. Consistent with Abdullah et al. (2022), the age variable also exhibited a negative coefficient value.

The coefficient value for education level was 0.285, with a P-value of 0.001, suggesting that it was a statistically significant variable. According to Kamri (2013), an education variable had a positive impact on the dependent variable, which aligns with this finding. The coefficient value for income was 0.375 with a P-value of 0.000, indicating its high significance as a variable. These findings corresponded with the study conducted by Mamat et al. (2020), which similarly concluded that income exhibited a positive correlation with the dependent variable, WTP. The awareness variable had a coefficient value of 0.561 and a P-value of 0.035, indicating its significance at a level below 5%. Consistent with Thakur et al. (2022), it was found that the awareness variable had a positive impact on the dependent variable.

Table 5: Single-bound modified logit regression

Single-bound (Initial bid)			
Variables	**Coefficient**	**Standard error**	**P>|z|**
Constant	-2.857	1.108	0.010
Bid	-0.120	0.013	0.000***
Gender	0.122	0.160	0.449
Age	-0.246	0.123	0.045**
Education level	0.285	0.086	0.001***
Marital status	0.277	0.248	0.264
Variables	**Coefficient**	**Standard error**	**P>|z|**
Income	0.375	0.080	0.000***
Awareness	0.561	0.265	0.035**
Attitude	-0.113	0.264	0.670
	LR chi^2 (8) = 174.55, Prob > chi^2 = 0.000, Log likelihood = -165.083, Pseudo R^2 = 0.3458x100% = 34.58%		

*=significant level at the 0.1, **=significant level at the 0.05, ***=significant level at the 0.01

After carefully considering the significant independent variables impacting willingness to donate, the final amount for the proposed e-bike-sharing project was determined to be RM10.40. This monetary value was calculated using the syntax developed by Alejandro (2012) in STATA software to determine the mean willingness to donate value.

Table 6: WTD value for modified model of single-bound CVM

Single-bound (Initial bid)			
Variable	Coefficient	Standard Error	P>|z|
WTD	10.40	0.749	0.000

CONCLUSION

According to the study's findings, it was evident that the residents of Taiping possess a considerable understanding of e-bikes. The mean scores for awareness and attitudes were high. The data revealed that the residents of Taiping possessed a high level of awareness and attitude towards e-bikes. They demonstrated awareness and a willingness to ride e-bikes. The majority of participants expressed their willingness to make a contribution. The factors that influenced the residents of Taiping to donate to the proposed e-bike-sharing development project included bid, age, education level, income, and awareness. Personal demographics can influence an individual's behaviour and thoughts. Taiping residents showed their support for the e-bike-sharing project by willingly donating RM10.40. It is recommended to organise awareness campaigns to disseminate information about e-bike-sharing consistently. Possible campaign content may encompass details regarding the advantages and long-term viability of e-bike-sharing. In addition, organising an e-bike test ride event could allow residents to experience the e-bike firsthand, potentially influencing their perception of this mode of transportation. It is necessary to inform and communicate with the Taiping Municipal Council regarding the RM10.40 donation per person, as providing financial assistance to the project is a possibility. Local municipalities should consider developing a comprehensive and meticulously planned strategy when implementing the project.

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REFERENCES

Abdullah, Y. A., Jamaluddin, N. B., Yakob, H., Hassan, M. A., Nasrudin, N., Yusup, M., Ahmad Zaki, Z., & Zanudin, K. (2022). Urban governance approaches for low carbon cities. The case of Shah Alam local government, Malaysia. *PLANNING MALAYSIA*, *20*. https://doi.org/10.21837/pm.v20i23.1169

Abdul Latip, N., & Umar, M. U. (2022). A sustainable carbon footprint analysis for the city of Kuantan, Pahang Malaysia. *PLANNING MALAYSIA*, *20*. https://doi.org/10.21837/pm.v20i23.1147

Alejandro, L. F. (2012). Introduction to contingent valuation using Stata. MPRA Paper, Munich Personal RePEc Archive, 41018, 1–16.

Apostolou, G., Reinders, A., & Geurs, K. (2018). An overview of existing experiences with solar-powered e-bikes. *Energies*, *11*(8), 2129. https://doi.org/10.3390/en11082129

Arif, Z. M. (2019, March 7). Taiping is No 3 most sustainable city in the world. *New Straits Times*. https://www.nst.com.my/news/nation/2019/03/466934/taiping-no-3-most-sustainable-city-world

Azevedo, B. F., Metzger, K., & Pereira, A. I. (2023). A comprehensive data analysis of e-bike mobility and greenhouse gas emissions in a higher education community: IPBike study of case. *SN Applied Sciences*, *5*(11), 1–17. https://doi.org/10.1007/s42452-023-05504-7

Bai, L., Sze, N. N., Liu, P., & Guo Haggart, A. (2020). Effect of environmental awareness on electric bicycle users' mode choices. *Transportation Research Part D: Transport and Environment*, *82*, 102320. https://doi.org/10.1016/j.trd.2020.102320

Bera, R., & Maitra, B. (2021). Analysing prospective owners' choice decision towards plug-in hybrid electric vehicles in urban india: A stated preference discrete choice experiment. *Sustainability*, *13*(14), 7725. https://doi.org/10.3390/su13147725

Bieliński, T., & Ważna, A. (2020). Electric scooter sharing and bike sharing user behaviour and characteristics. *Sustainability*, *12*(22), 9640. https://doi.org/10.3390/su12229640

Calia, P., & Strazzera, E. (2000). Bias and efficiency of single versus double bound models for contingent valuation studies: A Monte Carlo analysis. *Applied Economics*, *32*(10), 1329–1336. https://doi.org/10.1080/000368400404489

Chen, C.-F., & Chao, W.-H. (2011). Habitual or reasoned? Using the theory of planned behavior, technology acceptance model, and habit to examine switching intentions toward public transit. *Transportation Research Part F: Traffic Psychology and Behaviour*, *14*(2), 128–137. https://doi.org/10.1016/j.trf.2010.11.006

Department of Statistics, Malaysia. (2022, November). *My local stats perak 2021*. Department of Statistics, Malaysia. https://www.perak.gov.my/images/menu_utama/ms/kerajaan_negeri/data_UPEN/MyLocalStatsPerak/Perak/MLSNPerak2021.pdf

Dora, R., & Gouse Basha, M. (2023). Materials for e-bike and end to end design aspects. *Materials Today: Proceedings*. https://doi.org/10.1016/j.matpr.2023.05.519

Gojanovic, B., Welker, J., Iglesias, K., Daucourt, C., & Gremion, G. (2011). Electric bicycles as a new active transportation modality to promote health. *Medicine & Science in Sports & Exercise*, *43*(11), 2204–2210. https://doi.org/10.1249/mss.0b013e31821cbdc8

Guerra, E. (2019). Electric vehicles, air pollution, and the motorcycle city: A stated preference survey of consumers' willingness to adopt electric motorcycles in Solo, Indonesia. *Transportation Research Part D: Transport and Environment*, *68*, 52–64. https://doi.org/10.1016/j.trd.2017.07.027

Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Evaluation of reflective measurement models. In *Classroom Companion: Business* (pp. 75–90). Springer International Publishing. http://dx.doi.org/10.1007/978-3-030-80519-7_4

Handy, S. L., & Fitch, D. T. (2020). Can an e-bike share system increase awareness and consideration of e-bikes as a commute mode? Results from a natural experiment. *International Journal of Sustainable Transportation*, *16*(1), 34–44. https://doi.org/10.1080/15568318.2020.1847370

Jaensirisak, S., Luathep, P., & Paksarsawan, S. (2017). Willingness and ability to pay for a new public transport: A case study of Korat City, Thailand. *Journal of the Eastern Asia Society for Transportation Studies*, *12*, 2310–2320. https://doi.org/10.11175/easts.12.2310

Kamri, T. (2013). Willingness to pay for conservation of natural resources in the Gunung Gading National Park, Sarawak. *Procedia - Social and Behavioral Sciences*, *101*, 506–515. https://doi.org/10.1016/j.sbspro.2013.07.224

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30*(3), 607–610. https://doi.org/10.1177/001316447003000308

Li, R., Krishna Sinniah, G., & Li, X. (2022). The factors influencing resident's intentions on e-bike sharing usage in China. *Sustainability*, *14*(9), 5013. https://doi.org/10.3390/su14095013

Li, W., Long, R., Chen, H., Chen, F., Zheng, X., He, Z., & Zhang, L. (2020). Willingness to pay for hydrogen fuel cell electric vehicles in China: A choice experiment analysis. *International Journal of Hydrogen Energy*, *45*(59), 34346–34353. https://doi.org/10.1016/j.ijhydene.2020.01.046

Loh, I. (2022, February 12). New road near Taiping Lake Gardens to ease traffic situation. *The Star*. https://www.thestar.com.my/metro/metro-news/2022/02/12/new-road-near-taiping-lake-gardens-to-ease-traffic-situation

Mamat, M. P., Abdullah, M., Hassin, N. H., & Tuan Hussain, F. N. (2020). Economic valuation of nature area of sultan ismail petra ecosystem protection park (pergau lake), malaysia. *IOP Conference Series: Earth and Environmental Science*, *549*(1), 012092. https://doi.org/10.1088/1755-1315/549/1/012092

Markandya, A., Ortiz, R. A., & Chiabai, A. (2019). Estimating environmental health costs: General introduction to valuation of human health risks. In *Encyclopedia of Environmental Health* (pp. 719–727). Elsevier. http://dx.doi.org/10.1016/b978-0-12-409548-9.10657-8

McQueen, M., MacArthur, J., & Cherry, C. (2020). The E-Bike Potential: Estimating regional e-bike impacts on greenhouse gas emissions. *Transportation Research Part D: Transport and Environment*, *87*, 102482. https://doi.org/10.1016/j.trd.2020.102482

Ministry of Energy, Green Technology and Water Malaysia. (2017). *Low Carbon Cities Framework*. Ministry of Energy, Green Technology and Water Malaysia. https://www.lccf.my/wp-content/uploads/2018/10/LCCF_Book-Version-2-2017.pdf

National Low Carbon Cities Masterplan. (2021). Ministry of Environment and Water (KASA). https://www.kasa.gov.my/resources/alam-sekitar/NLCCM.pdf

Nautiyal, H., & Goel, V. (2021). Sustainability assessment: Metrics and methods. In *Methods in Sustainability Science* (pp. 27–46). Elsevier. http://dx.doi.org/10.1016/b978-0-12-823987-2.00017-9

Official Website of the Larut Matang & Selama District and Land Office - PDT Taiping - E-Tanah Perak. (n.d.). Retrieved May 6, 2023, from https://ptg.perak.gov.my/portal/en/web/taiping

Portal Rasmi Majlis Perbandaran Taiping. (2024, January 2). *Pemasangan lampu solar led di taman tasik taiping*. Portal Rasmi Majlis Perbandaran Taiping.

https://www.mptaiping.gov.my/index.php/informasi/aktiviti/pemasangan-lampu-solar-led-di-taman-tasik-taiping

Rosnan, H., & Abdullah, N. C. (2018). An exploratory study of bicycle sharing in malaysia. *Journal of ASIAN Behavioural Studies*, *4*(12), 25–36. https://doi.org/10.21834/jabs.v4i12.327

Son, J.-H., Kim, J., Lee, W., & Han, S. (2022). Willingness to pay for the public electric bus in Nepal: A contingent valuation method approach. *Sustainability*, *14*(19), 12830. https://doi.org/10.3390/su141912830

Thakur, B. K., Gupta, V., Bhattacharya, P., & Chakraborty, T. (2022). Impact of socioeconomic factors on households' willingness to pay for arsenic-free safe drinking water - A case study of Bihar, India. *Groundwater for Sustainable Development*, *19*, 100837. https://doi.org/10.1016/j.gsd.2022.100837

The official portal of the perak government. (n.d.). Retrieved May 6, 2023, from https://www.perak.gov.my/index.php/en/

Wynd, C. A., Schmidt, B., & Schaefer, M. A. (2003). Two quantitative approaches for estimating content validity. *Western Journal of Nursing Research*, *25*(5), 508–518. https://doi.org/10.1177/0193945903252998

Yang, H., Liu, X., Su, F., Cherry, C., Liu, Y., & Li, Y. (2018). Predicting e-bike users' intention to run the red light: An application and extension of the theory of planned behavior. *Transportation Research Part F: Traffic Psychology and Behaviour*, *58*, 282–291. https://doi.org/10.1016/j.trf.2018.05.027

Zhang, Z., Sheng, N., Zhao, D., Cai, K., Yang, G., & Song, Q. (2023). Are residents more willing to buy and pay for electric vehicles under the "carbon neutrality"? *Energy Reports*, *9*, 510–521. https://doi.org/10.1016/j.egyr.2022.11.206

Zheng, Y., Ma, Y., Easa, S. M., Hao, W., & Feng, Z. (2023). Nomophobia, attitude and mobile phone use while riding an E-bike: Testing a dual-process model of self-control. *Accident Analysis & Prevention*, *185*, 107032. https://doi.org/10.1016/j.aap.2023.107032

Zhu, L., Song, Q., Sheng, N., & Zhou, X. (2019). Exploring the determinants of consumers' WTB and WTP for electric motorcycles using CVM method in Macau. *Energy Policy*, *127*, 64–72. https://doi.org/10.1016/j.enpol.2018.12.004

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