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Driving the Transition to Sustainable Self-Driving Tourism: Domestic Tourists' Electric Vehicle Adoption Intentions in China

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Abstract

Tourism is a key driver of economic growth, yet unmanaged tourist activities can intensify environmental degradation, particularly through increased CO_2 emissions from transportation. In China, where over 58 major tourist destinations face urgent air pollution challenges, integrating electric vehicles (EVs) into tourism presents a promising solution. This study applies the Unified Theory of Acceptance and Use of Technology (UTAUT) to develop a conceptual framework that examines domestic tourists' intentions to adopt EVs for self-driving travel as a functional, technology-driven decision, with government support as a moderating factor. Based on 342 valid responses, measurement and structural analyses were conducted. The findings revealed that five of the direct hypotheses (i.e., performance expectancy, effort expectancy, social influence, perceived risk, and charging infrastructure) were found supported and government support is found strengthen the relationship between performance expectancy and EVs adoption intention in the Western Sichuan Loop of China context. Both the theoretical and practical implications of the study were further discussed in the manuscript.

Keywords: Driving Factors, Ev-Adoption, Self-Driving Routes, Government Support, China

Background

Globally, tourism plays an important role in contributing to countries' economic growth (UN Tourism, 2023) and is recognized as a key driver of socio-economic contributions to enhance the well-being of rural communities (Elgin & Elveren, 2024). According to the World Travel and Tourism Council, the global tourism and travel industry can account for 9% of the world's direct gross domestic product (GDP), as well as providing 120 million direct jobs and 125 million indirect jobs worldwide (Michailidou et al., 2016). However, it is noticeable that with the uncontrolled, overcrowded, and ill-planned tourist activities can have an adverse impact on the environment, particularly on global climate change (Baloch et al., 2022).

In the China context, carbon emissions from tourism and the tourism industry are one of the important factors affecting the ecological environment and restricting the development of low carbon tourism. (Cao et al., 2022) demonstrated that tourism traffic, tourism catering, tourism accommodation, and tourism activities belong to the main sources of carbon emissions from tourism in Guilin, China. It is also confirmed that tourism traffic accounts for the largest proportion of carbon emissions, accounting for 75% of the whole industry. Hence, integration of EVs adoption within the tourism sector in China is indeed an intriguing and potentially impactful research avenue.

China's domestic tourism has become an important activity. In 2019, China hosted over 6 billion domestic travellers. In the first three quarters of 2022, the number of Chinese domestic tourists was 2.094 billion, and the domestic tourism income (total domestic tourism consumption) was 1.72 trillion yuan. This could be possibly due to the rising incomes, more holidays, well-built roads, and fast-growing private car ownership. Besides, self-drive tourism has become a popular choice of travel mode for Chinese tourists over years (Jennings, 2024). Although, driving tourism is generally more popular in Western countries and are an important part of the tourism industry, however, it is also becoming one of the favourite travel modes for local Chinese to explore the country. In the realm of self-drive tourism, travellers have a range of options available to them, including both shorter day trips and longer journeys encompassing various modes of transportation such as cars, motorcycles, four-wheel drive vehicles (4WDs), and recreational vehicles (RVs) (Prideaux & Carson, 2011).

Therefore, the intersection of EVs adoption and tourism offers a unique opportunity to explore sustainable practices in a rapidly growing industry. The integration of EVs in tourism can enhance environmental sustainability such as reductions in CO2 (Wang et al., 2024), indirectly improve tourist experiences (Prakhar et al., 2024) and contribute to the broader goals of reducing carbon emissions and promoting green tourism (Chen et al., 2024). However, the success of EVs adoption depends on tourists' attitudes and willingness to embrace new technologies as well as the industry's ability to provide seamless and convenient experiences. Hence, understanding domestic tourists' perceptions of EVs adoption in China is crucial as China transitions towards sustainable transportation, domestic tourists represent a significant segment whose preferences and behaviors can influence the broader adoption of EVs (Wu et al., 2021).

Theoretically, different theory was adopted by past research to explore EVs adoption or usage intention, such as UTAUT (Alwadain et al., 2024; Handopo & Pinces, 2024; Wang, Ozden, & Tsang, 2023), UTAUT2 (Ahmad, Chaveeesuk, & Chaiyasoonthorn, 2024), TPB (Hull et al., 2024), and Stimulus-Organism-Response model (Zamil et al., 2023). For instance, studies that adopted UTAUT mainly examined the role of performance expectancy, effort expectancy, social influence, and facilitating condition on EVs adoption (Wang et al., 2024) without integrating the charging dimension. Moreover, it is essential to consider other factors such as perceived risks and government support as this could offer additional insights into the complexities of EV adoption among domestic tourists (Jain et al., 2021). Also, there is a notable lack of studies specifically examining domestic tourists' perspectives on EVs adoption. Most research tends to focus on broader consumer groups or international tourists, leaving a gap in understanding the unique needs and preferences of domestic tourists (Fitt, 2021).

In summary, this study adopted the UTAUT theory as the theoretical underpinning to guide the development of a conceptual framework to examine domestic tourists' intention to adopt EVs for self-driving when exploring tourism destinations in China, particularly in the Western Sichuan Loop. The adoption of UTAUT is important to review tourists' intention to adopt EVs for self-driving travel from a functional perspective and to inform technology-driven decisions. In specific, this study is intended to fulfil the following research objectives:

- to examine the influence of facilitating condition on EVs adoption intention,
- to determine the influence of effort expectancy on EVs adoption intention,
- to testify the influence of performance expectancy on EVs adoption intention,
- to reveal the influence of social influence on EVs adoption intention,
- to testify the influence of charging infrastructure on EVs adoption intention,
- to examine the influence of perceived risk on EVs adoption intention, and
- to explore the moderating role of government support on the proposed predictors on EVs adoption intention.

Theoretical Foundation and Literature Review

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh, Morris, Davis, and Davis in 2003. UTAUT is a developed theoretical framework that is used for explaining user intentions when adopting and using technology. UTAUT has integrated and synthesized the elements from eight previous models of technology adoption which include Technology Acceptance Model (TAM), Theory Planned Behaviour (TPB) and others (Dwivedi et al., 2019). This theory has pointed out that there are four key constructs in the determination of user intention and behaviour. The four constructs are performance expectancy, effort expectancy, social influence and facilitating conditions (Rahi et al., 2019). Performance expectancy means the degree to which using the technology is perceived in enhancing job performance and effectiveness. Effort expectancy means the ease of use that is associated with technology. Social influence means the extent to which users' perception affects the decision to use technology. Facilitating conditions means the degree to which users need necessary resources and support when using technology.

In the past, UTAUT has been used widely in the study of adoption and the use of diverse technological products in various contexts like consumer products (Hu et al., 2020), enterprise systems (Ling Keong et al., 2012), public and education technologies (Abbad, 2021), emerging technology (Slade et al., 2015) as well as electric vehicle (EV) (Jain et al., 2021). For consumer products, this theory has been applied to study on the adoption and usage of consumer technologies which focus on their perceptions and behavioural patterns. It mainly focusses on the adoption of smartphones, smart home systems and wearable devices (Hu et al., 2020). It also helps to understand the drivers of mobile application usage like banking, healthcare and social media applications. For enterprise systems, UTAUT has guided previous studies on the adoption of technologies that aimed for improving productivity and decision making, especially in organizational contexts. For EVs, UTAUT is relevant in EV adoption as both technological and societal factors play significant roles. Past studies have focused on the acceptance of EV-related technologies such as charging infrastructure, smart routing and energy management systems (Jain et al., 2021).

UTAUT is relevant in this study as it able to guide the development of the conceptual framework. It can examine the key predictors of EV adoption in the context of self-driving routes in China. This is because of the four constructs which are performance expectancy, effort expectancy, social influence and facilitating conditions. For users, they need to consider the value of using EVs such as efficiency, cost savings, sustainability benefits as well as long self-driving routes (Ryan, 2020). Furthermore, the ease of using EV-related technologies is crucial for adoption. For example, the autonomous systems and charging infrastructure of EV (Patil et al., 2022). Moreover, the social norms and the influences of peers and authorities will drive the adoption of EV. This includes government incentives and endorsements (Rezvani et al., 2015).

In China context, the availability of charging stations, autonomous driving support infrastructure and reliable route planning tools are influencing user's behaviour significantly (Teng et al., 2023). Therefore, UTAUT is adopted as one of the theories to guide the development of the conceptual framework to examine a list of predictors on EV adoption on self-driving routes in Western-Sichuan loop. Four of the suggested variables under UTAUT will be included as part of the study independent variables with extended two more variables, namely perceived risk and charging infrastructure.

Electrical Vehicle (EV) Adoption (Dependent Variables)

In the context of technology, adoption intention indicates the likelihood of a user in embracing and integrating new innovations into daily life. Especially for EV, adoption intention specifically refers to the degree to which individual is motivated to purchase and use EV as transportation. Past studies have examined various factors that could potentially influence EVs' purchasing or adoption intention. For instance, this intention will be shaped by factors such as environmental awareness, energy savings, lower fuel consumption, availability of charging infrastructure and the perceptions on performance and convenience (Singh et al., 2020). Moreover, EV adoption intention will also be influenced by social norms, government policies and incentives (Wang et al., 2021). Some existing research emphasized the factors like infrastructure availability, environmental benefits and government incentives. In developed regions such as Europe and United States (US), their EV adoption intention is influenced by environmental consciousness, supportive government policies (subsidies and tax breaks) and advanced charging networks (Broadbent et al., 2018; Javadnejad et al., 2024).

On the other hand, support from government is another important factor in influencing EVs adoption intention. For instance, the government of Malaysia is supportive in introducing the incentives (e.g., reduced import duties and tax exemptions) for encouraging EV purchases although the awareness still remains low (Veza et al., 2022). As for China, it has the world largest EVs market which present unique adoption dynamics. Government support through subsidies, tax breaks and investments in the manufacturing of EV is found to be important in the context of China (Zhao et al., 2024). This has boosted adoption significantly. Moreover, in recognition of the importance of charging infrastructure and coverage, China focusing on building an extensive network on charging stations in the urban areas as well as slowly trying to cover the rural areas with the aimed to address the major facilitating condition (Yong et al., 2023). As there is a growing concern on air quality, China has made EV an attractive option for environmentally conscious consumers (Lin & Wu, 2018). Government campaigns and peer

pressure have contributed to this perception which EV is the future of transportation (Ehsan et al., 2024).

Literature Review and Hypotheses Development

2.3.1 Performance Expectancy and EV Adoption (H1)

Performance expectancy is a critical construct in UTAUT. It refers to the extent to which an individual believes that using a technology able to result in gaining significant personal and professional benefits and task performance such as improving efficiency, saving costs and increasing convenience (Rahi et al., 2019). Existing studies have integrated performance expectancy with other factors like effort expectancy (ease of use) and social influence (Rahi et al., 2019; Abdekhoda et al., 2022; Kaluarachchi & Nagalingam, 2024) to examine various technological products adoption intention including EVs (Habib et al., 2024; Qadir et al., 2024; Zhao et al., 2022). Past studies have proven that there is a positive significant relationship between performance expectancy and EV adoption. For instance, Countries like Japan and South Korea, the high performance of EV that coupled with robust charging networks have driven the adoption (Masiero et al., 2017). In construct with developed countries, developing economies often face challenges on inadequate infrastructure which will inhibit performance expectancy and slow uptake (Namatovu et al., 2021). Thus, the proposed hypothesis is as follows:

H1: Performance expectancy is positively related to EVs adoption intention.

Effort Expectancy and EV Adoption (H2)

Effort expectancy refers to the perceived ease of use that is associated with a technology, innovation or system (Rahi et al., 2019). This relates with the intuitive, simpleness and user-friendly of a product and service to potential users (Ilieva et al., 2024). Effort expectancy plays a crucial role on the determination of individual intention in adopting and using technology continuously. To gain quicker acceptance on users and customers, technologies need to minimize complexity and provide seamless user experiences (Hoyer et al., 2020). This is critical as people, especially non-technical users, often resist adopting new technology when it is over complex and burdensome. This makes construction critical in the study of technology adoption in sectors where comfort and efficiency of user are paramount such as vehicle, education (Faqih & Jaradat, 2021), healthcare (Sadoughi et al., 2020) and organization management (Gupta et al., 2008). In vehicle context, effort expectancy has been studied extensively on the focus on emerging technologies like autonomous vehicles (AVs), EVs and connected car systems (Curtale et al., 2021).

Effort expectancy plays a pivotal role in the adoption of EV globally as it refers to the perceived ease of use which is associated with a technology (Abbad, 2021). In worldwide context, as the environmental benefits of EV are drawing attention increasingly, the ease of consumers incorporation the vehicle seamlessly into their daily lives have become a crucial factor in the determination of adoption rate (Zaino et al., 2024). Despite these advancements, some challenges have persisted especially in China rural areas where charging facilities are less accessible (Yu & Zhao, 2021). Although the challenges happened, China can also dominate the global EV market through focusing on the improvement of user experience like user-friendly charging infrastructure and real-time charging station locators (Mastoi et al., 2022). This showcases how effort expectancy can drive the adoption of sustainable technologies when integrating a well-coordinated national strategy. The combination of these factors has

created perception of convenience and simplicity and thus encourage adoption on self-driving routes of EV. The above discussion led the researcher to formulate the following hypothesis:
H2: Effort expectancy is positively related to EVs adoption intention.

Social Influence and EV Adoption (H3)

Social influence is a key construct in UTAUT as it refers to the degree to which individuals perceived and expected when they adopt and use a particular technology (Rahi et al., 2019). This can include peers, pressure (Brechwald & Prinstein, 2011), family, social norms, recommendations (Fraser & Brown, 2002) and authority figure endorsements (Abrahamse & Steg, 2013). This concept focuses on the role of external social pressures, normative beliefs and the desire on social acceptance to shape behavioural intentions (Joa & Magsamen-Conrad, 2021). According to Kim et al. (2024), social influence emphasizes the importance of expectations and endorsements to motivate individuals to embrace new technologies. Its impact can be strong when social status, identity and cultural norms are at stake. This is because the thoughts, behaviours and decisions of individuals are being shaped by the perceptions, actions as well as the expectations of others within their social environment (Bandura, 1999).

Social influence plays a crucial role in shaping the behaviour of consumers, especially in innovative technologies adoption such as EV (Sovacool, 2017). Social influence operates at multiple levels from personal networks to larger societal forces (Graf-Vlachy et al., 2018). In global context, social influence manifests through cultural norms, media narratives and influential groups' actions like governments, celebrities and early adopters (Wei et al., 2021). This can create a dynamic environment where the adoption of EV can either be accelerated or hindered based on collective attitudes and perceptions (Chen et al., 2024). The above discussion led the researcher to formulate the following hypothesis:
H3: Social influence is positively related to EVs adoption intention.

Facilitating Condition and EV Adoption (H4)

Facilitating condition that defined in UTAUT refers to the degree to the environmental and organizational resources that support individual's use of a technology (Abbad, 2021). Essentially, it represents the external factors that able to help users in adopting and utilizing technology. The factors include infrastructure availability, technical support, compatibility with existing systems and access on knowledge and training (Kijsanayotin et al., 2009). The relationship between facilitating condition and EV adoption is deeply intertwined as the conditions form the foundation on the building of EV which include consumer confidence, convenience and affordability (Eccarius & Chen, 2024). The adoption of EV will be influenced by various factors in which facilitating conditions plays a critical role among others. Facilitating conditions refers to the external infrastructure, policies and resources that enable individuals to embrace EV technology (Sovacool, 2017). In China, facilitating condition plays an unparalleled role in driving the adoption of EV. The country has boosted the world largest public charging stations and networks as both manufacturers and buyers are supported by government subsidies (LaMonaca & Ryan, 2022). The above discussion led the researcher to formulate the following hypothesis:
H4: Facilitating condition is positively related to EVs adoption intention.

Perceived Risk and EV Adoption (H5)

Perceived risk is a psychological construct which refers to the uncertainty level that an individual feels regard to the potential negative consequences of a decision (Mitchell, 1999). This often happens especially in the context of adopting new technology and making purchases (Kim et al., 2008). Perceived risk can be considered as subjective judgement as it will influence both personal experiences of individual (Williams & Noyes, 2007) and external factors. In the context of EVs, Qian and Yin (2017) and Christensen et al. (2021) have examined the role of perceived risk in influencing EVs use intention.

The relationship between perceived risk and EV adoption is complex and multifaceted. The adoption of EV is a global trend to promote sustainability which is driven by environmental concerns, technological advancements and government policies (Kumar & Alok, 2020). Perceived risks are influencing the decisions of consumers on EV adoption significantly (Featherman et al., 2021). Financial risks come from high EV upfront costs, uncertainties on long-term maintenance costs and resale value compared to traditional internal combustion engine vehicles (Nykvist et al., 2019). Besides, functional risks are the concerns on battery range, charging infrastructure availability and diverse driving conditions and reliability (Das et al., 2020). Social risks are arising from potential stigma and negative perceptions on EV in certain communities (Krishna, 2021). A number of past studies found that there is a negative and significant relationship between perceived risk and EV adoption. For instance, in Asia-Pacific region, the dynamics of perceived risk and EV adoption differentiate based on economic development and government intervention (Han et al., 2024). Thus, the proposed hypothesis is as follows:

H5: Perceived risk is negatively related to EVs adoption intention.

Charging Infrastructure and EV Adoption (H6)

Charging infrastructure refers to the physical facilities and digital systems network that are designed and supported for recharging EV to enable the operation and widespread use of EV (Das et al., 2020). This includes charging stations, electric vehicle supply equipment (EVSE), various power output connectors (Level 1, Level 2 and DC fast charging) (Khan et al., 2018), payment processing software, energy management and user interaction (Liu et al., 2022). Charging infrastructure plays a vital role in the adoption of technology as it able to address range anxiety which is considered as a key psychological barrier on the uptake of EV (White et al., 2022).

The relationship between charging infrastructure and EV adoption is dynamic and interdependent. It is a cornerstone of EV ecosystem as it influences consumer confidence, market expansion and overall adoption rates (Lanzini, 2024). Charging infrastructure serves as a backbone on the operations of EV. It is considered as one of the most significant barriers on the ownership of EV which is range anxiety (Noel et al., 2019). Without extensive, accessible and reliable charging network, potential users of EV may hesitate in transitioning from internal combustion engine vehicles (Adhikari et al., 2020). This is due to the concerns about power shortage during trips especially in rural and underserved areas. The relation of charging infrastructure and EV adoption is cyclical. This is because advance charging infrastructure drives EV demand and adoption while greater EV adoption incentives infrastructure investments (Kumar et al., 2021). The above discussion led the researcher to formulate the following hypothesis:

H6: Charging infrastructure is positively related to EVs adoption intention.

Government Support Moderates the Proposed Predictors and EV Adoption (H7-H12)
Government support is defined as the role of government in promoting and encouraging the implementation and usage of technology (Tornatzky & Fleischer, 1990). Based on the review of literature, government support not just being examined as a direct relationship, in fact various studies have collectively underscore the importance of government support as a moderating factor in various entrepreneurial and business contexts (Hyun, 2023; Majeed et al., 2022; Yaseen et al., 2024) as well as tourism (Moslehpour et al., 2023) and technological related context (Jais & Ngah, 2024). a recent study that focused on Malaysian government agencies' adoption of chatbot included government support as a moderator variable and found that government support strengthened the relationship between technology readinesses, organizational readiness on chatbot adoption intentions (Jais & Ngah, 2024). In short, government support is adopted as the moderator variable to examine its impact in strengthening the relationship between the proposed predictors (i.e., performance expectancy, effort expectancy, social influence, facilitating condition, perceived risk, and charging infrastructure) on EV adoption on self-driving routes in Western Sichuan Loop of China.

Based on the review of literature, government support is a multifaceted concept that encompasses various forms of assistance provided by the state to stimulate economic activity, support businesses, and address public needs. This support can be financial, such as grants and subsidies, or non-financial, such as policy frameworks and infrastructure development (Rankhumise & Masilo, 2018). Government support plays a significant role in moderating the relationship between effort expectancy and the intention to adopt EVs. This support can manifest in various forms, such as financial incentives, infrastructure development, and policy frameworks, which collectively influence consumer perceptions and adoption intentions. Government incentives, such as tax benefits and subsidies, are crucial in reducing the perceived financial burden of adopting EVs. In Thailand, fiscal incentives were found to significantly influence consumer decisions by enhancing the perceived economic benefits of EVs, thereby increasing adoption intentions (Chonsalasin et al., 2024).

For instance, in Indonesia, while social influences did not emerge as significant drivers of EV adoption, favorable government regulations and financial incentives were crucial. This suggests that government support can mitigate the lack of social influence by providing tangible benefits and reducing perceived risks (Handopo & Princes, 2024). Government support plays a crucial role in moderating social influence and the intention to adopt EVs. With the presence of strong facilitating conditions, supported by government initiatives, can enhance the perceived value and usability of EVs, thereby increasing adoption intention. Government support can amplify the positive effects of facilitating conditions by ensuring that necessary infrastructure and services are in place (Shetty & Rizwana, 2024).

Government support, particularly in the form of financial incentives, has been shown to reduce the perceived risk associated with EVs adoption. In India, government incentives were found to moderate the negative impact of perceived risk on adoption intention, making consumers more likely to consider purchasing EVs despite potential concerns about technology or infrastructure limitations (Jain et al., 2022). Charging infrastructure and

government support are two important factors influencing EV market adoption. In Indonesia, a study by Bachtiar et al. (2024) highlighted the need for collaboration among policymakers, industry players, and infrastructure developers to create an enabling environment for EV. In the case of Russia, government support measures are crucial for developing the charging infrastructure market (Musayeva et al., 2024). Hence, it is proposed that government support plays a crucial role in moderating the relationship between charging infrastructure and the adoption intention of EVs. Based on the review of literature, the following hypotheses were proposed:

H7: Government support moderates performance expectancy and EVs adoption intention.
H8: Government support moderates effort expectancy and EVs adoption intention.
H9: Government support moderates social influence and EVs adoption intention.
H10: Government support moderates facilitating condition and EVs adoption intention.
H11: Government support moderates perceived risk and EVs adoption intention.
H12: Government support moderates charging infrastructure and EVs adoption intention

Through the review of literature, a total of 12 hypotheses were proposed with six direct and six moderations. A conceptual framework was formed (see Figure 1) guided by UTAUT theory.

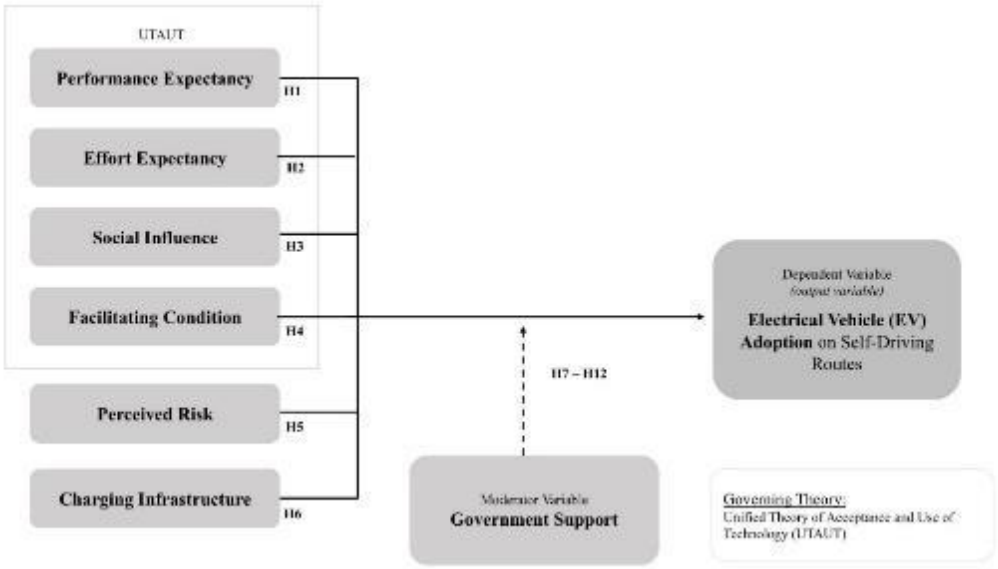


Figure 1 Conceptual Framework
(*Source*: Governed by UTAUT Theory and Developed by the Researchers)

Methodology

In the present study, a quantitative approach was adopted for data collection, the use of numerical measurement and analysis to determine the existence of a possible relationship between the independent variables, moderator variable and dependent variable. This study used a non-probability sampling method, specifically using purposive sampling techniques via distribution of questionnaires for data collection. The population of the present study consisted of domestic tourist that visited Western Sichuan Loop of China. The targeted respondents were at the age of 18 years old and above.

G*power 3.1.9.4 software (Faul et al., 2009) was used to calculate the minimum sample size. With a medium effect size, 0.05 significant level, and the maximum number of predictors of

13, the results indicated that a minimum of 189 respondents are required to test the conceptual model (see Figure 1). The platform "*Sojump*" or best known as "*Wen Juan Xing"* was used as the main platform for data collection. The questionnaire used are prepared in two languages, namely, Chinese and English. The measurement items were adapted from the past studies and slightly amend to fit the context of self-driving routes in China. Tourists were given 15 minutes to complete the questionnaire. However, due to partial of the respondents who were in their older age, a face-to-face interview was employed to collect the data from part of the domestic tourists, especially those who are older in age.

Findings

A total of 383 rows of data were collected. Prior to commencing with frequency, measurement and structural analysis, a series of data cleaning were performed to ensure the data is free from missing data and straight lining issues. Out of the 383 data collected, a total of 41 sets of data were removed due to straight lining issues. Hence, a total of 342 row of usable data were collected from domestic tourists visited Sichuan Province of China.

In this study, the researcher used confirmatory factor analysis (CFA) to assess the model's reliability, convergent, and discriminant validity. To ensure internal consistency, loading values for each item should exceed 0.50 to be considered acceptable (Bagozzi & Yi, 1988), while the threshold of values for composite reliability (CR) is set at 0.70 (Hair et al., 2021). Additionally, to ensure convergent validity, the minimum cut-off point for average variance extracted (AVE) should be 0.50 to be considered acceptable (Fornell & Larcker, 1981). As a result, this model had good reliability and validity because all loading, CR, and AVE values in this study achieved the minimum cut-off point (see Table 1). The discriminant validity of constructs using HTMT criterion were also reported in Table 2. All the values were below the threshold of 0.85 or 0.90, hence there is no multicollinearity issue detected.

Table 1
The Results of Measurement Model.

Constructs	Items	Loadings	CR	AVE
Charging Infrastructure	ChargingInfr_01	0.818	0.841	0.726
	ChargingInfr _02	0.885		
EV Adoption	EVAdoption_01	0.770	0.896	0.633
	EVAdoption _02	0.798		
	EVAdoption _03	0.872		
	EVAdoption _04	0.764		
	EVAdoption_05	0.769		
Effort Expectancy	EffoExpec_01	0.750	0.786	0.551
	EffoExpec _03	0.695		
	EffoExpec _04	0.780		
	FaciCondi_01	0.892	0.940	0.797

Facilitating Condition	FaciCondi_02	0.900		
	FaciCondi_03	0.882		
	FaciCondi_04	0.895		
Government Support	GovSupport_01	0.770	0.857	0.547
	GovSupport_02	0.759		
	GovSupport_03	0.781		
	GovSupport_05	0.658		
	GovSupport_06	0.724		
Performance Expectancy	PerExpec_01	0.803	0.926	0.759
	PerExpec_02	0.878		
	PerExpec_03	0.910		
	PerExpec_04	0.889		
Perceived Risk	PerRisk_01	0.837	0.837	0.563
	PerRisk_02	0.705		
	PerRisk_03	0.773		
	PerRisk_04	0.678		
Social Influence	SoInfluence_01	0.833	0.880	0.651
	SoInfluence_02	0.860		
	SoInfluence_03	0.895		
	SoInfluence_04	0.608		

Table 2
Discriminant Validity of Constructs (HTMT Criterion).

	1	2	3	4	5	6	7	8
1. Charging Infrastructure								
2. EV Adoption Intention	0.688							
3. Effort Expectancy	0.777	0.725						
4. Facilitating Condition	0.096	0.029	0.095					
5. Government Support (M)	0.563	0.616	0.825	0.147				
6. Perceived Risk	0.156	0.188	0.407	0.105	0.493			
7. Performance Expectancy	0.303	0.501	0.618	0.118	0.649	0.277		
8. Social Influence	0.245	0.511	0.597	0.103	0.851	0.562	0.569	

After achieving a satisfactory level of measurement model, the researchers proceed to the evaluation of the structural model. Hypothesis testing was conducted using a bootstrapping method with 5,000 re-samples to generate path coefficients (β), t-values, and p-values (see

Table 3 and Figure 2). For the one-tailed hypothesis test, hypotheses were considered supported when p-values ≤ 0.01 or 0.05 and t-values ≥1.645 or 2.33 (Chin, 1998).

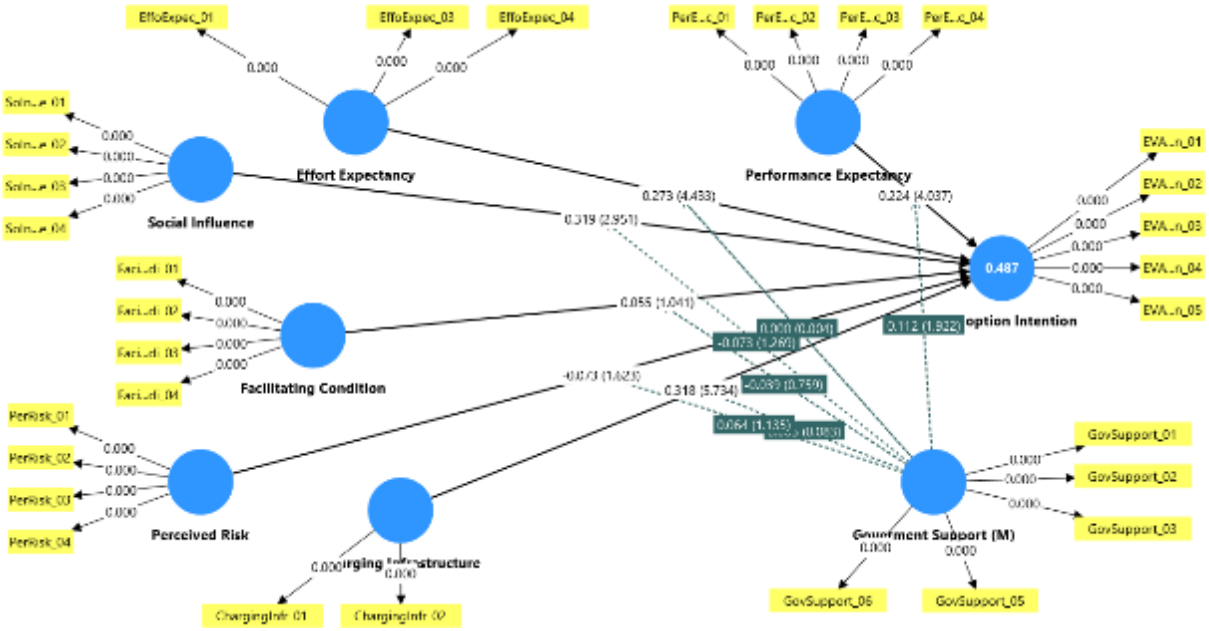


Figure 2 Research Model with P-values

Table 3

Results of Path Coefficient and Hypotheses Findings.

H	Relationship	Std. Beta	Std. Dev	t-values	P values	Decision
Direct						
H1	PE → EV Adopt	0.224	0.056	4.037	0.000	**S**
H2	EE → EV Adopt	0.273	0.062	4.433	0.000	**S**
H3	SI → EV Adopt	0.319	0.108	2.951	0.002	**S**
H4	FC → EV Adopt	0.055	0.053	1.041	0.149	NS
H5	PR → EV Adopt	-0.073	0.045	1.646	0.050	**S**
H6	CI → EV Adopt	0.318	0.055	5.734	0.000	**S**
Moderating						
H7	GS * PE → EV Adopt	0.112	0.058	1.922	0.027	**S**
H8	GS * EE → EV Adopt	0.000	0.059	0.004	0.498	NS
H9	GS * SI → EV Adopt	-0.073	0.058	1.269	0.102	NS
H10	GS * FC → EV Adopt	-0.039	0.051	0.759	0.224	NS
H11	GS * PR → EV Adopt	0.064	0.056	1.135	0.128	NS
H12	GS * CI → EV Adopt	0.005	0.055	0.083	0.467	NS

Note: p < 0.01, t > 2.33 or p < 0.05, t > 1.645; **S** = **Supported**, NS = Not Supported, H = Hypothesis, CI = Charging Infrastructure, EV Adopt = Electrical Vehicle Adoption Intention, EE = Effort Expectancy, FC = Facilitating Condition, GS = Government Support, PR = Perceived Risk, PE = Performance Expectancy, and SI = Social Influence.

(**Source:** Researcher's own compilation)

In short, as shown in Table 3, five out of the six direct hypotheses tested were found supported, namely H1, H2, H3, H5, and H6. Besides, out of the six proposed moderating hypotheses, H7 was found to be supported. The findings of this study highlight five key

determinants influencing domestic tourists' adoption of EVs for self-driving tourism, namely effort expectancy, performance expectancy, social influence, perceived risk, and charging infrastructure as well as the moderating role of government support in strengthening perceived usefulness and EVs adoption intention.

Discussion and Conclusion

Out of the 12 hypotheses tested, 5 (H1, H2, H3, H5, & H6) of the direct hypotheses and one moderating hypothesis (H7) were found to be supported. The findings of this study indicate that performance expectancy has a positive and significant influence on EVs adoption intention among domestic tourists who engage in self-driving routes along the Western Sichuan Loop. The statistical results ($\beta = 0.222$, $t = 4.059$, $p < 0.001$) confirm that H1 is supported. This suggests that tourists are more likely to adopt EVs when they perceive that these vehicles can deliver reliable performance, efficiency and suitability for long-distance travel. In tourism-oriented self-driving contexts, performance expectancy becomes particularly critical because travellers must rely on vehicle endurance, battery range and operational reliability across unfamiliar and rural routes. These performance-related considerations shape the confidence of tourists directly in EVs as viable alternatives to conventional vehicles.

The empirical findings reveal that effort expectancy has a positive and significant effect on EVs adoption intention thereby supporting H2 ($\beta = 0.270$, $t = 4.428$, $p < 0.001$). This indicates that domestic tourists are more inclined to adopt EVs when they perceive the vehicles as easy to use, charge and integrate into their travel routines. In self-driving tourism where travellers often face unfamiliar road conditions and logistical uncertainties, perceived ease of use plays a crucial role in reducing stress and enhancing travel comfort. Simple charging procedures, intuitive vehicle interfaces and accessible digital navigation tools can contribute to lowering the perceived effort which associated with EV usage during long-distance trips. These factors reduce the cognitive and physical effort required to operate EVs collectively. This can make adoption more appealing, especially for individuals who have less experience in using technology or who are new to electric mobility.

The results demonstrate that social influence has a positive and significant impact on EVs adoption intention and thus supporting H3 ($\beta = 0.343$, $t = 2.959$, $p = 0.002$). Among the examined UTAUT-related constructs, social influence exhibits a strong effect relatively. This indicates that the adoption decisions of tourists are shaped substantially by societal norms, peer opinions and influential reference groups. In the context of self-driving tourism, social influence manifests through peer recommendations, visibility of EV usage and broader societal narratives. For example, recommendations from friends and family, observation of EV usage by other travellers and exposure to broader societal narratives are framing EV adoption as environmentally responsible and technologically progressive.

The results of this study demonstrate that perceived risk has a negative and significant influence on EV adoption intention and thereby supporting H5 ($\beta = –0.079$, $t = 1.740$, $p = 0.041$). This finding indicates that higher levels of perceived risk reduce domestic tourists' willingness to adopt EVs for self-driving tourism. In the context of long-distance and rural-oriented travel routes such as the Western Sichuan Loop, perceived risks related to battery range, charging availability, safety concerns and unfamiliar driving conditions become

significantly salient. These uncertainties can discourage tourists from choosing EVs despite on the growing environmental awareness and policy support.

The findings reveal that charging infrastructure has a positive and significant effect on EVs adoption intention and thus supporting H6 ($\beta = 0.322$, $t = 5.774$, $p < 0.001$). This strong relationship indicates that the availability, accessibility and visibility of charging infrastructure play a decisive role in shaping tourists' willingness to adopt EVs for self-driving travel. In tourism contexts that involve long-distance routes and rural landscapes such as the Western Sichuan Loop, charging infrastructure influences travel feasibility and reduces range anxiety directly. Tourists are more likely to adopt EVs when they perceive that charging stations are sufficiently available along their travel routes.

The results indicate that government support positively moderates the relationship between performance expectancy and EVs adoption intention and thus supporting H12 ($\beta = 0.103$, $t = 1.757$, $p = 0.039$). This finding suggests that when government support is perceived to be high, the positive influence of performance expectancy on tourists' intention to adopt EVs becomes stronger. In the context of self-driving tourism along the Western Sichuan Loop, this moderation effect implies that even if tourists hold moderate expectations regarding EV performance, government support can reinforce their confidence and encourage adoption. Performance-related concerns such as driving range, battery reliability and vehicle efficiency are particularly salient in long-distance tourism routes while government intervention can helps mitigate uncertainty surrounding these concerns.

In short, as with any other studies, this study makes several theoretical and practical contributions. Theoretically, this study reinforces the continued relevance of the UTAUT in explaining EVs adoption intention by extending and contextualizing established technology adoption frameworks within the domain of EV use for self-driving tourism (Zhao & Simic, 2022). Specifically, this study proves the importance of performance expectancy, effort expectancy, social influence, charging infrastructure and reducing the perceived risk to enhance the adoption intention of EVs. Interestingly, this study also proves the role of government support in strengthening the relationship between performance expectancy of EVs adoption intentions.

From a practical perspective, particularly for government and policymakers, the findings underscore the pivotal role of institutional support in shaping domestic tourists' intentions to adopt EVs for self-driving travel within the tourism context. Besides, this study also provides several important practical implications for key stakeholders involved in the development and promotion of EVs adoption within self-driving tourism contexts, particularly along the Western Sichuan Loop (Zhao & Simic, 2022). These stakeholders include government authorities, tourism planners, EV manufacturers, charging infrastructure providers and domestic tourists. From government and policy-making perspective, the results highlight the central role of government support in shaping EV-related knowledge and awareness (Shu et al., 2022). The strong positive effect of government support on knowledge for EV suggests that continued investment in public education, policy communication and information dissemination is essential. Government agencies should prioritize initiatives that provide clear, accessible and practical information about EV usage, charging processes, incentives and route feasibility for self-driving tourists.

For tourism planners and destination management organizations, the findings emphasize the importance of integrating EV readiness into tourism infrastructure planning. Charging infrastructure was found to have a strong and direct effect on EV adoption intention which indicating that visible and accessible charging stations along self-driving routes are critical (Noel et al., 2019). Tourism authorities should collaborate with infrastructure providers to ensure that charging stations are strategically located at rest stops, scenic viewpoints, accommodations and popular attractions (Ji & Huang, 2018). Moreover, tourism operators can play an active role in promoting EV adoption by incorporating EV-friendly services into travel packages. With all the important components in place, it will lead to a higher adoption among domestic tourists on EVs adoption for self-driving routes to explore tourism destination particularly in the context of Western Sichuan of China.

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