WILEY | Hindawi

Research Article

The Car-Purchasing Intention of the Youth in the Context of Online Car-Hailing: The Extended Theory of Planned Behavior

Yihui Huang [iD],[1] Fei Yang,[1] Dong Zhang [iD],[2] and Zhennan Ding[1]

[1]*School of Transportation and Logistics, Southwest Jiaotong University, Chengdu 611756, China*
[2]*School of Transportation and Logistics, Dalian University of Technology, Dalian 116024, China*

Correspondence should be addressed to Dong Zhang; zhangdong@dlut.edu.cn

Online car-hailing services have become an integral part of people's daily travel in China. Considering that young people are the major consumer group in car purchases, it is worth investigating how the experience of online car-hailing services affects their intention to purchase a car. Based on the extended theory of Planned Behavior, this study found that the factors that negatively impact the car purchase intention of the youth are firstly the public transportation service quality, followed by the risks of private cars, and finally the online car-hailing services quality. Elevating the convenience and comfort of public transportation is conducive to reducing car purchasing intention. The indirect effect of online car-hailing services on car purchase intention is greater than its direct effect, and the most important factor is attitude. The car purchase intention is significantly heterogeneous across age and annual household income groups. Improving the convenience of public transportation will reduce the car purchase intention of people in the early youth. For middle and later youth, providing demand-responsive transit for important individuals to meet their diverse needs can reduce car purchase intention. As for online car-hailing services, youth care most about their convenience and comfort and worry most about their safety. Providing better online car-hailing services can reduce the car-purchasing intention of youth.

1. Introduction

Online car-hailing services, as a crucial form of shared mobility, are being used by an increasing number of young people in China with the popularization of online car-hailing applications such as Uber, Didi, and Gaode (AutoNavi) taxi.

There are divergences in the relationship between shared mobility and private car purchase. Some hold that shared mobility can shift individuals' dependence on traveling by private cars and reduce or postpone a car purchase [1, 2]; while some argue that shared mobility may be a compromise for individuals when they cannot afford cars, so shared mobility that appears in the transitional stage will prompt more individuals to buy private cars [3, 4]. According to China statistics, from 2016 to 2020, the number of new car registrations shows a slow downward trend from 2752 million units in 2016 to 2424 million units in 2020 [5]. At the same time, the number of people using online car-hailing services increased from 249.08 million in 2016 to 365.28 million in 2020, presenting an increase of 46% [6].

According to relevant reports, individuals aged 18 to 35 are most likely to purchase their first private car [7, 8]. The youth is at a special stage of life featured with open-mindedness and susceptibility to the influence of the external world. This period also witnesses the intensive occurrence of major life changes (such as marriage, childbirth, and migration). It has been found that major changes in life and long-term life-stage transitions impact household car ownership status [9, 10]. Youth as the core group of car buyers, their intention to purchase a car will trigger car purchase behavior. It has been found that car ownership is highly correlated with travel mode [11–13]. Then, once young people have their private cars, they are more likely to choose private cars over public transportation for travel in the future [14, 15]. However, as a populous country, China has only limited infrastructure resources. What is more, to

fulfill the objective of reducing carbon emissions, the government is prone to advocating public transportation and adjusting the travel structure. Therefore, this paper targets the young group, the major car purchasers, and explores the psychological mechanisms of their car purchase intentions in the era of online car-hailing.

In the era of online car-hailing, people regard online car-hailing as a new option in addition to traditional public transportation and private transportation. Suppose the model only considers the impact of online hailing services on car purchase intentions. In that case, the impact of online car-hailing services may be exaggerated, and the impact of improvements in other modes of transport neglected. Therefore, based on the Theory of Planned Behavior, this paper introduces the extended variables "perceived service quality of online car-hailing services," "perceived service quality of public transport," and "perceived risk of private cars" to investigate the impact of various factors on the car purchase intention.

This paper studies the factors and influencing mechanisms that affect car-purchasing intention in the era of online car-hailing services. The study has two features: one is that it is conducted among the youth, and the other is that it examines how public transportation, private transportation, and online car-hailing services affect car purchase intentions, respectively, in an environment where people can freely choose transportation modes. The rest of the paper is arranged as follows: The second section is a literature review that summarizes the previous studies; the third section constructs a model based on the Extended Theory of Planned Behavior; the fourth section displays the data collection and model modification; the fifth section reports the results of the model analysis in detail; the sixth section further concludes the study and puts forward feasible policies and measures.

2. Literature Review

Online car-hailing services, also known as carpooling, accurately match the demand and supply through the online scheduling of the platform or system [16]. Uber and Lyft Uber and Lyft, two of the most important online car-hailing service players, emerged in the United States in 2010. Subsequently, in 2016, ride-sourcing platforms such as Didi and Gaode Taxi became exceedingly popular in China. What kind of travel changes will online car-hailing services bring to Chinese people? Will it change the status of car ownership?

Most studies of shared mobility on car ownership concentrate on carsharing [17–19], and there are few studies about online car-hailing because the countries studied are mostly carsharing users. According to the US-based study by Blumenberg et al., the emergence of new technologies may reduce the dependence of some households on private cars. In contrast, for other households, it may not directly affect their decision to buy a car [20]. Wang et al. studied the situation of online car-hailing services in the United States, finding that regular and active users are more likely to own fewer cars compared to occasional users. [21]. Few studies in China have addressed the relationship between online

car-hailing services and car ownership. In China, research on online car-hailing services mainly focuses on the aspect of environmental protection [22–24], safety [25, 26], and individual preferences [27].

China has different national conditions from other developed countries. In China, car ownership per capita is much lower than that of developed countries, while the cost of car purchase is much higher. China has a huge community of online car users. Online car-hailing services have become popular in China since 2016. In 2020, the users of online car-hailing services totaled 365.28 million [6]. Therefore, this paper studies the relationship between the development of online car-hailing and car purchase intention under the background of China's national conditions.

It has been found that car ownership is mainly related to individual attributes, travel demand [18, 19], car cost and performance [20], and external travel environment. The external travel environment affects car purchases from three perspectives [21]: (1) Public transportation service quality. (2) Emerging shared modes of transportation. (3) Private car travel restrictions. Few studies incorporate all the three important variables of the external travel environment into the model for consideration. This paper explores the mechanisms that influence individuals' intention to purchase a car when they are confronted with public transportation, private cars, and online car-hailing services as available modes. This study can compare the impacts of car-purchasing intention brought by different modes, which is useful for policymaking.

Previous studies on car purchase intentions mainly target all age groups, few specifically focusing on young people. Wang et al. studied how online car-hailing services affect the travel behavior of young people. The study is based on a comparison of DiDi Hitch and DiDi Express Pool, which provide sidesplitting services in Hangzhou, China [28]. Muromachi used the life-oriented approach to study the relationship between college students' previous choices of travel to school and their car purchase intentions in the future [29]. He found that the student's previous experience of going to high school by bicycle positively correlates with their future car purchasing intention. In contrast, their traveling experience via railway showed a statistically significant negative correlation with their car purchase intentions. Muromachi's study provides important insights into how young people's experiences and travel habits may influence their future car purchasing behavior. However, how do Online Car-hailing experiences and habits affect young people's future car purchase behavior? What is the mechanism of action? No clear conclusion has been drawn yet.

3. Methods

3.1. Conceptual Model. Planned Behavior is a classic structural model for studying behavior mechanisms. Ajzen proposed that the theory of Planned Behavior is a relatively open theoretical framework, and the model's explanatory power can be lifted by adding new influencing variables [27]. According to relevant studies [18] and our hypothesis, this paper adds three extended variables, namely, "Perceived Service Quality of Public Transportation," "Perceived Service

Quality of Online Car-hailing Service," and "Perceived Risk of Private Cars," to construct an extended theory of Planned Behavior (TPB).

3.2. Hypotheses.
According to the TPB-related studies, behavioral intention is positively produced from a combination of attitude (ATT) toward the behavior, subjective norm (SN), and perceived behavioral control (PBC), in which subjective norm and perceived behavior control have a positive effect on attitude toward the behavior [30].

Studies have shown that as more and more people use Online car-hailing services, travelers may be less willing to buy cars [31]. According to the statistics [5, 6], the number of online car registrations negatively correlates with the number of new car registrations. Therefore, it is hypothesized that the perceived quality of Online car-hailing services can help reduce car purchase intention, and there is a negative relationship between the two. Considering that the relationship between perceived service quality of online car-hailing service and attitude, subjective norms, and perceived behavior control is not clear, they are hypothesized to be negatively correlated.

Public transportation and traveling by cars are in a competitive relationship. The higher the satisfaction with public transportation service quality, the lower the intention to buy a car [15]. Therefore, it is assumed that a high Perceived Service Quality of Public Transportation (PT) can help reduce car purchase intention. The subjective norms advocated by the society for green travel will reduce car purchase intentions. Public transportation fares and station accessibility are why travelers choose public transportation. Therefore, it is hypothesized that public transportation perception services negatively correlate with perceived behavior control. Considering that the relationship between attitude and Perceived Service Quality of Public Transportation is not clear, it is hypothesized that they are negatively correlated. Perceived risk of private cars (PR) is a factor that hinders the usage of private cars for travel and the purchase of private cars [32–36]. Attitude and perceived behavior control are related to previous travel preferences. When the living and travel environments remain unchanged, changing the familiar travel modal faces great resistance [37]. Therefore, attitude and perceived behavior control are hypothesized to negatively correlate with car purchase intentions. The relationship between the perceived risk of private cars and subjective norms is not clear, so it is hypothesized that they are negatively correlated. The hypothesized relationship in the model is shown in Table 1. The conceptual model of the young people's car purchase intention is shown in Figure 1.

3.3. Latent Variables and Observed Variables

3.3.1. Perceived Service Quality of Online Car-Hailing (CH) Service.
Perceived Service Quality of online car-hailing (CH) service denotes how travelers perceive online car-hailing services. Gilibert et al. [37] found that the biggest feature of online car-hailing service compared to traditional

TABLE 1: Summary of model research assumptions.

Symbol	Hypotheses
H1a	CH contributes to decreasing ATT
H1b	CH contributes to decreasing SN
H1c	CH contributes to decreasing PBC
H1d	CH contributes to decreasing PI
H2a	PT contributes to decreasing ATT
H2b	PT contributes to decreasing SN
H2c	PT contributes to decreasing PBC
H2d	PT contributes to decreasing PI
H3a	PR contributes to decreasing ATT
H3b	PR contributes to decreasing SN
H3c	PR contributes to decreasing PBC
H3d	PR contributes to decreasing PI
H4	A contributes to increasing PI
H5a	SN contributes to increasing ATT
H5b	SN contributes to increasing PI
H6a	PBC contributes to increasing ATT
H6b	PBC contributes to increasing PI

transportation methods is its convenience. Users are more concerned about online car-hailing services' reliability, availability, price, and time. Loa and Nurul Habib [38] researched quantitative travel characteristics (travel time, waiting time, travel expenses) and qualitative travel characteristics (weather, reliability, safety, convenience, and the availability of public transportation). He found that travelers attach more importance to comfort, reliability and safety among the qualitative characteristics. Liu et al. [25] studied the general safety perception and situational safety perception of Chinese passengers on online car-hailing services, concluding that the overall safety of online car-hailing services is significantly lower than that of traditional car renting services.

According to the above literature, five variables of economy, reliability, convenience, comfort, and safety are selected to describe CH.

3.3.2. Perceived Service Quality of Public Transportation (PT).
Perceived Service Quality of Public Transportation (PT) refers to how travelers perceive the service level of public transportation. Bi et al. [39] compared people's intention of choosing between buses and online car-hailing services and found that the travel cost affects the intention of choosing online car-hailing services. The accessibility of bus stops has a significant negative impact on car-hailing behavior, and more changes in public transportation will reduce the intention of travelers to take the bus. Atombo and Dzigbordi Wemegah [40] found that affordability, availability, safety, and reliability are highly correlated with passenger satisfaction expectations when studying commuters' satisfaction with public transportation services. Björklund and Swärdh [41] estimated the value of public transport in-car comfort and reduced congestion policy, finding that all travelers tend to strongly refuse the crowding level of eight standing passengers per square meter.

Based on the above literature, five variables of economy, reliability, convenience, comfort, and safety are selected to reflect PT.
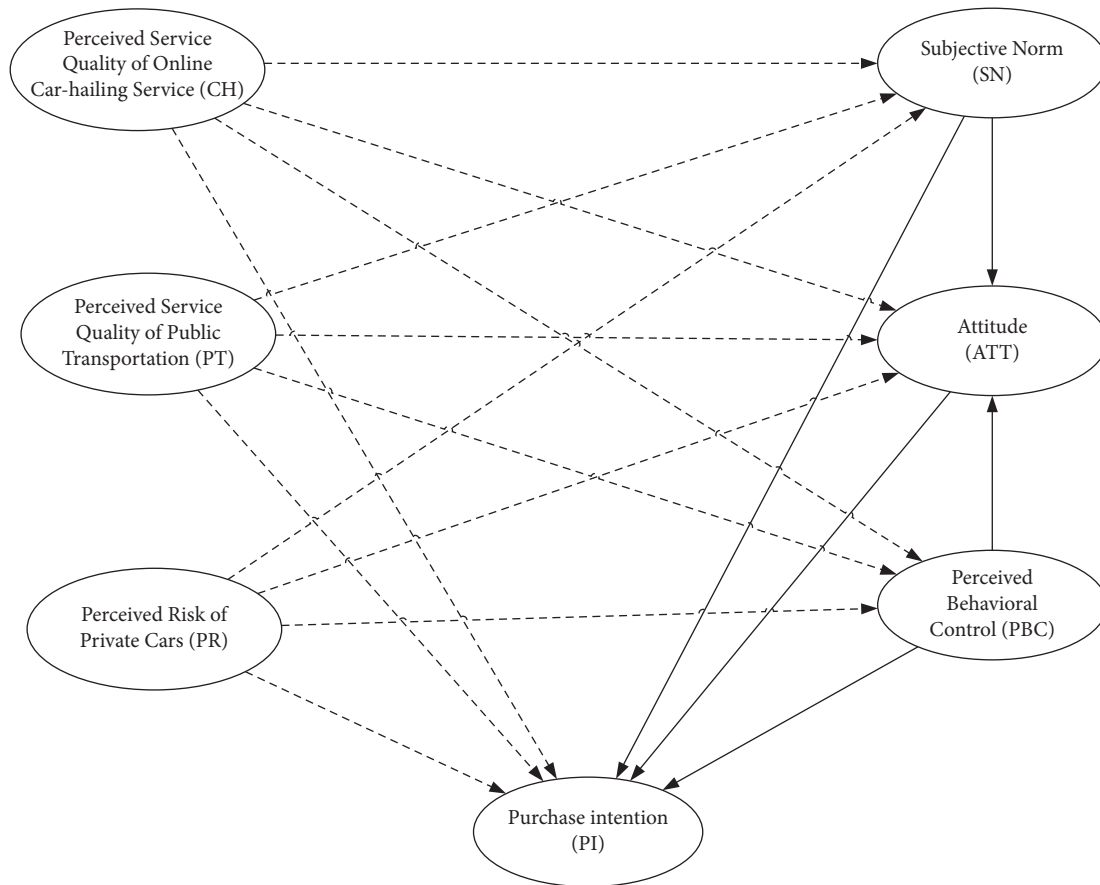
FIGURE 1: Conceptual model of young people's car purchase intentions (Note: The solid line represents positive correlation, and the dashed line represents negative correlation).

3.3.3. Perceived Risk of Private Cars (PR).

Perceived Risk of Private Cars (PR) refers to the risks of traveling by private cars, affecting travelers' intention to use and purchase cars. Chen et al. [42] and Liu et al. [32] studied China's policy of traffic restrictions based on the last digit of license plate numbers, which can reduce congestion and affect private car ownership. Christiansen et al. [33] discovered that the use of private parking spaces or reserved parking spaces doubled the possibility of owning a car. The empirical research by Khordagui [34] shows that higher parking prices will reduce driving, and parking pricing can indeed become an effective transportation demand management tool. Jinkins [35] compared the consumption between China and the United States and pointed out that in addition to the one-time purchase of the car, car consumption also includes car insurance, car maintenance, mechanical and electrical repair, and replacement.

Two factors that may also affect car purchase are added—the risk of congestion and traffic accidents. The former is added because, during peak hours, passengers may abandon their private cars and choose buses or subways with exclusive bus lanes to ensure time reliability and avoid being late. The latter is included because individuals, when drunk, tired, or unfamiliar with the road, may choose public transportation or online car-hailing service to reduce the risk of accidents.

PR is measured by five variables: parking difficulty, traffic restriction risk, continuous expenditure risk, congestion risk, and traffic accident risk.

3.3.4. Attitude (ATT).

Attitude (ATT) is an individual's evaluation of car purchasing behavior.

The evaluation consists of two parts: belief strength (strength) and result evaluation (evaluation), among which the strength refers to the degree to which people expect behavior results to be achieved, and the evaluation is people's expectation of the result regarding whether it is positive or negative [43]. Besides the strength and evaluation, the attitudes also include youth preferences for a car purchase. Belgiawan et al. [44] found that the preference for travel behavior in the past will affect future decisions on car purchases.

Attitude is measured with three variables: belief intensity, result evaluation, and preference.

3.3.5. Subjective Norms (SN).

Subjective norms (SN) represent the perceived social pressure of car purchasing behavior.

Social pressure comes from important individuals or groups, such as relatives, friends, classmates, or the public [43]. The important individuals that affect the car purchase intention of the youth include their friends and classmates (peer pressure) and family members. Car purchase intention

of the youth is also related to future family activities [9, 45], which can be summarized as "motivation to take care of a family."

SN is described by three variables: peer pressure, family guidance, and motivation to take care of a family.

3.3.6. Perceived Behavior Control (PBC). Perceived Behavior Control (PBC) refers to the degree of ease/difficulty with which an individual believes that he or she can control and perform a given behavior (car purchasing behavior) [43].

Young people's perception of the influencing factors of car purchase mainly includes three aspects: perception of car cost (car purchase cost and subsequent maintenance cost); perception of the ease/difficulty of obtaining license plates; self-control (Whether it can be decided by oneself) [46].

PBC is described by three variables: car cost perception, the ease/difficulty of obtaining license plates, and self-control.

3.3.7. Car Purchase Intention (PI). Behavioral intention is the intention prior to performing a specific act. The car purchase intention of the youth is affected by their economic conditions and the external traffic environment, among which the external traffic environment includes the public transportation environment [39] and the online car-hailing environment [31, 47].

The latent variables and observed variables are summarized in Table 2.

The above is the main body of the questionnaire used to collect empirical data for the 27 observed variables. The scale for the observed variables collection was the Likert 5 level scale, which used different scores to indicate individuals' subjective orientation. A score of 5 indicates strongly agree, 4 indicates agree, 3 indicates fair, 2 indicates disagree, and 1 indicates strongly disagree.

4. Data and Results

4.1. Survey Design

4.1.1. Basic Information of the Questionnaire. A questionnaire was designed to collect data for model estimation—both the sociodemographics of the respondents and their response to the previous measurement questions constituted the questionnaire. The survey was taken in Chengdu, Sichuan Province, China, from July 11 to 18, 2019. The specific locations of the survey were universities, commercial areas, parks, and hubs in the Chengdu metropolitan area. A total of 590 sample electronic and paper questionnaires were collected, among which 451 were valid. The sample distribution in Table 3 is consistent with the actual social and economic conditions of the youth in Chengdu, indicating that the survey data are demographically representative.

4.1.2. Age Classification in the Questionnaire. Does age affect the intention to purchase a car? This paper attempts to explain the factors influencing car-purchasing intention at different ages. Age was divided into three categories for sample collection. Young people in the early youth years (18–22 years old), the middle youth years (23–28 years old), and later youth years (28–35 years old). The sample sizes are 131, 179, and 141, respectively. The reasons for this classification are as follows.

The youth group aged 18–22 is mainly a student group. Their dormitories, cafeterias and classrooms are located inside the campus, and they do not need to travel outside the campus frequently, so they often do not have a strong desire to purchase a car. The level of transportation services affects their perceptions. This stage is the "perception stage."

The youth group aged between 22 and 28 are in a transitional stage of life; some may be continuing their education, and some are just entering the workforce. One thing that young people at this stage often have in common is the "lack of funds." They lack the necessary funds to buy a car and the ability to repay the car loan. This stage is the "Preparatory stage."

The youth group aged 28–35 years old in China typically faces two important life events, marriage and childbirth. Relevant studies have shown that changes in family structure affect car ownership. As the number of family members increases and the variety of transportation events, there is a necessity for private car purchases. This stage is the "implementation stage."

4.2. Model Test and Modification

4.2.1. Reliability and Validity. Reliability refers to the degree of stability and reliability of the questionnaire measurement results. Cronbach's α, CICT (Corrected Item-Total Correlation), two indicators, are used to determine the reliability. Cronbach's α is an indicator describing internal consistency, and most studies consider a value of Cronbach's alpha above 0.8 to be acceptable [48–50]. CICT refers to the Pearson correlation coefficient of each entry aggregated with other entries. In general, if this indicator is less than 0.3, we consider that the entry is not strongly correlated with other entries and can be excluded [48–50].

Validity is an indication of the accuracy and validity of the measurement results. The structural validity was tested by factor analysis with KMO (Kaiser–Meyer–Olkin) values, factor loadings, and cumulative explained variance of variables. If the KMO value is below 0.7, it is not suitable as an analysis factor. The factor loadings represent the correlation between the observed and latent variables. The lowest value should not be less than 0.5. Otherwise, it is regarded as an insignificant correlation. The minimum cumulative variance should not be less than 50% [48–50].

SPSS 24.0 software was used to test the reliability and validity of the questionnaire data, and the results are shown in Table 4.

The overall Cronbach's α coefficient is 0.820, Cronbach's α is around 0.8, and the CITC is greater than 0.3, indicating that the reliability test is qualified. KMO (Kaiser–Meyer–Olkin) value, factor loadings, and cumulative variance are all within a reasonable range.

TABLE 2: Statements used to measure the latent constructs.

Latent variable	Symbol	Measurable variable	Symbol	Statements
Perceived service quality of online car-hailing service (CH)	CH	Economy	CH1	With reasonable charging, traffic costs can be accepted.
		Reliability	CH2	Online car-hailing services usually meet my time expectations.
		Convenience	CH3	Feel convenient when using online car-hailing.
		Comfort	CH4	Feel comfortable when using online car-hailing. (Automotive interior/Driver's quality)
		Safety	CH5	Feel safe when using online car-hailing. (Driving safety/Personal and property safety.)
Perceived service quality of public transportation	PT	Economy	PT1	With reasonable charging, traffic costs can be accepted.
		Reliability	PT2	Public transport usually meets my time expectations. (Waiting time/Travel time)
		Convenience	PT3	Usually feel convenient when using public transport. (Stations covering/Transfer)
		Comfort	PT4	Usually feel comfortable when using public transport. (Automotive interior/Seats/Crowding)
		Safety	PT5	Usually feel safe when using public transport. (Driving safety/Personal and property safety)
Perceived risk of private cars	PR	Parking difficulty	PR1	I worry that the shortage of parking spaces in the city will increase my parking time and cost.
		Traffic restriction	PR2	I worry that the policy of driving and traffic restrictions will increase the additional fine or the idle rate of the car.
		Continuous expenditure	PR3	I worry that fuel, insurance, maintenance, and repair will cost me more after buying my car.
		Congestion risk	PR4	I worry that the road congestion will continue to worsen after purchasing a car, making car travel more inconvenient.
		Traffic accident	PR5	I worry that traffic accidents will threaten the life and property safety of myself and my family.
Attitude	ATT	Preference	ATT1	I think buying a car will make my life more convenient and free.
		Belief intensity	ATT2	I think cars are an indispensable part of life in the future.
		Results evaluation	ATT3	I think buying a car is a wise decision.
Subjective norm	SN	Peer pressure	SN1	All my peers and colleagues have cars.
		Family guidance	SN2	My family encouraged me to buy a car.
		Motivation to take care of a family	SN3	I would consider buying a car for taking care of my family's needs (medical appointments, taking my children to school)
Perceived behavioral control	PBC	Perception of the car cost	PBC1	I fully understand the cost (purchase/insurance/maintenance) of the car.
		The ease/difficulty of obtaining license plates	PBC2	Buying a car within five years of working is easy for me.
		Self-control	PBC3	Whether or not I need to buy a car for now or future is entirely up to me.
Purchase intention	PI	Purchase a car when economic conditions are met	PI1	I will buy a car when the money allows.
		Purchase a car when the shared mobility services are well-developed	PI2	Even though shared mobility services are well-developed in the future, I will still buy a car.
		Purchase a car with better public transportation	PI3	Even though public traffic services are better in the future, I will still buy a car.

4.2.2. Check Path Significance. AMOS 24.0 was used to analyze the effects between paths in the hypothetical model. The basic fitness level mainly considers the significance of the path coefficient between latent variables from the Standard Error of Estimate (S.E.) and Critical Ratio (C.R.) to test the rationality of the hypothesis. The critical ratio is the ratio of the parameter estimate to the standard error. The path significance test results are shown in Table 5.

TABLE 3: Sociodemographic statistics of the youth group sample.

Character	Value	Ratio (%)	Character	State	Ratio (%)
Gender	Male	51.6	Student	33.7	
	Female	48.4	Enterprise or company employee	42.9	
Age	18–22	28.7	Occupation	Civil servant	5.9
	23–28	39.2		Individual business	9.0
	29–35	32.2		Freelancer	3.9
Personal monthly income	Under ￥2000	30.4	Annual household Income (CNY)	Others	4.6
	￥2001–5000	31.9		Under 100000	32.6
	￥5001–8000	17.9		100000–150000	32.8
	￥8001–12000	14.2		150000–200000	22.5
	Above ￥12000	5.5		200000–300000	8.8
Education	Junior high or below	2.8	Family members	Above 300000	3.3
	High school	6.1		1	13.3
	Junior college	12.9		2	23.4
	Undergraduate	49.9		3	51.2
	Postgraduate or above<	28.2		4	9.6
Marriage and childbirth status	Unmarried	64.8		Over 5	2.4
	Married without child	22.8			
	Married with child	12.5			

TABLE 4: Reliability and validity results of latent variables.

Latent variable	Observed variable	CITC	Cronbach's α	Factor loadings	KMO	Cumulative variance (%)
CH	CS1	0.588		0.753		
	CS2	0.600		0.764		
	CS3	0.601	0.798	0.767	0.807	55.74
	CS4	0.591		0.748		
	CS5	0.532		0.699		
PT	PT1	0.487		0.659		
	PT2	0.572		0.745		
	PT3	0.653	0.791	0.806	0.777	54.65
	PT4	0.628		0.789		
	PT5	0.512		0.685		
PR	PR1	0.601		0.769		
	PR2	0.652		0.799		
	PR3	0.624	0.811	0.784	0.833	58.22
	PR4	0.697		0.831		
	PR5	0.456		0.614		
ATT	ATT1	0.652		0.837		
	ATT2	0.741	0.841	0.891	0.715	76.07
	ATT3	0.738		0.888		
SN	SN1	0.661		0.859		
	SN2	0.634	0.789	0.843	0.702	70.47
	SN3	0.596		0.816		
PB	PBC1	0.631		0.838		
	PBC2	0.643	0.794	0.846	0.71	70.97
	PBC3	0.641		0.844		
PI	PI1	0.708		0.859		
	PI2	0.825	0.896	0.925	0.705	82.80
	PI3	0.863		0.943		

TABLE 5: Significance results of structural model path coefficient.

Latent variable path			Estimate	S.E.	C.R.	P	Significance
SN	←	CH	−0.185	0.078	−2.382	0.017	*
SN	←	PT	−0.295	0.073	−4.030	<0.001	***
SN	←	PR	−0.206	0.077	−2.687	0.007	**
PBC	←	CH	−0.079	0.054	−1.464	0.143	—
PBC	←	PT	−0.106	0.051	−2.078	0.040	*
PBC	←	PR	−0.200	0.079	−2.523	0.012	*
ATT	←	CH	−0.187	0.08	−2.324	0.020	*
ATT	←	PT	−0.211	0.075	−2.820	0.005	**
ATT	←	PR	−0.157	0.054	−2.924	0.003	**
ATT	←	SN	0.438	0.058	7.540	<0.001	***
ATT	←	PBC	0.236	0.048	4.900	<0.001	***
PI	←	CH	−0.102	0.050	−2.036	0.042	*
PI	←	PT	−0.126	0.048	−2.634	0.008	**
PI	←	PR	−0.135	0.051	−2.657	0.008	**
PI	←	ATT	0.431	0.103	4.173	<0.001	***
PI	←	SN	0.162	0.068	2.378	0.017	*
PI	←	PBC	0.261	0.052	5.055	<0.001	***

Note. ***indicates $P < 0.001$, **indicates $P < 0.01$, *indicates $P < 0.1$, — indicates not significant..

As the Critical Ratio absolute value of the path "PBC←CH" is lower than 1.96, which does not meet the significance requirement, this path is excluded.

4.2.3. Check Modification Indices. In order to improve the overall fitness of the model, the Modification Indices (M.I.) are used to make appropriate modifications to the model. When M.I. >3.84, it generally means that we need to free the constraints between variables (to establish a covariance) [50]. The M.I. is shown in Table 6. It is required to establish covariances between e4 and e5 (the error terms of the observed variables of CH), e6 and e7 (the error terms of the observed variables of PT), as well as e26 and e27 (the error terms of the observed variables of the PI).

4.2.4. The Revised Model. The revised model is obtained after deleting the "CH⟶PBC" path and establishing the covariation relationship. The significance test results of the revised model are shown in Table 7. All paths pass the significance test. The factor loadings of the measurement model are shown in Table 8. The factor loadings of the observed variables are all between 0.5 and 0.95 [50], implying that the basic fitness of the measurement model is good. The fitness indices before and after the modification are compared, as shown in Table 9.

5. Discussion

5.1. Path Analysis and Factor Analysis. This section discusses the factors that influence the Car purchase intention based on path relationships and explains the possible reasons.

The direct and indirect effects of latent variables are shown in Table 10. The influence of observed variables on latent variables is shown in Table 8.

TABLE 6: Modification index.

Associated path			M.I.	Par change
e5	←⟶	e4	18.526	0.08
e26	←⟶	e27	14.24	0.031
e7	←⟶	e6	6.97	0.044

Note. Par Change: indicates the estimated parameter change amount of the forecast.

TABLE 7: Significance results of structural model path coefficient.

Latent variable path			Estimate	S.E.	C.R.	P	Significance
SN	←	CH	−0.208	0.077	−2.699	0.007	**
SN	←	PT	−0.311	0.076	−4.083	<0.001	***
SN	←	PR	−0.193	0.077	−2.503	0.012	*
PBC	←	PT	−0.11	0.052	−2.115	0.036	*
PBC	←	PR	−0.187	0.081	−2.319	0.02	*
ATT	←	CH	−0.21	0.081	−2.577	0.01	*
ATT	←	PT	−0.23	0.079	−2.928	0.003	**
ATT	←	PR	0.451	0.058	7.71	<0.001	***
ATT	←	SN	0.243	0.048	5.071	<0.001	***
ATT	←	PBC	−0.179	0.052	−3.466	<0.001	***
PI	←	CH	0.156	0.072	2.158	0.031	*
PI	←	PT	0.288	0.053	5.405	<0.001	***
PI	←	PR	0.488	0.108	4.511	<0.001	***
PI	←	ATT	−0.135	0.052	−2.607	0.009	**
PI	←	SN	−0.155	0.052	−2.992	0.003	**
PI	←	PBC	−0.139	0.053	−2.6	0.009	**

TABLE 8: Test results of a load of measurement model factors.

Latent variable	Observed variable path	Factor loadings
CH	CH1-CH	0.790
	CH2-CH	0.828
	CH3-CH	0.841
	CH4-CH	0.780
	CH5-CH	0.707
PT	PT1-PT	0.502
	PT2-PT	0.643
	PT3-PT	0.765
	PT4-PT	0.744
	PT5-PT	0.586
PR	PR1-PR	0.838
	PR2-PR	0.827
	PR3-PR	0.803
	PR4-PR	0.855
	PR5-PR	0.694
ATT	ATT1-ATT	0.726
	ATT2-ATT	0.840
	ATT3-ATT	0.813
SN	SN1-SN	0.769
	SN2-SN	0.744
	SN3-SN	0.743
PBC	PBC1-PBC	0.742
	PBC2-PBC	0.713
	PBC3-PBC	0.759
PI	PI1-PI	0.806
	PI2-PI	0.827
	PI3-PI	0.871

TABLE 9: Comparison indicators between the initial model and the modified model.

	CMIN/DF	RMSEA	GFI	NFI	CFI	TLI
Superior standard	<3	<0.05	>0.9	>0.9	>0.9	>0.9
Initial model	3.164	0.069	0.872	0.912	0.911	0.898
Revised model	2.895	0.058	0.884	0.923	0.923	0.911
Fit judgment	Superior	Accept	Accept	Superior	Superior	Superior

Note. CMIN/DF (chi-square degree of freedom ratio); RMSEA (root-mean-square); GFI (goodness of fit); CFI (comparative fit index); NFI (normed fit index); TLI (Tucker–Lewis index).

TABLE 10: Standardized direct and indirect effects between latent variables.

	Path		Direct effect	Indirect effect	Total effect
SN	←	CH	−0.160	—	−0.160
SN	←	PT	−0.362	—	−0.362
SN	←	PR	−0.235	—	−0.235
PBC	←	PT	−0.126	—	−0.126
PBC	←	PR	−0.232	—	−0.232
ATT	←	CH	−0.164	−0.077	−0.241
ATT	←	PT	−0.273	−0.205	−0.478
ATT	←	PR	−0.231	−0.171	−0.402
ATT	←	SN	0.479	—	0.479
ATT	←	PBC	0.253	—	0.253
PI	←	CH	−0.101	−0.119	−0.220
PI	←	PT	−0.159	−0.274	−0.433
PI	←	PR	−0.149	−0.252	−0.401
PI	←	ATT	0.404	—	0.404
PI	←	SN	0.137	0.194	0.331
PI	←	PBC	0.249	0.102	0.351

According to Tables 8 and 10, the factors influencing the car purchase intention of the youth could be discussed as follows.

(1) Among the positive effects of car purchase intention, ATT (0.404) > PBC (0.351) > SN (0.331), indicating that attitude is the strongest factor influencing car purchase intention. In attitude, the strength of the belief that "the car is an indispensable part of the future" has the greatest influence on car purchase intention. This consensus may be related to China's social background, as it is widely believed that "owning a house and a car is a symbol of success."

(2) Among the negative effects of car purchase intention, PT (−0.433) > PR (−0.401) > CH (−0.22), indicating that PT and PR are the major factors that affect individual purchase intentions. CH has a weak effect since the public may only use online car-hailing services to supplement public transportation or as an alternative in the absence of private car accessibility, which aligns with the relevant findings [34]. The key to reducing car purchase intention is to improve PT, especially its convenience and comfort.

(3) The level of external transportation service affects car purchase intention through psychological changes. For the effects of CH, PT, and PR on car purchase intention, the direct effect values are lower than the indirect effect values. It indicates that CH, PT, and PR suppress car purchase intention by affecting young people's ATT, SN, and PBC in most cases. (4) CH means perceived service quality of online car-hailing service. From Table 8, Convenience (0.841) > Reliability (0.828) > Economy (0.790) > Comfort (0.780) > Safety (0.707). Individuals are most satisfied with the convenience of online car-hailing services. Individuals' satisfaction with reliability stems from the fact that they can directly see the travel time on Apps, enabling them to schedule the appropriate departure time according to their needs without fear of being late. Individuals are most dissatisfied with safety, so improving the safety can prompt people to choose online car-hailing services.

5.2. Multi-Group Analysis of the Youth.

We classify the features of individual attributes and perform a multi-group analysis to understand the moderating effect of attribute features. If there is a significant difference in the estimation results of the correlation coefficient, it means that the attribute variable has a moderating effect on the model [50]. Using Multiple-Group Analysis in AMOS 24.0, the analysis results are shown in Table 11.

The results in Table 11 show that the path coefficients are significant for the age groups and annual household income groups at the 0.05 level. It indicates that only age and household income significantly moderate the model among the personal attribute variables.

This paper focuses on the analysis of the age groups. The path coefficient analysis for the age group is presented in Table 12. Path correlation analysis is useful for finding out the key variables that influence the intention to purchase a car for different age groups.

5.2.1. Early Youth Years (18–22 Years Old).

Young people in the early youth years (18–22 years old) are most negatively affected by PT. In China, the 18- to 22-year-old youth group mainly studies in universities with limited income. They are more willing to take public transportation. Combined with Table 8, it can be found that improving the convenience and comfort of public transportation will help young people to choose public transportation and thus reduce their intention to purchase a car.

Early youth is most positively influenced by attitudes (ATT). Attitudes can be changed by guiding perceptions. For example, promote the idea that "access is more important than ownership" and dispel the illusion that "owning a car equals a successful life."

TABLE 11: Results of multiple-group analysis.

Model	Gender	Age	Personal monthly income	Education	Occupation	Annual household income	Family members
CMIN/DF	1.26	1.63	1.08	1.23	1.09	1.22	1.95
P value	0.134	<0.001	0.293	0.084	0.324	0.166	<0.001

Note. $P < 0.001$ means significant.

TABLE 12: Path coefficient analysis of car purchase intention under different youth years.

Path	Early youth years	Middle youth years	Later youth years
PI ← CH	−0.18	−0.20	−0.34**
PI ← PT	−0.51*	−0.34	−0.44
PI ← PR	−0.24	−0.52*	−0.39**
PI ← ATT	0.41*	0.31	0.40
PI ← SN	0.30*	0.35**	0.41*
PI ← PBC	0.25*	0.24**	0.34**

Note. **indicates $p < 0.01$, *indicates $p < 0.01$.

TABLE 13: Abbreviations.

Term	Abbrev.
Theory of planned behavior	TPB
Perceived service quality of online car-hailing service	CH
Perceived service quality of public transportation	PT
Perceived risk of private cars	PR
Attitude	ATT
Subjective norms	SN
Perceived behavior control	PBC
Car purchase intention	PI
Standard error of estimate	S.E.
Critical ratio	C.R.
Modification indices	M.I.

5.2.2. Middle Youth Years (23–28 Years Old). Young people in the middle youth (23–28 years old) are most negatively affected by PR. Combined with the results of Table 8, the risk of traffic congestion is their biggest concern, followed by the inconvenience of parking and then the traffic restriction policy. Limiting car purchases requires raising the perceived risk of private cars, and in addition to effective means of traffic restrictions, regulating parking resources through price leverage is an effective and viable means.

Subjective norms are most positively affected by middle youth car purchase intention (SN). SN represents the social pressure of car purchasing behavior, which comes from important individuals. If the transportation needs of important individuals can be better met, the car-purchasing intention may be reduced from the perspective of SN.

5.2.3. Later Youth Years (29–35 years Old). Young people in the later youth years (29–35 years old) are most negatively affected by CH. It may be because 29- to 35-year-olds are more financially independent and have more opportunities to use online car-hailing services. Combined with the results of Table 8, it can thus be concluded that further improvement in the reliability and convenience of online car-hailing services will reduce the youth's willingness to purchase a car. Significant improvements in reliability and convenience rely on more advanced platform algorithms and technological innovations.

There was a significant positive effect on both PBC and SN. The effect of SN was on important individuals. The influence of important individuals is greater in later youth than in middle youth years. The reason for this is that after the age of 28, in China, young people face more changes in family structure, such as marriage and children, and important individuals from the family may have a stronger intention to purchase a car, thus enhancing the individual's willingness to purchase a car. The stronger willingness of family members to purchase a car may be because some of their travel needs cannot be met by public transportation and online car services. Perceived behavioral control was

more pronounced in later youth than in early and middle youth. As youth grow older, they are more financially independent and have more control over purchasing a car.

6. Conclusion

The present study introduces "Perceived Service Quality of Online Car-hailing (CH)," "Perceived Service Quality of Public Transportation (PT)," and "Perceived Risk of Private Cars (PR)" to construct an extended theory of Planned Behavior and studies the influence mechanism of online car-hailing service on Chinese youth groups' car purchase intention. The results show that PT has the greatest impact on the car purchase intention of the youth. Online car-hailing service is mainly leveraged to supplement public transportation or as a substitute for private car travel. The perception of the external traffic environment (CH, PT, PR) mainly affects the youth's car purchase intention through internal psychological factors (attitude, subjective norms, perceived behavior control), of which attitude is the most important one. There are also differences in the factors that influence the willingness to purchase a car for young people of different ages.

Based on the research and analysis in the article, we offer the following suggestions to reduce car purchase intention:

(1) For the young people in the early youth years (18–22 years old), improved accessibility to public transportation will significantly improve convenience. Accessibility can be improved by establishing subway stations or bus stops at the entrances of colleges, as Muromachi has also argued [29]. Early youth is in a great habit-forming stage. By having easier access to subways and buses, college students may develop a preference for public transportation travel, greatly reducing the willingness to purchase a private car.

(2) SN (Subjective norms) significantly impacted both mid and late youth. SN comes from important

individuals, such as family members. And, our study also found that the number of family members significantly affects the car purchasing intention. Therefore, satisfying the needs of family members will have a positive effect on reducing car purchase intention. The proposal is to provide demand-responsive transit service, which can better meet the various travel needs of families. For example, it could provide transport to and from school for children in the same neighborhood, escort older people in the same neighborhood to a neighboring hospital for regular medical care, and provide transport from residential areas to rail stations during peak hours. It is worth studying exactly what kind of services is more attractive to family members. In conclusion, we hope demand-responsive transit offers a more diverse range of services in terms of flexibility, convenience, and cost-efficiency.

(3) One of the keys to improving the attractiveness of online car-hailing services is to improve safety. Safety includes two categories: driver's driving behavior and security from not being the victim of rape and homicide. Safe driving by drivers can be ensured by raising the barrier to entry to become an online driver and requiring a longer and safer driving record to ensure safe driving behavior. The security of individuals and property can be achieved through better technical means, such as recording the car, real-time positioning information of the online car, and a key alarm.

Much work could be further conducted to investigate how online car-hailing services would influence the car purchasing intention of the youth cohort. For example, the present study has found car purchasing intention heterogeneity across age groups. It would be interesting to study how such intention will change as the family lifecycle stage changes from a long-time perspective in an era of shared mobility.

The abbreviations in the text are summarized in Table 13.

Data Availability

Data are available on request to the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

References

[1] A. Kolleck, "Does car-sharing reduce car ownership? Empirical evidence from Germany," *Sustainability*, vol. 13, no. 13, Article ID 7384, 2021.

[2] Y. Hui, Y. Wang, Q. Sun, and L. Tang, "The impact of car-sharing on the willingness to postpone a car purchase: a case study in Hangzhou, China," *Journal of Advanced Transportation*, vol. 2019, Article ID 9348496, 11 pages, 2019.

[3] J. Schlüter and J. Weyer, "Car sharing as a means to raise acceptance of electric vehicles: an empirical study on regime change in automobility," *Transportation Research Part F: Traffic Psychology and Behaviour*, vol. 60, pp. 185–201, 2019.

[4] Y. Hui, W. Wang, M. Ding, and Y. Liu, "Behavior patterns of long-term car-sharing users in China," *Transportation Research Procedia*, vol. 25, pp. 4662–4678, 2017.

[5] MPS: 2022, https://www.mps.gov.cn/n6557563/c7647931/content.html.

[6] CAC: 2022, http://www.cac.gov.cn/2021-02/03/c_1613923423079314.htm.

[7] Jiemain, "Insights into potential car buyers in 2018," 2021, https://www.jiemian.com/article/2757593.html.

[8] Zhuanlan, "Aurora Big Data: User Portrait Data Report of Potential Automotive Consumers," 2021, https://zhuanlan.zhihu.com/p/43805264.

[9] N. A. Khan and M. A. Habib, "When do households make vehicle transactions? What type of vehicle households choose after transaction events?" *Travel Behaviour and Society*, vol. 22, pp. 32–47, 2021.

[10] B. Herrenkind, I. Nastjuk, A. B. Brendel, S. Trang, and L. M. Kolbe, "Young people's travel behavior-using the life-oriented approach to understand the acceptance of autonomous driving," *Transportation Research Part D: Transport and Environment*, vol. 74, pp. 214–233, 2019.

[11] N. Commins and A. Nolan, "Car Ownership and Mode of Transport to Work in Ireland," The Economic and Social Research Institute (ESRI), Dublin, Ireland, ESRI Working Paper No. 310, 2009.

[12] A. Nobile, C. R. Bhat, and E. I. Pas, "A random-effects multinomial probit model of car ownership choice," in *Case Studies in Bayesian Statistics*, C. Gatsonis, J. S. Hodges, R. E. Kass, R. McCulloch, P. Rossi, and N. D. Singpurwalla, Eds., vol. 121, pp. 419–434, Springer New York, New York, NY, USA, 1997.

[13] C. Ding, D. Wang, C. Liu, Y. Zhang, and J. Yang, "Exploring the influence of built environment on travel mode choice considering the mediating effects of car ownership and travel distance - ScienceDirect," 2021, https://www.sciencedirect.com/science/article/abs/pii/S0965856416303391.

[14] N. Paulley, R. Balcombe, R. Mackett et al., "The demand for public transport: the effects of fares, quality of service, income and car ownership," *Transport Policy*, vol. 13, no. 4, pp. 295–306, 2006.

[15] D. Yao, L. Xu, C. Zhang, and J. Li, "Revisiting the interactions between bus service quality, car ownership and mode use: a case study in Changzhou, China," *Transportation Research Part A: Policy and Practice*, vol. 154, pp. 329–344, 2021.

[16] S. Huang, "The rise of online ride-hailing services and their impact on urban transport in China," *Handbook on Transport and Urban Transformation in China*, Edward Elgar, vol. 451, pp. 212–228, Cheltenham, UK, 2020.

[17] P. Jochem, D. Frankenhauser, L. Ewald, A. Ensslen, and H. Fromm, "Does free-floating carsharing reduce private vehicle ownership? The case of SHARE NOW in European cities," *Transportation Research Part A: Policy and Practice*, vol. 141, pp. 373–395, 2020.

[18] F. Giesel and C. Nobis, "The impact of carsharing on car ownership in German cities," *Transportation Research Procedia*, vol. 19, pp. 215–224, 2016.

[19] M. Golalikhani, B. B. Oliveira, M. A. Carravilla, J. F. Oliveira, and A. P. Antunes, "Carsharing: a review of academic literature and business practices toward an integrated decision-support framework," *Transportation Research Part E: Logistics and Transportation Review*, vol. 149, Article ID 102280, 2021.

[20] E. Blumenberg, J. Paul, and G. Pierce, "Travel in the digital age: vehicle ownership and technology-facilitated accessibility," *Transport Policy*, vol. 103, pp. 86–94, 2021.

[21] Y. Wang, W. Shi, and Z. Chen, "Impact of ride-hailing usage on vehicle ownership in the United States," *Transportation Research Part D: Transport and Environment*, vol. 101, Article ID 103085, 2021.

[22] Y. Sui, H. Zhang, X. Song et al., "GPS data in urban online ride-hailing: a comparative analysis on fuel consumption and emissions," *Journal of Cleaner Production*, vol. 227, pp. 495–505, 2019.

[23] T. Wu, S. Wang, L. Wang, and X. Tang, "Contribution of China's online car-hailing services to its 2050 carbon target: energy consumption assessment based on the GCAM-SE model," *Energy Policy*, vol. 160, Article ID 112714, 2022.

[24] J. Gao, S. Ma, L. Li, J. Zuo, and H. Du, "Does travel closer to TOD have lower CO_2 emissions? Evidence from ride-hailing in Chengdu, China," *Journal of Environmental Management*, vol. 308, Article ID 114636, 2022.

[25] Y. Liu, Q. Gao, and P.-L. P. Rau, "Chinese passengers' security perceptions of ride-hailing services: an integrated approach combining general and situational perspectives," *Travel Behaviour and Society*, vol. 26, pp. 250–269, 2022.

[26] L. Ma, X. Zhang, X. Ding, and G. Wang, "Risk perception and intention to discontinue use of ride-hailing services in China: taking the example of DiDi Chuxing," *Transportation Research Part F: Traffic Psychology and Behaviour*, vol. 66, pp. 459–470, 2019.

[27] X. Hu, W. Lin, J. Wang, and J. Jiang, "Choice of ride-hailing or traditional taxi services: from travelers' perspectives," *Research in Transportation Business & Management*, Article ID 100788, 2022.

[28] Z. Wang, X. Chen, and X. M. Chen, "Ridesplitting is shaping young people's travel behavior: evidence from comparative survey via ride-sourcing platform," *Transportation Research Part D: Transport and Environment*, vol. 75, pp. 57–71, 2019.

[29] Y. Muromachi, "Experiences of past school travel modes by university students and their intention of future car purchase," *Transportation Research Part A: Policy and Practice*, vol. 104, pp. 209–220, 2017.

[30] W. T. Duan and G. R. Jiang, "A review of the theory of planned behavior," *Advances in Psychological Science*, vol. 2, pp. 315–320.

[31] K. Shi, R. Shao, J. De Vos, L. Cheng, and F. Witlox, "The influence of ride-hailing on travel frequency and mode choice," *Transportation Research Part D: Transport and Environment*, vol. 101, Article ID 103125, 2021.

[32] Z. Liu, R. Li, X. Wang, and P. Shang, "Effects of vehicle restriction policies: analysis using license plate recognition data in Langfang, China," *Transportation Research Part A: Policy and Practice*, vol. 118, pp. 89–103, 2018.

[33] P. Christiansen, N. Fearnley, J. U. Hanssen, and K. Skollerud, "Household parking facilities: relationship to travel behaviour and car ownership," *Transportation Research Procedia*, vol. 25, pp. 4185–4195, 2017.

[34] N. Khordagui, "Parking prices and the decision to drive to work: evidence from California," *Transportation Research Part A: Policy and Practice*, vol. 130, pp. 479–495, 2019.

[35] D. Jinkins, "Conspicuous consumption in the United States and China," *Journal of Economic Behavior & Organization*, vol. 127, pp. 115–132, 2016.

[36] P. Haggar, L. Whitmarsh, and S. M. Skippon, "Habit discontinuity and student travel mode choice," *Transportation Research Part F: Traffic Psychology and Behaviour*, vol. 64, pp. 1–13, 2019.

[37] M. Gilibert, I. Ribas, N. Maslekar, C. Rosen, and A. Siebeneich, "Mapping of service deployment use cases and user requirements for an on-demand shared ride-hailing service: MOIA test service case study," *Case Studies on Transport Policy*, vol. 7, no. 3, pp. 598–606, 2019.

[38] P. Loa and K. Nurul Habib, "Examining the influence of attitudinal factors on the use of ride-hailing services in Toronto," *Transportation Research Part A: Policy and Practice*, vol. 146, pp. 13–28, 2021.

[39] H. Bi, Z. Ye, L. Hu, and H. Zhu, "Why they don't choose bus service? Understanding special online car-hailing behavior near bus stops," *Transport Policy*, vol. 114, pp. 280–297, 2021.

[40] C. Atombo and T. Dzigbordi Wemegah, "Indicators for commuter's satisfaction and usage of high occupancy public bus transport service in Ghana," *Transportation Research Interdisciplinary Perspectives*, vol. 11, Article ID 100458, 2021.

[41] G. Björklund and J.-E. Swärdh, "Estimating policy values for in-vehicle comfort and crowding reduction in local public transport☆," *Transportation Research Part A: Policy and Practice*, vol. 106, pp. 453–472, 2017.

[42] D. Chen, Y. Sun, and Z. Yang, "Optimization of the travel ban scheme of cars based on the spatial distribution of the last digit of license plates," *Transport Policy*, vol. 94, pp. 43–53, 2020.

[43] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes*, vol. 50, no. 2, pp. 179–211, 1991.

[44] P. F. Belgiawan, J.-D. Schmöcker, and S. Fujii, "Understanding car ownership motivations among Indonesian students," *International Journal of Sustainable Transportation*, vol. 10, no. 4, pp. 295–307, 2016.

[45] E. M. F. van Sluijs, U. Ekelund, B. H. Hansen et al., "Family car ownership and activity in young people: cross-sectional and longitudinal analyses using the International Children's Accelerometry Database," *The Lancet*, vol. 392, p. S89, 2018.

[46] R. Luke, "Car ownership perceptions and intentions amongst South African students," *Journal of Transport Geography*, vol. 66, pp. 135–143, 2018.

[47] T. Lyu, P. S. Wang, Y. Gao, Y. Wang, and Y. Wang, "Research on the big data of traditional taxi and online car-hailing: a systematic review," *Journal of Traffic and Transportation Engineering*, vol. 8, no. 1, pp. 1–34, 2021.

[48] I Corp, *IBM SPSS Statistics for Windows, version 24.0*, IBM, New York, NY, USA, 2012.

[49] T. Raykov and G. A. Marcoulides, *Introduction to Psychometric Theory*, Routledge, New York, NY, USA, 2010.

[50] A. M. Arachchige, "Structural equation modelling with AMOS," 2018, http://www.morebooks.de/store/cn/book/structural-equation-modeling-with-amos/isbn/978-613-9-82333-8.