Research Article

Structure Analysis of Factors Influencing the Preference of Ridesplitting

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1. Introduction

Ridesplitting is a new form of for-hire service that riders with similar origins and destinations are matched to the same vehicle in real-time via Internet [1–3]. Compared with traditional carpooling, ridesplitting improves real-time matching probability. This new form of transportation service also reduces traffic congestion and emission since ridesplitting will make more efficient use of vehicles than ordinary taxis [4, 5].

Due to its commercial potential, transportation network companies such as Uber, Lift, and Didi have launched this service since 2014 [3]. However, within 6 years of development, the market share of ridesplitting only accounts for a small fraction of the total travel. According to Chen et al. [6], ridesplitting trips occupied only 17% only of Didi’s ride-hailing trips in Hangzhou, China. Similarly, ridesplitting was not widely adopted compared with ridesourcing and taxi service in Los Angeles County as well according to Brown [7].

To figure out the causes of the low-level market share of ridesplitting among cities, researchers have devoted to investigating user characteristics and their effects on ridesplitting preferences. Mohamed et al. [8] investigated ridesourcing users by semistructured interviews to obtain characteristics of ridesplitting users. They found that ridesplitting was popular among students and travellers who preferred long-distance travel. Brown [7] studied Lyft’s trip data from Los Angeles and figured out that people living in dense and lower-income neighborhoods would have a higher possibility to use ridesplitting. Dias et al. [9] presented a bivariate ordered probit model to estimate influential factors that affected ridesourcing and ridesplitting use frequency. The results indicated that young, well-educated, higher-income users and individuals residing in higher-density areas were major ridesourcing and ridesplitting
users. Moody et al. [10] introduced a structural equation model to explore the influence of rider-to-rider discriminatory attitude on ridesplitting. It demonstrated that discriminatory attitude had a strongly negative influence on willingness to use ridesplitting.

Similarly, in the research field of traditional carpooling, Brownstone and Golob [11] presented an ordered probit discrete choice model to estimate the use frequency of carpooling. They discovered that women and individuals with multiple workers in family, long commutes, were more likely to use carpooling. Neoh et al. [12] adopted the meta-analysis to explore carpooling’s influential factors and revealed that females and travels with fixed work schedules were strongly interested in adopting carpooling. Meyer and Shaheen [13] studied carpooling data from BlaBlaCar in France. The finding indicated that users with low income were more inclined to be passengers compared with high-income users. Delhomme and Gheorghiu [14] conducted an online survey to compare the characteristics of carpoolers with non-carpoolers. The results showed that women and travellers with children, positive attitudes toward public transport, and environmentally aware were more likely to be carpoolers.

According to the literature review, existing studies have investigated the effects of socioeconomic characteristics on passengers’ travel preferences and provided insights for ridesplitting adoption estimation. However, these studies hardly reveal the key cognitive factors to influence travellers’ preference on ridesplitting. Cognitive factors have been demonstrated as important issues in people’s decision process, including choosing travel modes [15–22]. The research to identify cognitive determinants of ridesplitting would be helpful in designing its market measures, regulations, and incentives to achieve high-level customer attraction.

In this paper, we identify the cognitive determinants affecting ridesplitting preference and their inner relationships via the structural equation model. Attitudes towards incentives, such as discounts, surge pricing, and management issues, including implementation of HOV lane and etc., are considered in the model as well. An online survey was conducted in Shanghai to capture traveler’s attitudes and preferences on ridesplitting and the survey data were implemented for model calibration. Estimation results could identify those important factors affecting ridesplitting preference and may present useful information for ridesplitting service development.

The remainder of this paper is organized as follows. An overview of the questionnaire design and sample feature is presented in Section 2. Section 3 introduces the modeling method of structural equation model and its adopted variables and hypotheses. Section 4 discusses the results of the model estimation, followed by the conclusions in Section 5.

2. Questionnaire and Sample Feature

2.1. Questionnaire Design and Data Collection. Questionnaire is designed to collect traveler’s basic information and attitude towards factors that may influence travel preference on ridesplitting. The questionnaire is designed as two sections: the sociodemographic characteristic investigation section and the user attitudes investigation section. In the sociodemographic characteristic investigation section, respondents are asked to provide their personal information such as age, income, gender, education, household vehicle ownership, and single-trip commuting distance. In the user attitude investigation section, user attitudes towards ridesplitting service and some relative issues are investigated by using Likert Scales ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Referring to the research results of Ajzen [16] and Davis et al. [18], we designed the relative issues, including perceived usefulness (PU), perceived benefit (PB), attitude towards incentives and management issues (AIM), attitude towards public transport (APT), and ridesplitting preference (RP), into the questionnaire.

PU captures the perceived utility of ridesplitting for the traveller, which is closely related to the service efficiency, service quality, and riding environment. PB is defined as the anticipated benefit when using ridesplitting, which is related to the consumption characteristics of ridesplitting. AIM describes the effectiveness of incentives or traffic management measures when using the measures to encourage traveller to adopt ridesplitting. APT describes satisfaction with the service level of surrounding public transport. RP describes the travellers’ willingness to adopt the ridesplitting. The details of each category are shown in Table 1.

The online questionnaires were distributed randomly to the residents in Shanghai from 7 to 21, April 2020. 1187 respondents participated in the survey, and 848 investigation results passed the consistency and quality checks. The effective sample size is greater than 150, which is the minimum size of SEM analysis (Bagozzi and Yi [23]) and thus can be adopted by the structural equation model calibration.

2.2. Sample Feature. According to the survey data, over 60 percent of the respondents are male. The age of participants is ranging from 18 to 60, and the percentage of respondents below 41 years is nearly 80 percent. For the education statistic results, 74.76% of the respondents own bachelor or higher degree. For the revenue part, respondents with monthly income ranging between CNY 5000 and CNY 10000 occupy the highest proportion (42.92%). Over 65% of the respondents claim that they own household vehicles. The investigated results of single-trip commuting distance distribute relatively stable, while the travellers with distance ranging from 6 to 10 km account for 35 percent of the total sample. Compared to the Shanghai statistical yearbook [24], the survey respondents are generally younger and better educated than the average population in Shanghai. Meanwhile, the survey sample adequately covered the diversity of Shanghai residents concerning sociodemographic characteristics, household vehicle ownership, and single-trip commuting distance; sample features are shown in Table 2.
### 3. Methods

#### 3.1. Introduction of Structural Equation Modeling.

Structural equation modeling (SEM) is a multivariate statistical method to analyse the relationship among variables based on the covariance matrix of variables, which can reveal the causal relation [23]. This method has been adopted to identify the key factors influencing customer preference in many market areas [15–22]. Thus, it is suitable to capture the cognitive factors that may influence ridesplitting preference.

#### Table 1: Questions in user attitudes investigation section.

| Construct                      | Question                                                                 |
|--------------------------------|--------------------------------------------------------------------------|
| **Perceived Usefulness**       |                                                                          |
| PU1                           | I think ridesplitting can improve the quality of daily travel            |
| PU2                           | I think ridesplitting can save my waiting time and energy in travel      |
| PU3                           | I think ridesplitting can provide a comfortable and relaxed riding environment |
| PU4                           | I think ridesplitting can improve daily travel efficiency                |
| PU5                           | In a word, ridesplitting is very useful for me                           |
| **Perceived Benefits**         |                                                                          |
| PB1                           | I think ridesplitting can save money on daily travel                     |
| PB2                           | In terms of money, I think ridesplitting is worthwhile                   |
| PB3                           | I think ridesplitting has a good performance-price ratio                 |
| **Attitude towards Public Transport** |                                                                   |
| APT1                          | The distance I walk to the surrounding metro/bus stops is acceptable     |
| APT 2                         | I do not think it will take too much time by public transportation       |
| APT 3                         | I think the riding environment of public transportation is acceptable    |
| APT 4                         | I think surrounding public transportation facilities are very convenient for daily travel |
| **Attitude towards Incentives and Management Issues** |                                                                 |
| AIM1                          | I would like to choose ridesplitting with reasonable discounts or subsidies |
| AIM2                          | I would like to choose ridesplitting when surge pricing happens during rush hours |
| AIM3                          | I would like to choose ridesplitting when the increase in fuel or parking charge executed |
| AIM4                          | I would like to choose ridesplitting when providing high occupancy vehicle lane |
| **Ridesplitting Preference**  |                                                                          |
| RP1                           | In the future, I will use ridesplitting.                                 |
| RP2                           | I would like to use ridesplitting in my daily travel.                    |
| RP3                           | I would like to recommend ridesplitting to my family members/friends     |
| RP4                           | I am going to use ridesplitting as far as possible.                      |
| RP5                           | Compared with other travel modes, I prefer ridesplitting                 |

#### Table 2: Detail of sample feature.

| Variables                        | Description                        | Size | Proportion (%) |
|----------------------------------|------------------------------------|------|----------------|
| Gender                           | Males                              | 512  | 60.38          |
|                                  | Females                            | 336  | 39.62          |
| Age                              | [18, 25]                           | 171  | 20.17          |
|                                  | [26, 30]                           | 200  | 23.58          |
|                                  | [31, 40]                           | 300  | 35.38          |
|                                  | [41, 60]                           | 177  | 20.86          |
| Education                        | High school                        | 78   | 9.20           |
|                                  | Less than a bachelor’s degree      | 136  | 16.04          |
|                                  | Bachelor’s degree                  | 543  | 64.03          |
|                                  | Graduate degree and above          | 91   | 10.73          |
| Monthly income                   | 5000 CNY below                     | 176  | 20.75          |
|                                  | [5000, 10,000) CNY                 | 364  | 42.92          |
|                                  | [10,000, 15,000) CNY               | 201  | 23.70          |
|                                  | 15,000 CNY and above               | 107  | 12.62          |
| Household vehicle                | 0 (no vehicles)                    | 243  | 28.66          |
|                                  | 1                                 | 520  | 61.32          |
|                                  | 2 and above                        | 85   | 10.02          |
| Single-trip commuting distance   | 5km and below                      | 174  | 20.52          |
|                                  | [6, 10] km                         | 297  | 35.02          |
|                                  | [11, 15] km                        | 214  | 25.24          |
|                                  | 16km and above                     | 163  | 19.23          |
SEM is composed of a measurement model and a structural model.

3.1.1. Measurement Model. The measurement model is primarily adopted to describe and evaluate the relationship between latent variables and observed variables (measurement items) and ensure that each latent variable has a reasonable explanatory ability, equations which are shown as follows:

\[
X = \Lambda_\xi \xi + \delta, \\
Y = \Lambda_\eta \eta + \epsilon,
\]

where \(\Lambda_\xi\) is the loading matrix of exogenous variable \(X\) on exogenous latent variable \(\xi\); \(\delta\) is the measurement error vector of exogenous variable; \(\Lambda_\eta\) is the loading matrix of endogenous variable \(Y\) on endogenous latent variable \(\eta\); and \(\epsilon\) is the measurement error vector of endogenous variable.

3.1.2. Structural Models. The structural model is primarily used to capture and estimate the relationship between exogenous variables and endogenous variables, which can be reflected by the path diagram. Its equation is as follows:

\[
\eta = B\eta + \Gamma \xi + \zeta,
\]

where \(B\) is coefficient matrix of endogenous latent variable; \(\Gamma\) is coefficient matrix of exogenous latent variable; and \(\zeta\) is the residual vector of the structural model.

3.2. Definition of Variables. To reveal the determinants affecting ridesplitting preference, both sociodemographic variables and cognitive variables are considered in the modeling process. The model variables are defined in Table 3.

3.3. Theoretical Hypotheses. Since the correlation between cognitive variables may exist, this paper proposed several hypotheses to describe the relationship between the cognitive variables. The details of proposed hypotheses are presented in Table 4. The structural equation model of ridesplitting preference based on these hypotheses is then developed and is presented in Figure 1. The arrow in Figure 1 indicates the unidirectional influence of a cognitive factor on the other. The ID of each hypothesis is posed on its corresponding arrows for the sake of understanding.

3.4. Criterion of Model Fitness. The AMOS 21 and SPSS 21 are implemented to conduct the model calibration process. Different indicators are adopted to validate the fitness of measurement model and structural model [23, 25]. In the measurement model, factor loading, square multiple correlations (SMCs), composition reliability (CR), and average variance extracted (AVE) values, were implemented for model validation. The thresholds of these indicators are set to be 0.6, 0.36, 0.7, and 0.5, respectively. The consistency between the model and the sample data in the structural model is tested by degree of freedom ratio (\(\chi^2/DF\)), root-mean-squared error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and comparative fit index (CFI). The consistency threshold details are set to be \(\chi^2/DF < 3\), RMSEA<0.08, GFI>0.9, AGFI>0.9, and CFI>0.9.

4. Results and Discussion

4.1. Model Fitness. According to the model tests, measurement items, such as PU3, PU5, RP1, RP4, AIM3, and APT1, are statistically insignificant and thus dropped from the original model. The results of measurement model are presented in Table 5. Both factor loading and square multiple correlations (SMCs) are greater than their corresponding threshold, indicating the reliability of the measurement model. The composition reliability (CR) is over 0.7, and the average variance extracted (AVE) value is greater than 0.5. Therefore, convergent validity can be certified. The model fitness results of structural model are shown in Figure 2. The \(R^2\) values for perceived usefulness, perceived benefit, and ridesplitting preference are 0.73, 0.71, and 0.51, respectively. Moreover, fitness indices, such as chi-squared/df (2.504), CFI (0.975), GFI (0.958), AGFI (0.944), and RMSEA (0.042) meet its recommended value, indicating that model fitness is reasonable and estimation results can be further interpreted.

4.2. Analysis of Results of the Measurement Model. From the results of measurement model in Table 5, the loadings of PU1, PU2, and PU4 are positive. These results denote that measures to improve service quality, travel efficiency, and saving waiting time would exert positive effects on the perceived usefulness. Also, the loadings of PB1, PB2, and PB3 are positive and the loading of PB2 is the largest, signifying that saving money, reasonable price, and cost performance have positive effects on perceived benefit and reasonable pricing is essential to increase the perceived benefit. The loading of AIM2 is the largest, followed by AIM1 and AIM3, suggesting that the surge pricing on ridesourcing will exert the strongest positive influence on ridesplitting usage attitude, followed by ridesplitting discounts and the implementing HOV lane. Meanwhile, loadings of ATP4 and ATP3 are positive and their loading values are close, indicating that convenience of public transportation facilities and comfort of riding environment will share similar positive influences on the attitude towards public transport. The loadings of RP2, RP3, and RP5 are positive, exhibiting that willingness to use in the daily travel, willingness to recommend to the family, and travel preference on ridesplitting are suitable to describe the travellers’ preference to adopt the ridesplitting.

4.3. Analysis of Results of the Structural Model. According to the regression results of structural model, the coefficient and significance results are shown in Figure 2. The estimated results of significance (t value) are lower than 0.05, meaning the H1–H7 hypothesis cannot be rejected within 95% confidence interval. Also, age, education, and gender have a
significant impact on ridesplitting preference. The larger value of the path coefficients indicates the greater influence, and the negative path coefficient represents a negative influence. From the results of path coefficients, cognitive factors including perceived usefulness ($\alpha = 0.39$), perceived benefit ($\alpha = 0.36$), and attitude towards incentives and management issues ($\alpha = 0.3$) exert a significant impact on the ridesplitting preference. Additionally, perceived benefit significantly influence the perceived usefulness of ridesplitting ($\alpha = 0.41$), indicating that the indirect effect of perceived benefit will be imposed on ridesplitting preference. Similarly, the results demonstrate that attitude towards public transport has a significant negative impact on ridesplitting preference.

### Table 3: Model variables.

| Variable                        | Description                                                                 |
|---------------------------------|-----------------------------------------------------------------------------|
| Gender                          | 1 = males; 0 = female                                                       |
| Age                             | 1 = individual 18–25 years old; 0 = above 25                                 |
| Education                       | 1 = graduate degree; 0 = below graduate degree                              |
| Income                          | 1 = monthly income of 2500–5000 CNY; 0 = else                               |
| Low                             | 1 = monthly income of 5000–10000 CNY; 0 = else                              |
| High (reference)                | 1 = monthly income of above 10000 CNY; 0 = else                            |
| Distance                        | 1 = average distance of below 5 km; 0 = else                                 |
| Perceived usefulness            | Measured by items from PU1 to PU5 in Table 1, ranging from 1 to 7           |
| Perceived benefit               | Measured by items from PB1 to PB3 in Table 1, ranging from 1 to 7           |
| Attitude towards incentives and management issues | Measured by items from AIM1 to AIM4 in Table 1, ranging from 1 to 7 |
| Attitude towards public transport | Measured by items from APT1 to APT4 in Table 1, ranging from 1 to 7 |

### Table 4: Model hypotheses.

| Description                                                                 |
|-----------------------------------------------------------------------------|
| H1: perceived benefit exerts a significant positive effect on perceived usefulness |
| H2: perceived benefit exerts a significant positive effect on ridesplitting preference |
| H3: attitude towards incentives and management issues has a significant positive effect on perceived usefulness. |
| H4: attitude towards incentives and management issues has a significant positive effect on ridesplitting preference |
| H5: attitude towards incentives and management issues has a significant positive effect on perceived benefit. |
| H6: perceived usefulness has a significant positive impact on ridesplitting preference |
| H7: attitude towards public transport has a significant negative impact on ridesplitting preference |
incentives and management issues significantly affect the perceived usefulness of ridesplitting ($\alpha = 0.37$) as well as the perceived benefit ($\alpha = 0.92$), which then indirectly affects ridesplitting preference. The attitudes towards public transport appear not to be a strong negative driving force ($\alpha = -0.07$) to discourage the desire to adopt ridesplitting.

### 4.4. Discussion of Model Result

According to the preliminary analysis discussed above, cognitive factors, such as PU, PB, and AIM, appear to be a positive driving force encouraging ridesplitting usage. To clarify the determinants, total effects of the factors on ridesplitting preference are further estimated using bootstrapping of AMOS [26]. The results are presented in Table 6.

As shown in Table 6, sociodemographic variables including education ($\beta = 0.044$), gender ($\beta = -0.065$), and age ($\beta = -0.088$) indicate that young female travellers with better education would prefer to adopt the ridesplitting, although the impact of such factors is relatively low. AIM, PB, and PU appear to be key determinants influencing ridesplitting preference. AIM can be regarded as the most influential determinant with $\beta$ equalling to 0.772. This result indicates that incentives and management measurements, including

#### Table 5: Confirmatory factor analysis results.

| Latent variable                                      | Code | Loading | SMC  | CR   | AVE  |
|------------------------------------------------------|------|---------|------|------|------|
| Perceived usefulness                                 | PU1  | 0.837   | 0.701|      |      |
|                                                      | PU2  | 0.83    | 0.689| 0.879| 0.709|
|                                                      | PU4  | 0.858   | 0.736|      |      |
| Perceived benefits                                   | PB1  | 0.736   | 0.542|      |      |
|                                                      | PB2  | 0.847   | 0.717|      |      |
|                                                      | PB3  | 0.746   | 0.557|      |      |
| Attitude towards incentives and management issues    | AIM1 | 0.819   | 0.671|      |      |
|                                                      | AIM2 | 0.887   | 0.787|      |      |
|                                                      | AIM4 | 0.742   | 0.551|      |      |
| Attitudes towards public transport                   | APT2 | 0.78    | 0.608|      |      |
|                                                      | APT3 | 0.816   | 0.666|      |      |
|                                                      | APT4 | 0.857   | 0.734|      |      |
| Ridesplitting preference                             | RP2  | 0.813   | 0.661|      |      |
|                                                      | RP3  | 0.847   | 0.717|      |      |
|                                                      | RP5  | 0.829   | 0.687|      |      |

* denotes significance at the 0.05 level
** denotes significance at the 0.01 level
*** denotes significance at the 0.001 level
ridesplitting discounts, ridesourcing surge pricing, and implementing HOV, would lead to the increase of ridesplitting preference and usage. The estimated effect of PB on ridesplitting preference is 0.498, suggesting that reasonable pricing for ridesplitting is necessary to stimulate ridesplitting adoption. According to the result, the influence level of PU is 0.346, which also has a positive impact on ridesplitting preference. Meanwhile, APT (β = -0.065) is the only latent variable leading to the negative impact on ridesplitting adoption. It means that travellers may have less preference on ridesplitting in areas with sufficient public transportation supply [27].

5. Conclusions

Ridesplitting is a new form of for-hire service that provides real-time share travel via the Internet. Although this service increases the sharing travel efficiency with less negative externalities, the market share of ridesplitting still maintains at a low level. Identifying determinants affecting ridesplitting preference would provide useful information for further ridesplitting service design and management. This paper identifies the cognitive determinants to affect ridesplitting preference and their inner relationships by the structural equation model. The model has been calibrated by the online survey data collected in Shanghai. The modal fitness results are reasonable and the path coefficients are significant, exhibiting that the proposed hypothesis cannot be rejected. The result demonstrates that attitude towards incentives and management issues, perceived benefit, and perceived usefulness are calibrated as cognitive determinants, which appear to be strong active driving forces encouraging the ridesplitting preference.

Similar to other experimental studies, this study has its own limitations. Firstly, the investigation was only conducted in Shanghai, China, and the results may not be suitable for other areas. Secondly, other potentially influential factors, such as impacts from friends and family [28], personal technology acceptance, environmental awareness [29], the attitude towards share travel with strangers [10], and other latent variables are not considered in this paper and should be further discussed.

Data Availability

The data were obtained from the online survey for travelers at Shanghai, China. The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Table 6: Standardized effects on ridesplitting preference.

| Effect analysis | PB → RP | AIM → RP | APT → RP | PU → RP | Education → RP | Gender → RP | Age → RP |
|----------------|---------|----------|----------|---------|----------------|-------------|----------|
| Indirect effect | 0.155   | 0.521    | 0.065    | 0.346   | 0.044          | -0.065      | -0.088   |
| Direct effect  | 0.343   | 0.251    | 0.346    | 0.044   | -0.065         | -0.088      |          |
| Total effect   | 0.498   | 0.772    | 0.065    | 0.346   | 0.044          | -0.065      | -0.088   |

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References

[1] W. Li, Z. Pu, Y. Li, and X. Ban, "Characterization of ridesplitting based on observed data: a case study of Chengdu, China," Transportation Research Part C: Emerging Technologies, Transportation Research, vol. 100, pp. 330–353, 2019.
[2] S. Shaheen and A. Cohen, "Shared ride services in North America: definitions, impacts, and the future of pooling," Transport Reviews, vol. 39, no. 4, pp. 427–442, 2019.
[3] S. Shaheen, A. Cohen, and I. Zohdy, Shared Mobility: Current Practices and Guiding Principles: United States, Federal Highway Administration, Philadelphia, PA, USA, 2016.
[4] N. A. H. Agatz, A. L. Erera, M. W. P. Savelbergh, and X. Wang, "Dynamic ride-sharing: a simulation study in metro Atlanta," Transportation Research Part B: Methodological, vol. 45, no. 9, pp. 1450–1464, 2011.
[5] A. Najmi, D. Rey, and T. H. Rashidi, "Novel dynamic formulations for real-time ride-sharing systems," Transportation Research Part E: Logistics and Transportation Review, vol. 108, pp. 122–140, 2017.
[6] X. Chen, M. Zahiri, and S. Zhang, "Understanding ridesplitting behavior of on-demand ride services: an ensemble learning approach," Transportation Research Part C: Emerging Technologies, vol. 76, pp. 51–70, 2017.
[7] A. E. Brown, "Who and where rideshares? Rideshare travel and use in Los Angeles," Transportation Research Part A: Policy and Practice, vol. 136, pp. 120–134, 2020.
[8] M. J. Mohamed, T. Rye, and A. Fonzone, "Operational and policy implications of ridesourcing services: a case of Uber in London, UK," Case Studies on Transport Policy, vol. 7, no. 4, pp. 823–836, 2019.
[9] F. F. Dias, P. S. Lavieri, V. M. Garikapati, S. Astroza, R. M. Pendyala, and C. R. Bhat, "A behavioral choice model of the use of car-sharing and ride-sourcing services," Transportation, vol. 44, no. 6, pp. 1307–1323, 2017.
[10] J. Moody, S. Middleton, and J. Zhao, "Rider-to-rider discriminatory attitudes and ridesharing behavior," Transportation Research Part F: Traffic Psychology and Behaviour, vol. 62, pp. 258–273, 2019.
[11] D. Brownstone and T. F. Golob, “The effectiveness of ride-sharing incentives,” Regional Science and Urban Economics, vol. 22, no. 1, pp. 5–24, 1992.
[12] J. G. Neoh, M. Chipulu, and A. Marshall, "What encourages people to carpool? an evaluation of factors with meta-analysis," Transportation, vol. 44, 2017.
[13] G. Meyer and S. Shaheen, Online and App-Based Carpooling in France: Analyzing Users and Practices—a Study of BlaBlaCar, Springer International Publishing, Berlin, Germany, 2017.
[14] P. Delhomme and A. Gheorghiu, “Comparing French carpoolers and non-carpoolers: which factors contribute the
most to carpooling?” Transportation Research Part D: Transport and Environment, vol. 42, pp. 1–15, 2016.

[15] J. Ye, J. Zheng, and F. Yi, “A study on users’ willingness to accept mobility as a service based on UTAUT model,” Technological Forecasting and Social Change, vol. 157, 2020.

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

[17] A. Y.-L. Chong, “A two-staged SEM-neural network approach for understanding and predicting the determinants of m-commerce adoption,” Expert Systems With Applications, vol. 40, no. 4, pp. 1240–1247, 2013.

[18] F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, “User acceptance of computer technology: a comparison of two theoretical models,” Management Science, vol. 35, no. 8, pp. 982–1003, 1989.

[19] A. George and G. S. G. Kumar, “Antecedents of customer satisfaction in internet banking: technology acceptance model (TAM) redefined,” Global Business Review, vol. 14, no. 4, pp. 627–638, 2013.

[20] W. Mohamad, A. Fuad, N. Shahib et al., “A framework of customer’s intention to use Uber service in tourism destination,” International Academic Research Journal of Business and Technology, vol. 2, pp. 102–106, 2016.

[21] R. Septiani, P. W. Handayani, and F. Azzahro, “Factors that affecting behavioral intention in online transportation service: case study of GO-JEK,” Procedia Computer Science, vol. 124, pp. 504–512, 2017.

[22] L. Zhang, J. Zhu, and Q. Liu, “A meta-analysis of mobile commerce adoption and the moderating effect of culture,” Computers in Human Behavior, vol. 28, no. 5, pp. 1902–1911, 2012.

[23] R. P. Bagozzi and Y. Yi, “Specification, evaluation, and interpretation of structural equation models,” Journal of the Academy of Marketing Science, vol. 40, no. 1, pp. 8–34, 2012.

[24] S. B. o. Statistics, Shanghai Statistical Yearbook, Shanghai Bureau of Statistics, Shanghai, China, 2019.

[25] X. Cheng, S. Fu, and G.-J. De Vreede, “A mixed method investigation of sharing economy driven car-hailing services: online and offline perspectives,” International Journal of Information Management, vol. 41, pp. 57–64, 2018.

[26] A. F. Hayes, "Beyond baron and kenny: statistical mediation analysis in the new millennium," Communication Monographs, vol. 76, no. 4, pp. 408–420, 2009.

[27] M. Stiglic, N. Agatz, and M. Savelsbergh, "Enhancing urban mobility: integrating ride-sharing and public transit," Computers & Operations Research, vol. 90, pp. 12–21, 2017.

[28] J. Schikofsky, T. Dannewald, and M. Kowald, "Exploring motivational mechanisms behind the intention to adopt mobility as a service (MaaS): insights from Germany," Transportation Research Part A: Policy and Practice, vol. 131, pp. 296–312, 2020.

[29] F. Alemi, G. Circella, P. Mokhtarian, and S. Handy, "What drives the use of ridehailing in California? Ordered probit models of the usage frequency of Uber and Lyft," Transportation Research Part C: Emerging Technologies, vol. 102, pp. 233–248, 2019.