Determinants of the Continued Intention of College Students in China to Use DiDi Mobile Car-Sharing Services

Isaac Kofi Mensah¹, Zhao Tianyu², Guohua Zeng¹, and Luo Chuanyong³

Abstract
This research paper examined the continued intention of college students to use DiDi mobile car-sharing services in China. The unified theory of acceptance and use of technology (UTAUT) was used as the theoretical framework while the data analysis was completed with SPSS. The results have demonstrated that performance expectancy, reliability, efficiency, and security and privacy were significant predictors of the continued intention to use mobile car-sharing services. Contrary to our expectations, effort expectancy was not a significant determinant of the continued intention to use mobile car-sharing services. In addition to these direct effects, the moderating impact of trust in the internet was also examined. The moderating analysis showed that trust in the internet showed no significant moderating impact on the relationship between performance expectancy, effort expectancy, reliability, efficiency, and security and privacy and the continued intention to use mobile car-sharing services. The implications of these findings are discussed.

Keywords
sharing economy, car-sharing, students, China, DiDi, UTAUT

Introduction
The concept of car-sharing service is considered as an important option as compared to other means of sustainable transportation and mobility (Paundra et al., 2017). The car-sharing industry is based on the sharing economy principles. The development and availability of information and communication technology (internet and web technologies) have provided the foundation for the adoption/facilitation of sharing economy principles, which permit individuals to communicate, coordinate, and build trust and confidence with others (Albinsson & Yasanthi Perera, 2012; Belk, 2014; John, 2013; Martin, 2016). The sharing economy principle is an economic arrangement between or among individuals who share and use underutilized resources or assets (Bardhi & Eckhardt, 2012; Cohen & Kietzmann, 2014; Zervas et al., 2017) for mutual benefits. The sharing economy is also defined as the peer-to-peer action which involves acquiring, giving or sharing the access to goods and services, experiences, knowledge and collaboration via online services to ensure societal well-being/welfare (Fraiberger & Sundararajan, 2017; Gargiulo et al., 2015; Hamari et al., 2016). Extended, the sharing economy is seen as an integrated and collective system of entrepreneurs and consumers who attempt to leverage technology to share and maximize the use of resources, save money, and generate capital (Cohen & Shaheen, 2018). The car-sharing services can be categorized into online and offline services (Cheng et al., 2018). The online services involve the services conducted online, reservation, electronic payment as well as user reviews and offline services when the individual user is picked up in the car (Cheng et al., 2018).

Car sharing is a situation where a car is utilized by many or several other people (Fleury et al., 2017). Car sharing is also considered as the shared use of a vehicle fleet for
members on a need-and-demand basis, and a shared car could be in the form of round trip, one way, peer to peer, and fractional (Martin & Shaheen, 2016; Stocker et al., 2016). The round-trip car sharing enables the user to start and end a trip at the same vehicle location, whereas the one-way car-sharing enables members to start a trip and end a trip at different locations (Martin & Shaheen, 2016). In addition, the peer-to-peer car-sharing operates like the round-trip car sharing but in this case the vehicle flight is usually owned/leased by private individuals and facilitated by a third-party operator (Martin & Shaheen, 2016). The fractional car-sharing model enables consumers to co-own a vehicle and share its costs and use (Martin & Shaheen, 2016). The car-sharing concept enables the individual to enjoy and have access to a private car within a period of time without necessarily having to own it (Baptista et al., 2014; Shaheen et al., 2002). Car sharing is not expensive as compared to the use of personal cars; individual users can travel within short distances than with a personal car, and it can reduce the number of cars on the roads (Fleury et al., 2017; Seik, 2000). Users can get access to vehicles by payment of fees and usage rate which is calculated based on the distance to be covered (Baptista et al., 2014). Car sharing can be substitute mobility for those who do not have or own a private car or means of transport and complement to public transportation which provides options for commuters (Ferrero et al., 2017; Fleury et al., 2017; Shaheen & Cohen, 2013). Car-sharing services have an impact on both environmental sustainability and personal efficient and rational mobility of the user (Baptista et al., 2014; Paundra et al., 2017). A shared car has the potential to remove about nine to 13 private cars off the roads which consequently reduces the level of air pollution, traffic jam, and increase in the number of parking spaces (De Luca & Di Pace, 2015; Efthymiou et al., 2013; Martin et al., 2010). Car-sharing can also ensure shared mobility for consumers. Shared mobility is an innovative transportation strategy that enables users to have short-term access to a mode of transport on a needed basis (Cohen & Shaheen, 2018).

Data show that the proportion of online car users in the Chinese market were aged between 25 and 30 years and is the highest, accounting for 30.2% of the total users, and the proportion of net car users aged 25 to 35 is 50.9%. In terms of gender, the proportion of male users is higher than the proportion of female users (AiMedia, 2018). It was also indicated that, in the Chinese online travel market in 2017–2018, over 80% of users are willing to accept the use of online car travel. In the survey on the reasons for choosing to use the network to travel, 71.3% of the online car users indicated that they use the online car services because it saves time and 47% said because online cars have more favorable price and also the better riding environment is a major contributing factor for the users to use online car travel (AiMedia, 2018). DiDi is one of the car-sharing services in China. DiDi which was founded in 2012 is a Chinese-owned car-sharing services that combine artificial intelligence and autonomous technologies to provide services such as taxi hailing, car sharing, bike sharing, e-bike sharing, and express to its numerous consumers through their smartphones. The DiDi platform is the most widely used car-sharing services in China, and its sharing services range from round trip, one way, peer to peer, and fractional. The services are available to the broader Chinese community/society of which the university is part. It has been indicated that as of February 2016, a little over 84% of China’s mobile transportation ride-share orders were made through DiDi Chuxing (Statista, 2019). DiDi had since its inception expanded its operation to other regions of the world such as Australia, Brazil, Japan, and Mexico. It is estimated that about 550-million people use DiDi services and operates in about 400 Chinese cities such as Beijing, Shanghai, Changsha, Guangzhou, Shenzhen, Hangzhou, Ningbo, and Harbin. At the end of 2018, the annual volume of DiDi auto services reached 37-billion RMB ($5 billion). It has 21-million registered drivers of which 2.3 million are women (10%). In 2017, the platform provided more than 7.43-billion mobile travel services to 450-million users in more than across various cities in China (AiMedia, 2018). It is further estimated that the daily orders reached 25 million on the DiDi platform (AiMedia, 2018).

The purpose of this study is to examine the continued intention of college students to use the DiDi mobile car-sharing services in the city of Ganzhou. College students are considered one of the important market segments for car-sharing service providers due to the fact that they have an extremely dynamic life and exhibit certain characteristics such as frequent movement, low car ownership, heavy usage of smartphones, sharing propensity, commuting to the city center, and multi-mode oriented usage (Martin & Shaheen, 2011; Rotaris et al., 2019). Car-sharing services, therefore, provide opportunities for college students to have access to cars for easy sustainable mobility without having to own one. This study thus seeks to contribute to the car-sharing economy literature by exploring the moderating impact of consumer trust in the internet on performance expectancy, effort expectancy, service reliability, service efficacy, and security and privacy and the continued intention to use DiDi mobile car-sharing services. The research questions to be explored are as follows:

**Research Question 1:** What are the factors determining the continued intention of college students to use the DiDi mobile car-sharing services?

**Research Question 2:** What is the significant impact of these factors on the continued intention to use DiDi mobile car-sharing services?

**Research Question 3:** To what extent does consumer trust moderate the impact of performance expectancy, effort expectaney, reliability, efficiency, and security and privacy on the continued intention to use mobile car-sharing services?
The rest of the research paper is presented in this manner: Research theoretical framework and hypotheses development, research model, research methodology, results and data analysis, discussion, conclusion, and limitations of the study.

**Research Theoretical Framework and Hypotheses Development**

**UTAUT Model**

The unified theory of acceptance and use of technology (UTAUT) model is an extension of the technology acceptance model (TAM) developed by Davis (1989) and Davis et al. (1989). The UTAUT model examines the influence of information technology and its related applications on individual adoption behavior (Venkatesh et al., 2003). The UTAUT model is an integration of other technology adoption models such as TAM, theory of planned behavior (TPB), theory of reasoned action (TRA), and the innovation diffusion theory (IDT). The UTAUT model has been applied extensively covering different areas such as e-government (Faulkner et al., 2018; Mansoori et al., 2018; Verkijika & De Wet, 2018), m-government adoption (Alomari, 2018), electronic voting machine (Chauhan et al., 2018), e-commerce adoption/online/mobile shopping (Chopdar et al., 2018; Gupta et al., 2018; Singh & Matsui, 2018), mobile payment (Cao & Niu, 2019), health information systems/e-health/m-health (Bawack & Kamdjoug, 2018; Hoque & Sorwar, 2017; Jewer, 2018), internet banking/online banking (Abbas et al., 2018; Rahi et al., 2018; Zendehdel et al., 2018), and e-learning (Khan, 2018; Lashayo & Johar, 2018; Lawson-Body et al., 2018) to examine the user behavior toward new technologies. The UTAUT model has three main determinants of the behavioral intention to use. These are performance expectancy, effort expectancy, and social influence while facilitating conditions determine both the intention to use and actual user behavior (Venkatesh et al., 2003).

**Performance Expectancy**

Performance expectancy is defined as the individual user confidence that the use of new information technology and its related applications will contribute to his or her job performance (Venkatesh et al., 2003). The extent to which a consumer is convinced that using an online service will aid in achieving the expected services will have an impact on their intention to adopt and use such technological services like the carpooling services. Studies have shown that performance expectancy is a significant predictor of the behavioral intention to use (Fleury et al., 2017; Huang & Chen, 2017; Lan & Zhu, 2016; Leicht et al., 2018; Rahi et al., 2018). Consequently, H1 was proposed.

**Hypothesis 1 (H1):** Performance expectancy is positively related to the continued intention to use DiDi mobile car-sharing services.

**Effort Expectancy**

Effort expectancy is considered the user understanding that using new technology will be ease of use (Venkatesh et al., 2003). The manner in which a new technology service is adopted and used is largely dependent on the consumer’s ability to navigate and use such technologies without any troubles or challenges which will have an effect on their behavioral intention to use. Previous studies have demonstrated that effort expectancy has a positive significant impact on the behavioral intention to use (Fleury et al., 2017; Huang & Chen, 2017; Lan & Zhu, 2016; Leicht et al., 2018; Rahi et al., 2018). Accordingly, H2 was proposed.

**Hypothesis 2 (H2):** Effort expectancy is positively related to the continued intention to use DiDi mobile car-sharing services.

**Reliability**

Reliability is one of the dimensions of service quality. Reliability is considered the extent to which an expected service is delivered or performed accurately and dependably (Parasuraman et al., 1985, 1988). The reliability of service quality has the potential to have an enormous effect on the survival of businesses, and it is considered the most important dimension in the SERQUAL (Baumann et al., 2007; Kassim & Souiden, 2007; Omar et al., 2015). Some characteristics or attributes of reliability dimensions are the accurate delivery of service, complete order of service, being truthful, keeping service promise, accurate online booking, and website availability (Omar et al., 2015). The extent to which car-sharing services are reliable will have a consequent effect on the decision of users to continue to use such services. Studies have shown that the reliability of service quality is a significant predictor of the intention to use (Hoque & Sorwar, 2017; Ramamoorthy et al., 2018). Accordingly H3 was proposed.

**Hypothesis 3 (H3):** Reliability is positively related to the continued intention to use DiDi mobile car-sharing services.

**Efficiency**

Efficiency from the customer perspective is the availability of effective systems to enjoy service delivery. Car sharing has the capacity to enhance the mobility efficiency of the
consumer (Alencar et al., 2019; Mattia et al., 2019; Tuominen et al., 2019). Efficiency has been demonstrated to have direct significant impact on consumer satisfaction (Hammoud et al., 2018). Accordingly, the extent to which car-sharing services are considered by the consumer to be efficient in terms of contributing to getting to the desired destination in and on time can influence their intention to continue to use such services. Hence, H4 was proposed.

**Hypothesis 4 (H4):** Efficiency is positively related to the continued intention to use DiDi mobile car-sharing services.

### Security and Privacy

The security and privacy protection of the consumer is an important contributing factor for the consumer to engage in any online service provision or technology. The fear of misuse of information provided during interaction online to other unauthorized persons is of importance to the consumer. As technology expands and grows, it becomes increasingly vital for organizations to be put in place measures to protect consumers’ information in order to prevent security and privacy breach (Skolmen & Gerber, 2015). The level of uncertainty expressed by the consumer with regard to security and privacy of personal information can impede or hinder the adoption of new technologies as well as online services adoption (Skolmen & Gerber, 2015). Studies have indicated that issues of security and privacy have an impact on the intention to adopt and use (Ando et al., 2016; Lallmahamood, 2007; Vasileiadis, 2014; Wang & Lin, 2017). Consequently, H5 was proposed.

**Hypothesis 5 (H5):** Perceived security and privacy are positively related to the continued intention to use DiDi mobile car-sharing services.

### Consumer Trust in the Internet

Trust in the internet has been indicated as the major determinant of the adoption of e-services and new technologies (Carter & Bélanger, 2005; Warkentin et al., 2002). Consumer trust in the internet in terms of its ability to protect his or her transactions from being breached by third parties is fundamental to drive the adoption of technologies such as DiDi car-sharing services. Previous studies have indicated the positive impact of trust in the internet on the behavioral intention to use (Alalwan et al., 2018). Trust in the internet has been explored to moderate significantly the impact of attitudes toward use and the intention to use online services (Mangin et al., 1970). In addition, trust was demonstrated to moderate first the impact of perceived risk on consumer satisfaction and second the impact of perceived risk and the consumer re-purchase intentions (Chen et al., 2015). In this study, we are testing the trust in the internet as a moderator, moderating the impact of performance expectancy, effort expectancy, reliability, efficiency, and security and privacy on the intention to use DiDi mobile car-sharing services. Accordingly, H6, H7, H8, H9, and H10 were proposed.

**Hypothesis 6 (H6):** Trust in the internet has a positive moderating effect on the relationship between performance expectancy and the continued intention to use DiDi mobile car-sharing services.

**Hypothesis 7 (H7):** Trust in the internet has a positive moderating effect on the relationship between effort expectancy and the continued intention to use DiDi mobile car-sharing services.

**Hypothesis 8 (H8):** Trust in the internet has a positive moderating effect on the relationship between reliability and the continued intention to use DiDi mobile car-sharing services.

**Hypothesis 9 (H9):** Trust in the internet has a positive moderating effect on the relationship between efficiency and the continued intention to use DiDi mobile car-sharing services.

**Hypothesis 10 (H10):** Trust in the internet has a positive moderating effect on the relationship between security and privacy and the continued intention to use DiDi mobile car-sharing services.

### Research Model

Based on the research hypothesis developed, this study will explore the research model depicted in Figure 1. Performance expectancy, effort expectancy, reliability, efficiency, and security and privacy are expected to have a direct impact on the continued intention to use DiDi mobile car-sharing services. The consumer trust in the internet is expected to moderate the impact of these factors on the continued intention to use.

### Research Methodology

The data for this study were acquired through a research question that was developed and administered online. The survey was developed on an online website (www.wenjuan.com) and then shared through the Chinese social media platform such as WeChat for respondents (students) within the university community (Jiangxi University of Science and Technology in Ganzhou) to complete. The study was focused on Jiangxi University of Science and Technology because of, first, the authors’ familiarity and knowledge of this institution and the City in which this university is located and, second, the author’s observation of the higher frequency with which the students of the university use the DiDi car-sharing services. The constructs of the instrument were adapted from previous studies but were modified to reflect the content of this study. Performance expectancy, effort expectancy, and behavioral intention to use were adopted from Venkatesh
et al. (2003); reliability and efficiency from Alawneh et al. (2013) and Asad et al. (2016); security and privacy from Alawneh et al. (2013) and Sikdar et al. (2015); and trust in the internet from Dutton and Shepherd (2006) and Wangpipatwong et al. (2005). Questionnaire items were first developed in English before it was translated into Chinese. The items were measured on a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree. The questionnaire items used are attached as appendix.

Piloting and pretesting was undertaken before the data collection section online. Piloting and pretesting of the questionnaire were necessary to avoid likely problems that respondents may have in responding to the questions and also to anticipate any challenges that may arise with the data analysis. It was also aimed at assessing their understanding of the problem, the format of the questionnaire, the response time, and the nature of the scales used. The feedback received during the piloting and pretesting to about 70 students who would be respondents were helpful in restructuring some of the items in the questionnaires which reduced the level of ambiguity. It took about 3 months (October-December 2018) for the data to be gathered online. After the specified period for the completion of the online questionnaire, a total of 225 responses were elicited out of the targeted sample size of 500 students. This accounted for 45% of the targeted number of respondents. The sample size was calculated using three variables such as the population (36,000 students—estimated number of students at the university) size, the margin of error (5%), and confidence level (95%). With this calculation (see, for formula, https://www.surveymonkey.com/mp/sample-size-calculator/), the minimum estimated sample size should be 381 but we extended and rounded it up to 500 sample size. The captured data were analyzed with SPSS.

### Results and Data Analysis

#### Demographic Statistics

The demographic statistics of the respondents are shown in Table 1. The majority of the respondents were female students (67.56%). Also, the majority of the respondents were between the ages of 18 and 25 years (97.3%) while the majority of them were undergraduate students (97.3%). In term of years of experience with the DiDi mobile car-sharing services, the majority indicated that they have had two years and above (2+) experience using the DiDi mobile car-sharing services (72.4%).

| Item                | Frequency | Percentage |
|---------------------|-----------|------------|
| Gender              | Male      | 73         | 32.44     |
|                     | Female    | 142        | 67.56     |
| Age distribution    | 18–25     | 219        | 97.33     |
|                     | 26–30     | 6          | 2.67      |
| Educational level   | Undergraduate | 219        | 97.33     |
|                     | Master’s  | 6          | 2.67      |
| User experience     | Less than 1 year | 0          | 0         |
|                     | 1–2 years | 62         | 27.56     |
|                     | 2+ years  | 163        | 72.44     |
Table 2. Descriptive Statistics and Correlation Analysis.

| Variable | M     | SD    | PE    | EE    | RE    | EF    | SP    | CIU   | TI    |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| PE       | 3.120 | 0.884 | 1     |       |       |       |       |       |       |
| EE       | 3.324 | 0.5637| .324**| 1     |       |       |       |       |       |
| RE       | 2.990 | 0.8047| .535**| .392**| 1     |       |       |       |       |
| EF       | 3.439 | 0.6253| .530**| .555**| .687**| 1     |       |       |       |
| SP       | 3.060 | 0.7384| .401**| .329**| .674**| .572**| 1     |       |       |
| CIU      | 3.20  | 0.795 | .530**| .357**| .768**| .614**| .627**| 1     |       |
| TI       | 2.98  | 0.486 | .273**| .195**| .446**| .439**| .407**| .364**| 1     |

Note. PE = performance expectancy; EE = effort expectancy; RE = reliability; EF = efficiency; SP = security and privacy; CIU = continued intention to use; TI = trust in the internet.

**Correlations are significant at the 0.01 (two-tailed) level of significance.

Descriptive Statistics

Before the statistical examination of the constructs proposed in this article, a simple descriptive analysis of the mean, variance, and related relationships of the variables was conducted. The results of the descriptive statistics and correlations of the variables are shown in Table 2. As indicated in Table 2, there is a significant positive correlation between the variables such as performance expectations, effort performance, reliability, efficiency, privacy and security, trust in the internet and continued intention to use. The above results provided the basis for the analysis of the relationship between the relevant variables in this study. In general, the outcome of the descriptive analysis and correlation between the variables basically met the hypothetical expectations of the study.

Measurement Model

The results of the quality criterion, reliability, and validity of the constructs used in this study are shown in Table 3. The reliability and validity of the constructs were determined through the analysis of the composite reliability, Cronbach’s alpha, average variance extracted (AVE), and factor loadings. The reliability indicator for factor loadings for each item is recommended to be .70 (Hair et al., 2010). The indicator reliability for Cronbach alpha and composite reliability are respectively recommended to have values above .70 and .80 (Henseler et al., 2009). In addition, the values for AVE should have a minimum value of 0.50 (Hair et al., 2010). As indicated in Table 3, all the recommended values for the indicator reliability for factor loadings, Cronbach’s alpha, composite reliability, and AVE were all met. In addition, the discriminant validity of the constructs was also conducted by using the Fornell–Larcker criterion principle. The results of the discriminant validity are shown in Table 4. The Fornell–Larcker principle states that there is discriminant validity if the square root of the AVE (shown in bold in Table 4) is greater than the paired intercorrelations between the latent variables. As indicated in Table 4, the entire diagonal variables (square roots of the AVE) are higher than their equivalent off-diagonal values (paired intercorrelations). So it can be concluded that criteria for the Fornell–Larcker criterion was met and consequently affirming the discriminant validity of the scales used in this study.

Structural Model

Direct effects. The results of the direct relationships between the variables considered in this study are shown in Table 5. All the direct relationships were statistically supported except for one of the relationships which was not supported. The results have shown that performance expectancy (β = .150, p < .05), reliability (β = .536, p < .05), efficiency (β = .152, p < .05), and security and privacy (β = .232, p < .05) were all significant determinant of the continued intention to use DiDi mobile car-sharing services. Accordingly, H1, H3, H4, and H5 were supported. It was, however, shown that effort expectancy does not predict significantly the continued intention to use DiDi mobile car-sharing services (β = -.048, p > .05). H2 was therefore not supported.

Moderating effects. The results of the moderating analysis conducted are shown in Table 6, and the outcomes of the moderating effects are summarized in Table 7. The hierarchical regression method of analysis was adopted to examine the moderating effect of the trust in the internet on the relationship between performance expectancy, effort expectancy, reliability, efficiency, and security and privacy and the continued intention to use. This was tested with SPSS 23 software. As the test of moderating effects involves the interaction between the constructs, it is imperative that the extent of multicollinearity between the interaction term and the original variables is examined. To avoid the problem of multicollinearity, the relevant variables were normalized to have a mean of 0 and a variance of 1. To ensure the reliability and accuracy of the results that are guaranteed, three important statistical tests were further conducted for each construct. These tests are multicollinearity, sequence-related, and heteroscedasticity problem tests.
### Table 3. Construct Validity and Reliability Analysis.

| Constructs          | Code | Factor loadings | t value | Standard factor load | AVE  | CR   | Cronbach’s α |
|---------------------|------|-----------------|---------|----------------------|------|------|--------------|
| Performance Expectancy | PE1  | 1.000           |         | 0.609                | 0.6804 | .9128 | .910         |
|                     | PE2  | 1.431           | 9.876   | 0.845                |       |      |              |
|                     | PE3  | 1.521           | 10.183  | 0.891                |       |      |              |
|                     | PE4  | 1.541           | 10.211  | 0.889                |       |      |              |
|                     | PE5  | 1.543           | 10.034  | 0.856                |       |      |              |
| Effort Expectancy   | EE1  | 1.000           |         | 0.740                | 0.6789 | .8117 | .709         |
|                     | EE2  | 1.061           | 12.034  | 0.792                |       |      |              |
|                     | EE3  | 1.116           | 12.282  | 0.820                |       |      |              |
|                     | EE4  | 1.210           | 13.146  | 0.883                |       |      |              |
|                     | EE5  | 1.153           | 13.256  | 0.876                |       |      |              |
| Reliability         | RE1  | 1.000           |         | 0.854                | 0.6302 | .8942 | .893         |
|                     | RE2  | 1.062           | 17.416  | 0.887                |       |      |              |
|                     | RE3  | 0.925           | 13.838  | 0.787                |       |      |              |
|                     | RE4  | 0.912           | 11.645  | 0.713                |       |      |              |
|                     | RE5  | 0.880           | 11.884  | 0.712                |       |      |              |
| Efficiency          | EF1  | 1.000           |         | 0.696                | 0.6254 | .7749 | .770         |
|                     | EF2  | 1.009           | 9.287   | 0.715                |       |      |              |
|                     | EF3  | 0.327           | 3.627   | 0.285                |       |      |              |
|                     | EF4  | 1.069           | 7.537   | 0.714                |       |      |              |
|                     | EF5  | 1.072           | 7.562   | 0.735                |       |      |              |
| Security and Privacy| SP1  | 1.000           |         | 0.717                | 0.6168 | .8892 | .888         |
|                     | SP2  | 1.011           | 11.394  | 0.791                |       |      |              |
|                     | SP3  | 0.986           | 10.604  | 0.771                |       |      |              |
|                     | SP4  | 1.156           | 11.633  | 0.851                |       |      |              |
|                     | SP5  | 1.005           | 11.080  | 0.791                |       |      |              |
| Trust in the Internet | TI1  | 1.000           |         | 0.795                | 0.7103 | .7736 | .7582        |
|                     | TI2  | 0.901           | 7.338   | 0.722                |       |      |              |
|                     | TI3  | 0.888           | 7.507   | 0.742                |       |      |              |
|                     | TI4  | 1.226           | 9.518   | 0.782                |       |      |              |
|                     | TI5  | −1.248          | 10.080  | 0.733                |       |      |              |
| Continued Intention to Use | CI1  | 1.000           |         | 0.778                | 0.7461 | .8795 | .919         |
|                     | CI2  | 0.940           | 16.161  | 0.791                |       |      |              |
|                     | CI3  | 0.950           | 16.492  | 0.836                |       |      |              |
|                     | CI4  | 1.078           | 16.285  | 0.8090               |       |      |              |

**Note.** AVE = average variance extracted; CR = composite reliability; AVE: average variance extracted.

### Table 4. Discriminant Validity.

| Constructs      | PE    | EE    | RE    | EF    | SP    | CIU   | TI    |
|-----------------|-------|-------|-------|-------|-------|-------|-------|
| PE              | **0.6983** | **0.6842** |       |       |       |       |       |
| EE              | .324** | .392*** | **0.6404** |       |       |       |       |
| RE              | .535** | .555** | **0.687** | **0.6588** |       |       |       |
| EF              | .530** | .329** | .674** | .572** | **0.6207** |       |       |
| SP              | .401** | .357** | **0.768** | .614** | .627*** | **0.6467** |       |
| CIU             | .530** | .195** | .446** | .439** | .407*** | .364*** | **0.7865** |
| TI              | .273** |       |       |       |       |       |       |

**Note.** Values below the diagonal represent correlations between constructs; values of the diagonal are the square root of AVE; PE = performance expectancy; EE = effort expectancy; RE = reliability; EF = efficiency; SP = security and privacy; CIU = continued intention to use; TI = trust in the internet.

**Correlations are significant at the .001 (two-tailed) level of significance.**
Multi-collinearity problem test. The first test was multi-collinearity problem test. Multi-collinearity means that the correlation between explanatory variables in a linear regression model is too high, making the model estimation to be distorted or difficult to estimate accurately. Common methods for testing multiple collinearity problems are divided into two categories. First, the correlation coefficient judgment method generally considers that when the correlation coefficient between variables is lower than .8, it then means that there is no serious multi-collinearity problem. The analysis indicated in Table 6 shows that the correlation coefficients between the variables are less than .8, which indicates that there is no multicollinearity problem. Second, if the variance inflation factor (VIF) is less than 10, there is no multicollinearity problem. After testing the VIF index of each regression model in this study as shown in Table 6, it can be said that the VIF was less than 10. Based on these two assumptions we can, therefore, conclude that there is no serious multicollinearity in this study.

Table 5. Main Effect Results Hypotheses.

| Hypotheses | Path   | \( \beta \) | t value | Supported |
|------------|--------|-------------|---------|-----------|
| H1         | PE→CI  | .152        | 2.251   | Yes       |
| H2         | EE→CI  | -.048       | -0.888  | No        |
| H3         | RE→CI  | .536        | 7.262   | Yes       |
| H4         | EF→CI  | .152        | 1.658   | Yes       |
| H5         | SP→CI  | .232        | 3.201   | Yes       |

Note. PE = performance expectancy; CI = continued intention to use; EE = effort expectancy; RE = reliability; EF = efficiency; SP = security and privacy.

Table 6. Regression Coefficient.

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 | Model 11 |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|
| MAN       | .138*** | .103**  | .102**  | .123**  | .132*** | .023    | .023    | .124**  | .124**  | .048     | .047     |
|           | (0.064) | (0.053) | (0.053) | (0.057) | (0.057) | (0.043) | (0.044) | (0.051) | (0.051) | (0.051)  | (0.051)  |
| AGE       | .202**  | .123**  | .126**  | .158**  | .159**  | .064    | .068    | .086*   | .086*   | .108***  | .108***  |
|           | (0.064) | (0.053) | (0.054) | (0.057) | (0.057) | (0.044) | (0.044) | (0.051) | (0.051) | (0.051)  | (0.051)  |
| UIYEAR    | -.180** | -.130** | -.128** | -.088   | -.089   | -.040   | -.037   | -.180*  | -.108*  | -.151*** | -.151*** |
|           | (0.075) | (0.061) | (0.062) | (0.069) | (0.069) | (0.051) | (0.051) | (0.059) | (0.059) | (0.059)  | (0.059)  |
| B12YEAR   | .073    | .089    | .090    | .133**  | .133**  | .065    | .068    | .088    | .088    | .066     | .066     |
|           | (0.075) | (0.062) | (0.062) | (0.067) | (0.067) | (0.050) | (0.051) | (0.059) | (0.059) | (0.059)  | (0.059)  |
| PE        | .407*** | .408*** |         |         |         |         |         |         |         |          |          |
|           | (0.055) | (0.055) |         |         |         |         |         |         |         |          |          |
| TI        | .284*** | .284*** | .345*** | .341*** | .116**  | .117**  | .215*** | .215*** | .179*** | .179***  |          |
|           | (0.054) | (0.055) | (0.058) | (0.060) | (0.047) | (0.047) | (0.054) | (0.055) | (0.056) | (0.056)  |          |
| TPE       |         | .248***  | .248***  |         |         |         |         |         |         |          |          |
|           |         | (0.060)  | (0.060)  |         |         |         |         |         |         |          |          |
| EE        |         |         | .013(0.052) |         |         |         |         |         |         |          |          |
| R         | .687*** | .690***  |         |         |         |         |         |         |         |          |          |
|           | (0.050) | (0.050) |         |         |         |         |         |         |         |          |          |
| TR        |         |         |         |         |         |         |         | .494*** | .494***  |          |          |
|           |         |         |         |         |         |         |         | (0.055) | (0.055)  |          |          |
| EF        |         |         |         |         |         |         |         |         | .494***  | .494***  |          |
|           |         |         |         |         |         |         |         | (0.055) | (0.055)  |          |          |
| TEF       |         |         |         |         |         |         |         |         |         | .001     | (0.037)  |
| SP        |         |         |         |         |         |         |         |         |         | .505***  | .505***  |
|           |         |         |         |         |         |         |         |         |         | (0.057)  | (0.057)  |
| TSP       |         |         |         |         |         |         |         |         |         | .002     | (0.039)  |
| Constant  | -1.434E-7 | 1.908E-8 | .003    | 1.185E-6 | -0.003  | -9.139E-7 | .008    | 2.540E-7 | .000    | 1.466E-6 | -0.001   |
|           | (0.063) | (0.052) | (0.053) | (0.056) | (0.057) | (0.042) | (0.044) | (0.049) | (0.051) | (0.049)  | (0.052)  |
| Sample size | 255    | 255    | 255    | 255    | 255    | 255    | 255    | 255    | 255    | 255      | 255      |
| R²        | .119   | .418   | .418   | .324   | .324   | .612   | .613   | .468   | .468   | .465     | .465     |
| Adjusted R² | .103   | .402   | .399   | .305   | .302   | .602   | .600   | .453   | .451   | .450     | .448     |
| F value   | 7.426  | 26.064 | 22.260 | 17.406 | 14.865 | 57.389 | 49.074 | 31.948 | 27.258 | 31.563   | 26.930   |
| VIF value | ≤1.405 | ≤1.419 | ≤1.429 | ≤1.507 | ≤1.509 | ≤1.442 | ≤1.457 | ≤1.419 | ≤1.432 | ≤1.427   | ≤1.432   |

Note. Standard error in parentheses. Regression coefficients are non-normalized coefficients. PE = performance expectancy; EE = effort expectancy; EF = efficiency; SP = security and privacy; VIF = variance inflation factor.

*p < .1. **p < .05. ***p < .01.
Table 7. Moderating Effect Results Hypotheses.

| Hypotheses | Path        | β     | t value | Supported |
|------------|-------------|-------|---------|-----------|
| H6         | PE × TI → CI | -0.012 | 0.041   | No        |
| H7         | EE × TI → CI | 0.013  | 0.052   | No        |
| H8         | RE × TI → CI | -0.018 | 0.033   | No        |
| H9         | EF × TI → CI | -0.001 | 0.037   | No        |
| H10        | SP × TI → CI | 0.002  | 0.039   | No        |

Note. PE = performance expectancy; TI = trust in the internet; CI = continued intention to use; EE = effort expectancy; RE = reliability; EF = efficiency; SP = security and privacy.

Sequence correlation problem test. The second test was the sequence correlation problem test. Sequence correlation problems have to do with the high correlation between samples of different periods. Theoretically, there is no sequence correlation problem, but this study is still tested using the Durbin–Watson (DW) value. It is generally considered that the DW value is between 1.5 and 2.5, which indicates that there are no sequence correlation problems between variables. After testing, the DW values of each regression model in this study, the results indicated that the values are between 1.5 and 2.5 as shown in Table 6. Therefore, it is believed that there is no sequence correlation problem in this study.

Test for heteroscedasticity problem. The third test was the test for heteroscedasticity problem. The heteroscedasticity problem is the variance of the explanatory variable exhibits a regular trend of the variable as the explanatory variable changes and is usually judged by using a scatter diagram. Our observation showed that the normalized residuals do not exhibit certain regularity with the standardized prediction values, and thus mean that there is no heteroscedasticity problem. Therefore, it was determined that there were no heteroscedasticity problems in each of the models in this study.

The results of the moderation effects. The hierarchical regression approach was used to determine the moderation impact of trust in the internet on the relationship between performance expectancy, effort expectancy, reliability, efficiency, security and privacy and continued intention to use. The results are divided into 11 models. The results are shown in Table 6. Model 1 is the basic model, including only the control variables such as age, gender, and user experience. The adjusted $R^2$ is .103, indicating that Model 1 can explain 10.3% variation of the dependent variable, and the VIF value of each variable is less than 1.405. This is indicative that there is no multicollinearity problem in Model 1. Model 2 adds two variables, expected performance and trust in the internet, based on Model 1. The adjusted $R^2$ is .402, indicating that Model 2 can explain 40.2% of the variation of the dependent variable, and the VIF values of each variable are smaller than 1.419, indicating that Model 2 does not have a multicollinearity problem as well.

Model 3 is a product term that increases the expected performance and trust in the internet based on Model 2. The adjusted $R^2$ is .399, indicating that Model 3 can explain 39.9% of the variation of the dependent variable, and the VIF values of each variable are smaller than 1.429, indicating that Model 3 does not have a multicollinearity problem.

Model 4 adds two variables of effort performance and trust in the internet based on Model 1. The adjusted $R^2$ is .305, indicating that Model 4 can explain the variation of the dependent variable by 30.5%, and the VIF value of each variable is less than 1.507 which indicates that there is no multicollinearity problem in Model 4.

In addition, Model 5 adds the product of effort performance and trust in the internet, based on Model 1. The adjusted $R^2$ is .602, indicating that Model 5 can explain the variation of the dependent variable by 60.2%, and the VIF values of each variable are less than 1.442. This also means that there is no multicollinearity problem in Model 5.

Again Model 7 is a product term that increases the reliability and trust in the internet based on Model 6. The adjusted $R^2$ is .600, indicating that Model 7 can explain the variation of 60% of the dependent variable, and the VIF values of each variable are smaller than 1.457, an indication that Model 7 does not have a multicollinearity problem.

Model 8 adds two variables, efficiency and trust in the internet, based on Model 1. The adjusted $R^2$ is .453, indicating that Model 8 can explain the 45.3% variation of the dependent variable, and the VIF values of each variable are less than 1.419 which means that Model 8 does not have a multicollinearity problem.

Model 9 is a product term that increases the efficiency and trust in the internet based on Model 8. The adjusted $R^2$ is .451, indicating that Model 9 can explain the 45.1% variation of the dependent variable, and the VIF values of each variable are less than 1.432. This is an indication that Model 9 does not have a multicollinearity problem. Furthermore, the Model 10 adds two variables of security and privacy and trust in the internet based on Model 1. The adjusted $R^2$ is .450, indicating that Model 10 can explain the 45% variation of the dependent variable, and the VIF values of each variable are less than 1.427. This means that Model 10 does not have a multicollinearity problem.

Model 11 adds the product of security and privacy to the trust in the internet based on Model 10. The adjusted $R^2$ is .448, indicating that Model 11 can explain the variance of 44.8% of the dependent variable, and the VIF value of each variable is less than 1.432. An indication that Model 11 does not have a multicollinearity problem.
Summary of the moderating effect of trust in the internet. Based on the above model analysis of the moderating impact in Table 6, the summary of the main results of the moderating effects is shown in Table 7. The results have demonstrated that trust in the internet does not moderate significantly the impact of performance expectancy ($\beta = -0.012$, $p > .05$), effort expectancy ($\beta = 0.013$, $p > .05$), reliability ($\beta = -0.018$, $p > .05$), efficiency ($\beta = -0.001$, $p > .05$), and security and privacy ($\beta = 0.002$, $p > .05$) on the continued intention to use. Accordingly, H6, H7, H8, H9, and H10 were all not statistically supported.

The depiction of the validated research model is illustrated in Figure 2. The validated model accounts for about 79.7% of the factors predicting the continued behavioral intention to use DiDi mobile car-sharing services.

Discussion
This study adopted the UTAUT model to investigate the factors influencing the continued intention of college students in China to use DiDi mobile car-sharing services. The results emanating from the data analysis have indicated that factors such as performance expectancy, reliability, efficiency, and security and privacy were significant determinants of the continued intention of college students to use the DiDi mobile car-sharing services. Against our anticipation, it was found that the effort expectancy of mobile car-sharing services was not a predictor of the continued intention to use the DiDi mobile car-sharing services. In addition, this study integrated the trust in the internet as a moderating variable on the relationship between performance expectancy, effort expectancy, reliability, efficiency, and security and privacy and the continued intention to use DiDi car-sharing services. The moderating analysis indicated that all the proposed moderating effects were not statistically supported. That is, trust in the internet does not moderate significantly and respectively the impact of performance expectancy, effort expectancy, reliability, efficiency, and security and privacy on the continued intention to use.

The significant impact of performance expectancy on the continued intention to use supports other studies which also have indicated the positive relationship between performance expectancy and intention to use car-sharing services (Fleury et al., 2017; Liang et al., 2018; Madigan et al., 2016, 2017). Customers or clients of mobile car-sharing services would continue to use mobile car-sharing...
services only if they find the mobile car-sharing services to be useful in being able to make bookings timely 24/7 and get to their destination without delay. In contrast, the nonsignificant impact of effort expectancy on the continued intention to use contradicts previous studies that have demonstrated that effort expectancy is a significant predictor of the intention to use car-sharing services (Fleury et al., 2017; Madigan et al., 2017). On the surface, this finding may seem a little surprising, but the reason for the nonsignificant impact of effort expectancy on the continued intention to use may be due to the overfamiliarity and indulgence with DiDi mobile car-sharing services. This overfamiliarity and indulgence with the features of the mobile car-sharing services over the years makes the issue of complexity or difficulties a less problem or concern for users. As shown in this study (Table 1), the respondents have indicated that they have had more than 2 years of experience in using the DiDi car-sharing services. This long usage of the DiDi mobile car-sharing services may account for the reason why in this case effort expectancy was not significant in determining the continued intention to use. It is also an indication that the more users interact or get familiarized with new technologies, the easier or fewer challenges they would have or encounter in using such new technologies.

Furthermore, our finding on the significant impact of reliability and efficiency on the continued intention to use DiDi car-sharing services is an indication that consumers or passengers will be attracted to continue to use mobile car-sharing services only if they believe that such systems are highly reliable and can provide the best efficiency in the service quality of the car-sharing services. Also, the findings on the positive significant impact of security and privacy on the continued intention to use mobile car-sharing services are in line with previous findings which indicated that issues of security and privacy are predictors of the intention to use (Kaur & Rampersad, 2018). Mobile car-sharing services that provide protection for passengers by making sure that the security and privacy of the individual is a top priority would attract passengers to continue to use mobile car-sharing services.

The nonsignificant moderating effect of trust in the internet on the relationship between performance expectancy, effort expectancy, reliability, efficiency, and security and privacy and the continued intention to use is an indication that the inclusion of trust in the internet as the third construct does not contribute or strengthen the impact of these factors on the continued intention to use the DiDi car-sharing services. The literature so far has indicated that there is no study that has examined the moderating effect of trust in the internet on performance expectancy, effort expectancy, reliability, efficiency and security and the intention to use. Hence, results of the moderating effect of this study seem to be the unique contribution of this study.

**Practical Implications**

The first implication of this study is that performance expectancy of mobile car-sharing services to meet the daily mobility needs of passengers and clients should continue to be an important issue for car-sharing service providers because the usefulness of car-sharing services to satisfy the mobility aspirations of consumers would lead to corresponding continued intention to use such services. Second, car-sharing service providers should endeavor to provide car-sharing services that are easy to use, cost-efficient, and reliable which will serve as the best alternative to owning cars. Providing car-sharing services that are efficient and reliable will not only encourage the continued intention of passengers to use mobile car-sharing services but also serve as a good alternative means of obtaining sustainable mobility instead of owning a car.

Third, the development, design, and implementation of security and privacy measures (protocols) by car-sharing service providers that ensure that protection of passengers and car owners’ personal information such as identity, location, address, and destination are important steps toward encouraging the continued intention to use mobile car-sharing services. The implementation of both technical and organizational security and privacy measures in the deployment of car-sharing services would ensure that consumers are guaranteed of their data protection and safety. Some of the information that needed protection is the basic personal data, communication data (emails, telephones), bank information and credit card history, booking information, and payment data. Addressing and tackling the security and privacy issue surrounding car-sharing services would provide the basis for car-sharing services users to have the highest confidence to continue to use the car-sharing services.

**Conclusion**

The car-sharing economy is an important innovation to provide an efficient means of transportation for persons who do not have access to a readily available car or transport for both personal and business usage. College students are one of the major categories of people who may engage the services of mobile car-sharing services particularly with reference to the DiDi car-sharing services in China. This study has shown that per the perspectives of the college students studied, factors such as performance expectancy, reliability, efficiency and security, and privacy are important predictors determining their continued intention to use mobile car-sharing services. However, effort expectancy does not influence their continued intention to use mobile car-sharing services. Furthermore, we have established that trust in the internet does not moderate the impact of performance expectancy, effort expectancy, reliability, efficiency, and privacy and the continued intention to use mobile car-sharing services. These
findings have provided the empirical basis for car-sharing services providers to deliver tailor-made services to meet the sustainable mobility expectations of customers, in this case, college students. Also, this study has contributed to the car-sharing adoption and economy literature by demonstrating that though trust in the internet is considered to impact the adoption of technology-driven services, it does not, however, moderate the impact of performance expectancy, effort expectancy, reliability, efficiency, and security and privacy on the continued intention to use mobile car-sharing services.

Limitations and Future Research

The first limitation of this study is that the sample size may not be representative, and hence the interpretation and generalization of the result findings should be done with caution. Second, the model, factors, and method used in this study could be replicated in other studies but the findings may not necessarily support the findings in this study. Third, only two predictors of the intention to use in the UTAUT model were applied in this study. Fourth, the factors determining the continued intention to use car-sharing services cannot be covered in just a single study. Hence, future study would attempt to examine the direct impact of consumer trust on the adoption of car-sharing services.

Appendix

Questionnaire Items (English Version)

Performance Expectancy

PE1: Using the DiDi mobile car-sharing services would enhance my mobility
PE2: Using the DiDi mobile car-sharing services will save time
PE3: The DiDi mobile car-sharing service is useful
PE4: I will use the DiDi mobile car-sharing services any time and day
PE5: Overall, Using the DiDi mobile car-sharing services will be helpful for me to undertake my daily routine

Effort Expectancy

EE1: Learning to operate the DiDi mobile car-sharing services is easy for me
EE2: I have the right skills to use the DiDi mobile car-sharing services
EE3: The use of DiDi mobile car-sharing services is challenge-free
EE4: It is easy to navigate through the DiDi mobile car-sharing services
EE5: Overall, I will have no problem in using the DiDi mobile car-sharing services

Reliability

R1: I have high confidence in the DiDi mobile car-sharing services
R2: The DiDi mobile car-sharing service is reliable and dependable
R3: The DiDi mobile car-sharing services provide the right service at the right time
R4: I prefer to use DiDi mobile car-sharing services rather than taking a taxi
R5: Overall, the DiDi mobile car-sharing services never disappoint me

Efficiency

E1: The use of DiDi mobile car-sharing services is effective.
E2: The DiDi mobile car-sharing services are faster
E3: The DiDi mobile car-sharing services are stress-free and convenient to use
E4: Reduced time when using the DiDi mobile car-sharing services
E5: Overall, my interaction with the DiDi mobile car-sharing service is clear, understandable, and flexible

Security and privacy

SP1: The DiDi mobile car-sharing services do not allow others to access my accounts
SP2: The DiDi mobile car-sharing services provide high protection for my transactions
SP3: The DiDi mobile car-sharing service is secured and safe from any hacking or fraud
SP4: The DiDi mobile car-sharing service offers secured personal privacy
SP5: Overall, I feel secure while engaging in any transactions on the DiDi mobile car-sharing services

Trust in the Internet

TI1: I believe that the internet is not safe and dangerous
TI2: My personal data on the internet is protected
TI3: There are right laws to protect my information from any third party
TI4: I have high hope that the internet will not harm me
TI5: Overall, my confidence on the internet is very high

Continuance Intention to Use

CIU1: I will continue to use the DiDi mobile car-sharing services
CIU2: I intend to regularly use the DiDi mobile car-sharing services
CIU3: I will frequently recommend to my friends and colleagues to also use the DiDi mobile car-sharing services
CIU4: I am confident to get the best service while using the DiDi mobile car-sharing services
CIU5: Overall, DiDi mobile car-sharing services would continue to be my first choice of mobility
Questionnaire Items (Chinese Version)

绩效期望（使用效果评价）
条目1 使用滴滴汽车共享服务将大大节省我完成相关任务的时间
条目2 使用滴滴汽车共享服务可以提高我的学习、工作表现
条目3 使用滴滴汽车共享服务可以提供我的学习、工作效率
条目4 使用滴滴汽车共享服务让我能够更容易完成相关学习和工作任务
条目5 总的来说，使用滴滴汽车共享服务对我的日常学习工作有帮助

努力期望（功能便捷性评价）
条目1 学习操作滴滴软件的过程对我来说很容易
条目2 我能够有效地利用滴滴软件完成打车服务
条目3 滴滴软件的功能展示很清楚、很容易让人理解
条目4 我能够很熟练地使用滴滴软件提供的各种服务
条目5 总的来说，我认为滴滴软件的操作很简单

可靠度（可靠性评价）
条目1 我对滴滴提供的打车服务的未来充满信心
条目2 我认为滴滴提供的打车服务可靠并值得信赖
条目3 滴滴在线打车服务能够在合适的时间提供合适的服务
条目4 我更喜欢使用滴滴打车服务，而不是乘坐出租车
条目5 总的来说，滴滴在线打车服务从未让我失望过

效率（服务效率评价）
条目1 使用滴滴服务可以大大节省打车时间
条目2 滴滴在线拼车服务提供的乘车服务更快
条目3 DiDi移动汽车共享服务无压力且使用方便
条目4 学习操作滴滴在线服务对我来说很容易
条目5 总的来说，我与滴滴在线打车服务的互动清晰，易懂，灵活

安全和隐私
条目1 滴滴打车软件不允许其他人访问我的个人账户和信息
条目2 滴滴在线打车服务为我的资金交易提供安全保障
条目3 滴滴在线打车服务可以防止任何黑客或欺诈行为
条目4 滴滴在线打车服务提供安全的个人隐私保护
条目5 总的来说，我认为滴滴提供的交易环境是安全有保障的

对互联网的信任
条目1 我相信互联网并不安全和危险
条目2 我在互联网上的个人数据大多数情况下是受到保护的
条目3 我认为有正确的法律来保护我的信息免受任何第三方的侵害
条目4 我认为在互联网的活动不会对我造成负面影响
条目5 总的来说，我对互联网的信心非常高

持续使用的意愿
条目1 预计我会下一次出行依然会选择滴滴在线打车服务
条目2 我将在未来的生活继续使用滴滴在线打车服务
条目3 我认为使用滴滴在线打车服务是非常棒的选择
条目4 总的来说，滴滴在线打车服务将是我的首选
条目5 总的来说，DiDi移动汽车共享服务将继续是我出行的首选。
Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Isaac Kofi Mensah https://orcid.org/0000-0003-2964-1736

References

Abbas, S. K., Hassan, H. A., Asif, J., Ahmed, B., Hassan, F., & Haider, S. S. (2018). Integration of TTF, UTAUT, and ITM for mobile Banking Adoption. International Journal of Advanced Engineering, Management and Science, 4(5), 375–379.

AiMedia. (2018). Ai media report 2017-2018 China network car industry research special report. http://www.iimedia.cn/61053.html

Alalwan, A. A., Baabdullah, A. M., Rana, N. P., Tamilmani, K., & Dwivedi, Y. K. (2018). Examining adoption of mobile internet in Saudi Arabia: Extending TAM with perceived enjoyment, innovativeness and trust. Technology in Society, 55, 100–110.

Alawneh, A., Al-Refai, H., & Batsha, K. (2013). Measuring user satisfaction from e-Government services: Lessons from Jordan. Government Information Quarterly, 30(3), 277–288.

Albinsson, P. A., & Yasanthi Perera, B. (2012). Alternative market-places in the 21st century: Building community through sharing events. Journal of Consumer Behaviour, 11(4), 303–315.

Alencar, V. A., Rooke, F., Cocca, M., Vassio, L., Almeida, J., & Vieira, A. B. (2019). Characterizing client usage patterns and service demand for car-sharing systems. Information Systems. Advance online publication. https://doi.org/10.1016/j.is.2019.10148

Alomari, M. (2018). Mobile government adoption: Citizen-centric approach. https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1484&context=amcis2018

Ando, R., Shima, S., & Takemura, T. (2016). Analysis of privacy and security affecting the intention of use in personal data collection in an IoT environment. IEICE TRANSACTIONS on Information and Systems, 99(8), 1974–1981.

Asad, M. M., Mohajerani, N. S., & Noursresh, M. (2016). Prioritizing factors affecting customer satisfaction in the internet banking system based on cause and effect relationships. Procedia Economics and Finance, 36, 210–219.

Baptista, P., Melo, S., & Rolim, C. (2014). Energy, environmental and mobility impacts of car-sharing systems: Empirical results from Lisbon, Portugal. Procedia-social and Behavioral Sciences, 111, 28–37.

Bardhi, F., & Eckhardt, G. M. (2012). Access-based consumption: The case of car sharing. Journal of Consumer Research, 39(4), 881–898.

Baumann, C., Burton, S., Elliott, G., & Kehr, H. M. (2007). Prediction of attitude and behavioural intentions in retail banking. International Journal of Bank Marketing, 25(2), 102–116.

Bawack, R. E., & Kamdjoug, J. R. K. (2018). Adequacy of UTAUT in clinician adoption of health information systems in developing countries: The case of Cameroon. International Journal of Medical Informatics, 109, 15–22.

Belk, R. (2014). Sharing versus pseudo-sharing in Web 2.0. The Anthropologist, 18(1), 7–23.

Cao, Q., & Niu, X. (2019). Integrating context-awareness and UTAUT to explain Alipay user adoption. International Journal of Industrial Ergonomics, 69, 9–13.

Carter, L., & Bélanger, F. (2005). The utilization of e-government services: Citizen trust, innovation and acceptance factors. Information Systems Journal, 15(1), 5–25.

Chauhan, S., Jaiswal, M., & Kar, A. K. (2018). The acceptance of electronic voting machines in India: A UTAUT approach. Electronic Government: An International Journal, 14(3), 255–275.

Chen, Y., Yan, X., Fan, W., & Gordon, M. (2015). The joint moderating role of trust propensity and gender on consumers’ online shopping behavior. Computers in Human Behavior, 43, 272–283.

Cheng, X., Fu, S., & de Vreede, G.-J. (2018). A mixed method investigation of sharing economy driven car-hailing services: Online and offline perspectives. International Journal of Information Management, 41, 57–64.

Chopdar, P. K., Korfiatis, N., Sivakumar, V., & Lytras, M. D. (2018). Mobile shopping apps adoption and perceived risks: A cross-country perspective utilizing the unified theory of acceptance and use of technology. Computers in Human Behavior, 86, 109–128.

Cohen, A., & Shaheen, S. (2018). Planning for shared mobility. https://escholarship.org/content/qt0dk3h89p/qt0dk3h89p.pdf

Cohen, B., & Kietzmann, J. (2014). Ride on! Mobility business models for the sharing economy. Organization & Environment, 27(3), 279–296.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13, 319–340.

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science, 35(8), 982–1003.

De Luca, S., & Di Pace, R. (2015). Modelling users’ behaviour in inter-urban carsharing program: A stated preference approach. Transportation Research Part A: Policy and Practice, 71, 59–76.

Dutton, W. H., & Shepherd, A. (2006). Trust in the Internet as an experience technology. Information, Communication & Society, 9(4), 433–451.

Efthymiou, D., Antoniou, C., & Waddell, P. (2013). Factors affecting the adoption of vehicle sharing systems by young drivers. Transport Policy, 29, 64–73.

Faulkner, N., Jorgensen, B., & Koufariotis, G. (2018). Can behavioural interventions increase citizens’ use of e-government? Evidence from a quasi-experimental trial. Government Information Quarterly, 36, 61–68.

Ferrero, F., Perboli, G., Rosano, M., & Vesco, A. (2017). Car-sharing services: An annotated review. Sustainable Cities and Society.

Fleury, S., Tom, A., Jamet, E., & Colas-Maheux, E. (2017). What drives corporate carsharing acceptance? A French case study. Transportation Research Part F: Traffic Psychology and Behaviour, 45, 218–227.
Fraiberger, S. P., & Sundararajan, A. (2017). Peer-to-peer rental markets in the sharing economy. http://www.hbs.edu/faculty/conferences/2016-dids/Documents/Fraiberger_Sundararajan_March2016.pdf

Gargiulo, E., Giannantonio, R., Guercio, E., Borean, C., & Zenezini, G. (2015). Dynamic ride sharing service: Are users ready to adopt it? Procedia Manufacturing, 3, 777–784.

Gupta, A., Dogra, N., & George, B. (2018). What determines tourist adoption of smartphone apps? An analysis based on the UTAUT-2 framework. Journal of Hospitality and Tourism Technology, 9(1), 50–64.

Hair, J., Black, W., Babin, B., Anderson, R., & Tatham, R. (2010). Multivariate data analysis: A global perspective (Global ed.). Pearson Education.

Hamari, J., Sjöklint, M., & Ukkonen, A. (2016). The sharing economy: Why people participate in collaborative consumption. Journal of the Association for Information Science and Technology, 67(9), 2047–2059.

Hammoud, J., Bizri, R. M., & El Baba, I. (2018). The impact of e-banking service quality on customer satisfaction: Evidence from the Lebanese banking sector. SAGE Open, 8(3). https://doi.org/10.1177/2158244018790633

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In C. Tamer (Ed.), New challenges to international marketing (pp. 277–319). Emerald Group.

Hoque, R., & Sorwar, G. (2017). Understanding factors influencing the adoption of mHealth by the elderly: An extension of the UTAUT model. International Journal of Medical Informatics, 101, 75–84.

Huang, G.-q., & Chen, X. (2017). A Study on the intention of bike-sharing usage based on context awareness theory and UTAUT Model. Consumer Economics, 3, 009. http://en.cnki.com.cn/Article_en/CJFDTotal-XFYJ201703009.htm

Jewer, J. (2018). Patients’ intention to use online postings of ED wait times: A modified UTAUT model. International Journal of Medical Informatics, 112, 34–39.

John, N. A. (2013). The social logics of sharing. The Communication Review, 16(3), 113–131.

Kassim, N. M., & Souidem, N. (2007). Customer retention measurement in the UAE banking sector. Journal of Financial Services Marketing, 11(3), 217–228.

Kaur, K., & Rampersad, G. (2018). Trust in driverless cars: Investigating key factors influencing the adoption of driverless cars. Journal of Engineering and Technology Management, 48, 87–96.

Khan, R. (2018, May 26). Determining the influence of new modulators of UTAUT2 in the adoption of learning management systems using structure equation modeling [Paper presentation]. Society for Information Technology & Teacher Education International Conference, Washington, DC.

Lallmahmood, M. (2007). An examination of individual’s perceived security and privacy of the Internet in Malaysia and the influence of this on their intention to use E-commerce: Using an extension of the technology acceptance model. Journal of Internet Banking and Commerce, 12(3), 1.

Lan, J., & Zhu, D.-j. (2016). Acceptance and use behavior of sustainable transport: Based on a survey of carsharing in Shanghai. China Population, Resources and Environment, 11, 013. http://en.cnki.com.cn/Article_en/CJFDOTAL-ZGRZ201611013.htm

Lashayo, D. M., & Johar, M. G. M. (2018). Instructor adoption of E-learning systems in Tanzania’s Universities: A proposed multi-factors adoption model (MFAM11). International Journal on Informatics Visualization, 2(2), 76–80.

Lawson-Body, A., Willoughby, L., Lawson-Body, L., & Tamandja, E. M. (2018). Students’ acceptance of E-books: An application of UTAUT. Journal of Computer Information Systems. Advance online publication. https://doi.org/10.1080/08874417.2018.1463577

Leicht, T., Chtourou, A., & Youssef, K. B. (2018). Consumer innovativeness and intentioned autonomous car adoption. The Journal of High Technology Management Research, 29, 1–11.

Liang, X., Jin, Y., & Jiang, J. (2018). Factors impacting consumers’ sharing behavior under sharing economy: A UTAUT-based model. ICEB 2018 Proceedings, 71. https://aisel.aisnet.org/iceb2018/71

Madigan, R., Louw, T., Dziennus, M., Graindorge, T., Ortega, E., Graindorge, M., & Merat, N. (2016). Acceptance of automated road transport systems (ARTS): An adaptation of the UTAUT model. Transportation Research Procedia, 14, 2217–2226.

Madigan, R., Louw, T., Wilbrink, M., Schieben, A., & Merat, N. (2017). What influences the decision to use automated public transport? Using UTAUT to understand public acceptance of automated road transport systems. Transportation Research Part F: Traffic Psychology and Behaviour, 50, 55–64.

Mangin, J.-P. L., Bourgault, N., Porral, C. C., Mesly, O., Telahague, I., & Trudel, M. (1970). The moderating role of risk, security and trust applied to the TAM model in the offer of banking financial services in Canada. The Journal of Internet Banking and Commerce, 19(2), 1–21.

Mansoori, K. A. A., Sarabdeen, J., & Tchantchane, A. L. (2018). Investigating Emirati citizens’ adoption of e-government services in Abu Dhabi using modified UTAUT model. Information Technology & People, 31(2), 455–481.

Martin, C. J. (2016). The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? Ecological Economics, 121, 149–159.

Martin, E., & Shaheen, S. (2016). Impacts of car2go on vehicle ownership, modal shift, vehicle miles traveled, and greenhouse gas emissions: An analysis of five North American cities. Transportation Sustainability Research Center, UC Berkeley.

Martin, E., Shaheen, S. A., & Lidicker, J. (2010). Impact of car-sharing on household vehicle holdings: Results from North American shared-use vehicle survey. Transportation Research Record, 2143(1), 150–158.

Martin, E. W., & Shaheen, S. A. (2011). Greenhouse gas emission impacts of carsharing in North America. IEEE Transactions on Intelligent Transportation Systems, 12(4), 1074–1086.

Mattia, G., Mugion, R. G., & Principato, L. (2019). Shared mobility as a driver for sustainable consumptions: The intention to reuse free-floating car sharing. Journal of Cleaner Production, 237, 117404.

Omar, H. F. H., Saadan, K. B., & Seman, K. B. (2015). Determining the influence of the reliability of service quality on customer satisfaction: The case of Libyan E-commerce customers. International Journal of Learning and Development, 5(1), 86–89.
Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *The Journal of Marketing*, 49, 41–50.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). Servqual: A multiple-item scale for measuring consumer perc. *Journal of Retailing*, 64(1), 12.

Paundra, J., Rook, L., van Dalen, J., & Ketter, W. (2017). Preferences for car sharing services: Effects of instrumental attributes and psychological ownership. *Journal of Environmental Psychology*, 53, 121–130.

Rahi, S., Ghani, M., Alnaser, F., & Ngah, A. (2018). Investigating the role of unified theory of acceptance and use of technology (UTAUT) in internet banking adoption context. *Management Science Letters*, 8(3), 173–186.

Ramamooorthy, R., Gunasekaran, A., Roy, M., Rai, B. K., & Senthilkumar, S. (2018). Service quality and its impact on customers’ behavioural intentions and satisfaction: An empirical study of the Indian life insurance sector. *Total Quality Management & Business Excellence*, 29(7–8), 834–847.

Rotar, L., Danielis, R., & Malteze, I. (2019). Carsharing use by college students: The case of Milan and Rome. *Transportation Research Part A: Policy and Practice*, 120, 239–251.

Seik, F. T. (2000). Vehicle ownership restraints and car sharing in Singapore. *Habitat International*, 24(1), 75–90.

Shaheen, S., Wright, J., & Sperling, D. (2002). California’s zero-

Skolmen, D. E., & Gerber, M. (2015). Protection of personal information in the South African cloud computing environment: A framework for cloud computing adoption. https://ieeexplore.ieee.org/document/7335049

Statista. (2019). Share of Didi Chuxing in average daily mobile transportation orders as of February 2016. https://www.statista.com/statistics/715382/china-di-di-chuxing-average-daily-order-share/

Stocke, K., Lazarus, J., Becker, S., & Shaheen, S. (2016). *North American College/University car sharing impacts: Results from Zipcar’s college travel study 2015*. Transportation Sustainability Research Center.

Tuominen, A., Rehunen, A., Peltomaa, J., & Mäkinen, K. (2019). Facilitating practices for sustainable car sharing policies—An integrated approach utilizing user data, urban form variables and mobility patterns. *Transportation Research Interdisciplinary Perspectives*, 2, 100055.

Vasileiadis, A. (2014). Security concerns and trust in the adoption of m-commerce. *Social Technologies*, 4(1), 179–191.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27, 425–478.

Verkijika, S. F., & De Wet, L. (2018). E-government adoption in sub-Saharan Africa. *Electronic Commerce Research and Applications*, 30, 83–93.

Wang, S.-T., & Lin, R.-L. (2017). Perceived quality factors of location-based apps on trust, perceived privacy risk, and continuous usage intention. *Behaviour & Information Technology*, 36(1), 2–10.

Wangpipatwong, S., Chutimaskul, W., Papasaratorn, B. (2005, November 19–20). Factors influencing the adoption of Thai e-Government websites: Information quality and system quality approach [Paper presentation]. Proceedings of the Fourth International Conference on e-business, Hong Kong.

Warkentin, M., Gefen, D., Pavlou, P. A., & Rose, G. M. (2002). Encouraging citizen adoption of e-government by building trust. *Electronic Markets*, 12(3), 157–162.

Zendehdel, M., Paim, L. H., Fard, S. S., & Delafrooz, N. (2018). A study of mobile banking in Malaysia based on the UTAUT model. *Herald National Academy of Managerial Staff of Culture and Arts*. http://jrhnamsca.icu/index.php/hnamsca/article/view/389

Zervas, G., Proserpio, D., & Byers, J. W. (2017). The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of Marketing Research*, 54(5), 687–705.

**Author Biographies**

**Isaac Kofi Mensah** is an associate professor at the School of Economics and Management, Jiangxi University of Science and Technology, Ganzhou, Jiangxi, China. He is also the founder and President of the Africa-Asia Dialogue Network (AADN), a Think Tank for Global Research and Advocacy. He received his PhD in Public Administration from the School of Management, Harbin Institute of Technology, Harbin, Heilongjiang, China. He received a post graduate certificate in Public Administration (CPA) from the Ghana Institute of Management and Public Administration (GIMPA), Accra, Ghana. He got his master’s degree from Hunan University located in Hunan Province, Changsha, China, and Bachelor’s Degree from the University of Ghana, Accra, Ghana. His research interests include e-government, local e-government, local government, entrepreneurship, human resource management, e-voting, e-business/e-commerce, and cross-border e-commerce.

**Zhao Tianyu**, PhD is an associate professor at the School of Economics and Management, Jiangxi University of Finance and Economics, Nanchang, P.R. China.

**Guohua Zeng**, PhD in Economics, an associate professor at the School of Management, Jiangxi University of Science and Technology. His research direction is human resource management.

**Luo Chunyong**, postgraduate student (master) at the School of Economics and Management, East China Jiaotong University, Nanchang, P.R. China. He is engaged in labor economics research.