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A Quantitative Study to Explore the Factors Affecting Beijing, China Adults' E-Hailing Services Satisfaction

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While E-hailing services have gained widespread popularity among urban citizens in China, the fulfilment of customers' satisfaction with E-hailing services become very crucial. The past E-hailing research studies have not studied the factors affecting Beijing, China citizens' satisfaction with E-hailing services. This research conducted a quantitative study to determine whether the factors of price, safety, accessibility, and comfort affect Beijing, China adults' E-hailing service satisfaction with an online questionnaire survey that involved 507 adults in Beijing, China. The Estimation of Customer Satisfaction Index (CSAT) is computed to identify the level of Beijing, Adult's satisfaction, in different aspects of the factors under investigation. Several statistical analysis methods were adopted to explore the factors that have positive and significant relationships with the satisfaction of using E-hailing services, as well as the relationship between adults' satisfaction and intention to continuously use E-hailing services in the city. The analysis result indicated that price, safety, and accessibility had a higher impact on Beijing, China adults' E-hailing service satisfaction. The adult's satisfaction also have moderately strong influenced their intention to continuously use the E-hailing services. The findings of this research offer valuable insights for Beijing, China's E-hailing service providers to better understand their customers.

Keywords: Beijing adults, Customer Satisfaction, CSAT; E-hailing service, Service Adoption

1. Introduction

E-hailing services refer to on-demand transportation services by using mobile applications (apps). As an emerging travel service, E-hailing services have gained popularity worldwide and it has become an efficient new mode of transportation [1]. Undoubtedly, E-hailing services have had a significant impact on the urban transportation industry in the last ten years [2]. This sharing economy also greatly changed peoples' lifestyles, preferences, and behaviours [3]. The E-hailing services have streamlined the citizen's commuting experiences and at the same time contributed to the reduction of traffic congestion in urban cities.

According to Cheng [4], customer satisfaction is important in developing and sustaining the E-hailing service business. Some established E-hailing service providers such as Didi and

Uber in China had launched extensive online marketing and promotion efforts to satisfy the needs of the customers, and subsequently boost the usage of E-hailing among citizens. Among the various aspects of service which is relevant to E-hailing services include the improvement of the efficiency, quality, and value creation of services [5].

Despite there was a previous study by Wang et al. [6] that studied E-hailing customer satisfaction in China, the research was only focused on Nanjing City. No research has been conducted in the second largest city in China, Beijing as well as the adult group. As the competition for E-hailing services in Beijing is more intense than in Nanjing as there are more E-hailing service providers, it is necessary to study the factors that affect the largest customer group of E-hailing (adults) in Beijing, so that the E-hailing service providers can gain bigger market share. There are also several customer satisfaction factors such as price, safety, accessibility, and comfort which have never been explored as a theoretical framework in Beijing before.

There are two research objectives to be achieved in this research. Firstly, this research attempted to determine whether factors such as price, safety, accessibility, and comfort have positive and significant relationships with satisfaction in using E-hailing services among Beijing, China adults. Secondly, this research would determine whether there is a positive and significant relationship between E-hailing satisfaction and intention to use E-hailing in the Beijing, China adult.

The study of the existing relevant theoretical frameworks and factors that affect E-hailing customer satisfaction and behavioural intention will be discussed in the next section. Following on, the research methodology of the research would be discussed. The quantitative research findings will be presented and discussed before the conclusion of the research is derived in the last section.

I. Theoretical Models for Service Quality Satisfaction Research

There are several theoretical models which could be used to measure service quality, customer satisfaction, and user behaviours. SERVQUAL model which was proposed by Valenzo-Jiménez et al. [7] served as a framework to assess the quality of transportation services. The factors of price, safety, accessibility, and comfort were found to be input to measure expected service and perceived service, which were later used to relate to the perceived service quality of the service under investigation. This framework was adopted by Lee [8] and Ziyad et al. [9] in their research for E-hailing customer satisfaction study in Malaysia and Pakistan respectively.

II. Past Research in E-hailing Satisfaction Study

Research about E-hailing satisfaction was conducted in various countries in the world. In China, two recent research were conducted by Wang et al. [6] and Ma et al. [10]. The researchers found that price, safety, service quality, responsiveness, and risks were significant factors that affected the citizens' satisfaction with using E-hailing services. In Malaysia, the research was conducted by Lee [8], Yeo & Shafi [11], Ali et al. [12], Norhisham et al. [13], and Idros et al. [14]. Among the significant factors discovered were price, safety, accessibility, comfort, and convenience. Researchers from other countries such as Pasquali et al. [15] from Ghana, Rachbini et al. [16] from Indonesia, and Nguyen-Phuoc et al. [17] from Vietnam found

that service quality was the most important factor that affected customer satisfaction, whereas the researchers Pratondo and Zaid [18] from Indonesia and Thaithatkul et al. [19] from Thailand found that responsiveness and competency of services were important satisfaction factors.

III. Other Relevant Technology Adoption Theory and Model

To review the relationship between customer satisfaction and intention to use E-hailing services, this research also reviewed several technology adoption theory models such as the Technological Acceptance Model (TAM) by Venkatesh and Davis [20], Theory of Reasoned Action (TRA) by Fishbein and Ajzen [21], and Theory of Planned Behaviour (TPB) by Ajzen [22]. The TAM model showed that perceived usefulness and perceived ease of use of technology will affect the behavioural intention to use technology. In TRA, there were two factors namely the attitudes (behavioural beliefs and outcome evaluation) and subjective norms (normative beliefs and motivation to comply) that would affect the behavioural intention of a person. Whereas for TPB, the researchers extended the TRA model by adding a new factor called perceived behavioural control as the factor that affected the intention and final behaviour to use technology.

2. Methods and Methodology:

A. Research Design and Theoretical Framework

This research adopted a quantitative research method whereby a questionnaire survey was adopted as a research instrument to collect Beijing, China adults' responses about basic demographic data, agreement on factors that affected their satisfaction level, and the behavioural intention in using E-hailing service. The research theoretical model consisted of two relationships. The first one consisted of four independent variables namely the price, safety, accessibility, and comfort to measure the significant relationship with the dependent variable customer satisfaction. The second one measured the relationship between E-hailing service satisfaction and behavioural intention to use E-hailing service.

The four variables/factors of price, safety, accessibility, and comfort were chosen because this combination set of variables had never been explored and investigated in Beijing, China. The variables were adopted from Lee [7]'s research which was conducted in Malaysia. However, one of the variables in Lee's research namely convenience was dropped in this research because this factor is not significant in China's context. The proposed research theoretical framework for identifying the factors affecting Beijing, China adults' satisfaction and intention to use E-hailing services is shown in Figure 1.

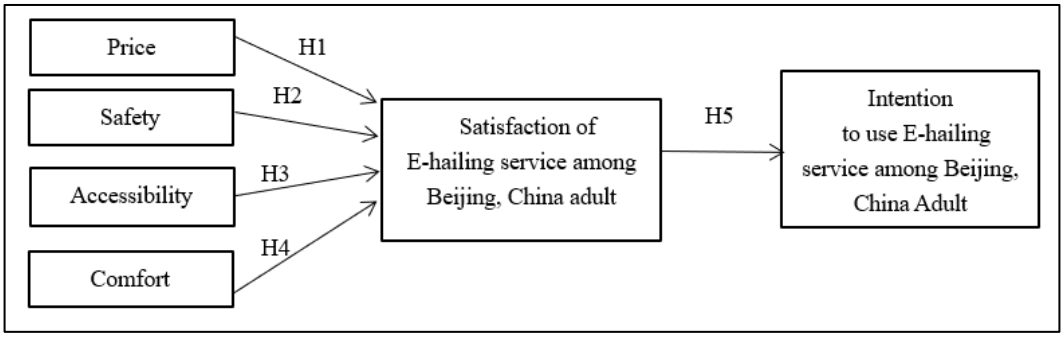

Figure 1. Research theoretical framework

The hypotheses for this research are:

H1: Price has a positive and significant relationship with satisfaction of using E-hailing services among adults in Beijing, China.

H2: Safety has a positive and significant relationship with satisfaction of using E-hailing services among adults in Beijing, China.

H3: Accessibility has a positive and significant relationship with satisfaction of using E-hailing services among adults in Beijing, China.

H4: Comfort has a positive and significant relationship with satisfaction of using E-hailing services among adults in Beijing, China.

H5: Satisfaction of using e-hailing services has a positive and significant relationship with intention to use e-hailing services among adults in Beijing, China.

B. Research Instrument Design

The quantitative research was conducted in two phases. This research adopted the questionnaire survey questions from Lee [8]. Each question is measured by a Likert scale with the range of 1 – strongly disagree to 5 – strongly agree. In the first phase of the pilot study, the questionnaire was validated by using a reliability test that involved 30 Beijing, China adults with the age from 18 to 60 years old. The sample size of the pilot test was based on Initial Scale Development: Sample Size for Pilot Studies [23]. Once the questionnaire instrument is validated to have high reliability, phase two for the full test will be conducted by involving 500 adults in Beijing, China. According to the formula proposed by Pallant [24], the sample size (N) must be greater than 82 ($N > 50 + 8(m)$, m is the number of investigated factors/variables) to ensure statistical robustness and meaningful analysis. Another statistical research proposed a size of 100 for the full test requirement [25]. With consideration of the research's target population being in the metropolitan area of Beijing, China, a larger sample size would significantly enhance the robustness of the survey results. Therefore, this research aimed to collect 500 responses to ensure the survey's meaningful significance within this urban context.

The questionnaire was designed with an online questionnaire tool named Wenjuanxing. The questionnaire link would be shared in various Beijing communities' Wechat groups and social media groups to recruit respondents via a purposive sampling method. The respondents would

be filtered by age. Section A of the questionnaire consisted of questions about demographics such as gender, age, education level, E-hailing service used, and frequency of using E-hailing service. Sections B to D of the questionnaire asked about the adults' agreement on satisfaction factors and behavioural intention for using E-hailing services. There were five questions to be answered for each independent variable (price, safety, accessibility, comfort), and four questions for customer satisfaction, with one question for behavioural intention.

C. Research Instrument Design

Several quantitative analysis methods were used to analyse the questionnaire responses. The pilot test adopted a reliability test whereby the Cronbach Alpha value of each variable would be measured before other statistical tests were run for the research. In the descriptive analysis, charts, and tables were used to display the demographic distribution of the respondents. Following on, the customer satisfaction score (CSAT) was used to illustrate the satisfaction level of customers toward E-hailing service from 0% terrible to 100% fantastic. The computation formula for CSAT is shown in Eq (1). Pearson correlation analysis would be used to test the hypotheses, whereas multiple regression analysis would be used to determine the rank of the impact of each factor on E-hailing service satisfaction.

$$\text{CSAT} = \frac{\text{The total number of 4 and 5 responsens}}{\text{Number of total responses}} \times 100 \quad (1)$$

3. Results:

A. Pilot Test

This research successfully collected 30 responses during the pilot testing stage. The reliability test showed that the variables demonstrated sufficient reliability in the Cronbach Alpha values range of 0.719 to 0.916 (acceptable to excellent range). One question from the variable accessibility could be removed to improve the reliability of the variable. The question would not be used in the full test later. The reliability test result for the pilot test is shown in Table 1.

Table 1. Output of reliability test in pilot study

Factor	Cronbach's Alpha (before)	Cronbach's Alpha (after)
Factor 1: Price (P)	0.824	0.824
Factor 2: Accessibility (A)	0.834	0.837
Factor 3: Safety (S)	0.875	0.875
Factor 4: Comfort (COMF)	0.719	0.719
Customer Satisfaction (CS) & Intention to Use (IU)	0.916	0.916

B. Full Test – CSAT Computation

CSAT score was computed for all the questionnaire responses from the 507 respondents. The highest level of satisfaction with 56.21% was attributed to E-hailing services that offer promotions and discounts (price factor). Following closely, the second-highest satisfaction level was 56.02%, which was associated with the adequacy of seating during E-hailing travel (comfort factor). In contrast, the lowest CSAT score is observed for E-hailing platforms that provide an accessible platform for all users, registering at only 46.94% (accessibility factor). Overall, the respondents perceived price and comfort factors as more significant satisfaction

factors (with higher CSAT scores).

C. Full Test – Descriptive Analysis

The summary of 507 respondents' demographic data is shown in Table 2. The survey achieved gender equality whereby 48.13% of respondents are male and 51.87% are female. The age range of the respondents also showed the respondents are distributed fairly from different age groups significantly, with the largest group being the age of 18-25 (29.98%), followed by the age group of 34-40 (26.43%), age group of 26-33 (23.47%), and another two age groups above 40 years old with the percentage in the range of 10% of total respondent's population. 75% of the respondents have an education background with at least a college level.

The descriptive analysis showed that the four major E-hailing service providers in Beijing city namely Didi Chuxing, Huaxiaozhum, T3 Travel, and Ruqi Travel had an equal customer share of around 24-25%. It showed that the E-hailing market in Beijing city is highly competitive. The E-hailing service is also in high demand among Beijing adults whereby the study showed that more than 60% of the respondents used the E-hailing service at least once a week.

Table 2. Demographic Data from the Respondents

Demographic Variables	Frequency	Percentage (%)
Gender		
male	244	48.13%
female	263	51.87%
Age		
18-25	152	29.98%
26-33	119	23.47%
34-40	134	26.43%
41-48	52	10.26%
49-60	50	9.86%
Education		
Junior high school and below	22	4.34%
high school	108	21.3%
College	183	36.09%
Undergraduate	166	32.74%
Postgraduate and above	28	5.52%
E-hailing service		
Didi Chuxing	125	24.65%
Huaxiaozhu	127	25.05%
T3 Travel	125	24.65%
Ruqi Travel	130	25.64%
others	0	0%
How often do you use E-hailing services?		
every day	43	8.48%
a few times a week	115	22.68%
once a week	160	31.56%
several times in a month	189	37.28%

D. Full Test – Statistical Analysis

The quantitative statistical analyses that were conducted in the full test were Pearson correlation analysis and multiple regression test. The output of Pearson correlation analysis which investigated the relationship of four factors (price, safety, accessibility, and comfort)

with Beijing, China adult's E-hailing service satisfaction is shown in Table 3. All the hypotheses H1 to H4 were accepted. There were strong positive and significant relationships among the factors of price, safety, accessibility, and comfort with Beijing, China adult's E-hailing service satisfaction. On the other hand, it was found that there was a moderately strong positive and significant relationship between Beijing, China adult satisfaction (using CS1-CS4) and behavioural intention (IU) to use E-hailing services with a correlation coefficient value of 0.595. This, H5 was also accepted in the study.

Table 3. Pearson Correlation Analysis Summary for Hypothesis H1-H4

Factor	Person Correlation	Correlation strength	Sig (2-tailed)	Hypothesis outcome
Price	0.807	Strong	<0.001*	H1 is accepted
Safety	0.818	Strong	<0.001*	H2 is accepted
Accessibility	0.796	Strong	<0.001*	H3 is accepted
Comfort	0.774	Strong	<0.001*	H4 is accepted

* Significant

In the multiple regression analysis output, the correlation coefficient value of 0.867 indicated a strong positive linear relationship between the independent (price, safety, accessibility comfort) and dependent variable (satisfaction). The R square value denoted that 75.2% of the variability in the dependent variable could be accounted for by the adopted independent variables in the model. The analysis showed that all variables are significant in the model. The unstandardised coefficient value showed that the most important factor was safety (0.293), followed by price (0.247), and accessibility (0.212), and the least important factor was comfort (0.174). The findings of the analyses could be used as a reference for all Beijing E-hailing service providers to design better-targeted services for adult customers.

4. Discussion of Result

This research discovered four factors that have significant relationships with Beijing, China adults' satisfaction in using E-hailing services. This research is consistent with Lee's [8] findings as observed in Malaysia. However, this research finding is not aligned with Yeo and Shafi's [11] research. It could be due to difference of regional differences whereby the customers from big and medium cities had different customer satisfaction preferences and favourable factors. On the other hand, some of the research findings were also aligned with Wang et al.'s [6] findings in Hangzhou. This variation in findings among studies showed that it was important to consider the regional nuances and comprehensive studies across diverse locations to derive more focused conclusions.

This research discovered that safety is the most critical variable in determining customer service satisfaction among adults who used E-hailing services in Beijing, China, with price ranked second place. This result contrasted with Wang et al.'s [6] finding, where price was identified as the most important variable, and safety was not considered. The reason could be that Beijing, China's adults felt that E-hailing expenses were affordable and did not prioritise it as the most important factor for E-hailing service satisfaction. Instead, adults in Beijing city felt that safety was more important for riding E-hailing vehicles in Beijing due to the complex

traffic conditions in the large city.

5. Conclusion:

This research outcome fulfilled two objectives. Firstly, this research discovered that four factors namely price, safety, accessibility, and comfort were important and had positive and significant relationships with Beijing, China adults' E-hailing service satisfaction. Secondly, this research identified that there was a positive and significant relationship between satisfaction and behavioural intention to use E-hailing services in Beijing, China's adults. These research findings were obtained via various quantitative statistical methods and CSAT. By studying the important factors of adult satisfaction, the E-hailing service providers in Beijing can offer more marketing and fare promotions to the customers. At the same time, they could provide better services such as safety routes and trackable trips, easy reservation, reachable services (shorter and nearer distance E-hailing availability), and in-vehicle comfortability like spacious seats, music, and clean floor carpets.

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Conflict of interest:

The authors declare that there is no conflict of interest.

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