Ecosistema de Datos y la Competitividad

COORDINADORES

JOSÉ SÁNCHEZ-GUTIÉRREZ

PAOLA IRENE MAYORGA-SALAMANCA

Distribución RIICO 2020-Guadalajara, noviembre 2020
Red Internacional de Investigadores en Competitividad
Universidad de Guadalajara
Editado por: Sánchez-Gutiérrez José y
Mayorga-Salamanca Paola Irene

ISBN: 978-607-96203-0-9

INNOVACIÓN Y TECNOLOGÍA Y DATOS

VENTAJA COMPETITIVA Y DESARROLLO ECONÓMICO

Use of mobile applications in individual public transportation in Mexico

Claudia Leticia Preciado-Ortiz[1]

Abstract

Objective: The main objective of this research work was to analyze the factors that influence satisfaction and the intention to continue with the use of transport mobile applications among young university students from Guadalajara, Jalisco, Mexico.

Design / Methodology / Approach: The approach was quantitative. 144 valid responses were used and data analysis is performed by multiple regression.

Results: The results indicate that information quality, system quality and perceived risk are influential predictors of satisfaction. At the same time, satisfaction and design quality were predictors for the continuity of the use of the app.

Originality / Value: Companies that offer individual passenger transport through a mobile application have increased in recent years, generating intense competition both between existing brands and with established traditional taxis. This study provides new and recent information for marketing managers and academics on application user behavior in the transportation industry.

Keywords: mobile app, public transport, satisfaction, intention to continue use.

Resumen

Objetivo: El presente trabajo de investigación tuvo como principal objetivo analizar los factores que influyen en la satisfacción y la intención de continuar con el uso de aplicaciones móviles para las empresas en red de transporte particular entre los jóvenes universitarios de Guadalajara, Jalisco.

Diseño / Metodología / Enfoque: El enfoque fue cuantitativo. Se utilizaron 144 respuestas válidas y el análisis de los datos se realize mediante regresión múltiple.

Resultados: Los resultados indican que la calidad de la información, calidad del sistema y riesgo percibido son predictores influyentes en la satisfacción. Mientras que la satisfacción y la calidad del diseño fueron predictores para la continuidad del uso de la app.

Originalidad / Valor: Las empresas que ofrecen transporte individual de pasajeros mediante una app móvil han aumentado en los últimos años generando una fuerte competencia tanto entre las marcas existentes como con los taxis tradicionales establecidos. Este estudio aporta información nueva y reciente para los directores de marketing y académicos sobre el comportamiento del usuario de apps en la industria del transporte.

Palabras clave: app móviles, transporte público, satisfacción, intención de continuar el uso.

[1] Doctorado en Ciencias Administrativas – CONACYT. Universidad de Guadalajara

Introduction

Mobile applications (apps) currently occupy an important place in daily life (Jain, Kumar and Singla, 2014), even becoming indispensable in daily activities (Soemantadiredia, Vitayala & Hermadi, 2015), and changing the ways of life of many ways (Chan, Chang, Lau, Law & Lei, 2016). o mention an example are the applications to stay related to other people in the personal or work environment (Whatsapp, Facebook, Messenger, Zoom, Google Meet, among others), or to communicate and perform basic activities (such as remembering the time to wake up, take medicine or a meeting) or even applications that are in the form of financial services, airline reservation services, shopping, games, health applications, food and fitness and a new service in ordering taxis (Keong, 2016).

The taxi sector has recently had a phase of disruption generated by social, cultural and economic changes through the introduction of the internet and new technologies (Akbulaev, 2020). Emerging mobile transport based on complementary or independent technological platforms that act as intermediaries between passengers and drivers, through the use of applications appearing in countries around the world (Agyeman, Kwarteng, & Zurkalnaine, 2019). This new taxi ordering service is called Mobile Booking Taxi Application (MBTA) (Kanti, Anandya & Rahardja, 2018), where the user makes the point-to-point service request from a mobile device at any time and from anywhere (Harding, Kandlikar, & Gulati, 2016; Kanti et al. 2018; Mohamed, Rye, & Fonzone, 2020). For example, Uber, Hailo, Curb and Lyft in the USA, Uber and Cabify in Europe and Latin America, App Chiflea in Ecuador, Easy taxi and 99 taxis in Brazil, Little and Mondo in Africa, or Grab, Go-Jek, Didache, Kuaidi Dache, Didi, Meru, Ola, and Hailing in Asia. This innovation has generated new direct competition to taxis, since in the beginning the absence of legislation to operate in this sector, previously exclusively for taxis, caused problems in public transport policies, such as monopoly or protests in different countries, especially the poorest, that they were not prepared for this (Harding et al. 2016; Akimova, Arana-Landín, & Heras-Saizarbitoria, 2020; Cetin & Deakin, 2017; Paronda, Regido, & Napalang, 2016; Ye, Cen, Chen, & Zhen, 2018; Contreras & Paz, 2018; Agyeman et al. 2019; Mohamed et al. 2020; Sánchez-Torres, Correa & Gómez, 2020).

In various parts of the world, the individual public passenger service (taxis) had been presenting problems related to asymmetries of information and coordination between client and driver, as it was not known precisely where to take a taxi, service hours, and driver reliability, safety, cleanliness and vehicle quality, knowledge of the city by the driver and the price to pay for the service offered, among others, reflecting on uncomfortable trips for the consumer (Balachandran &

Bin, 2017). To address these problems, different work schemes and their regulation have been adopted with varying degrees of success, implementing the MTBAs to provide better quality services to passengers and entirely in tune with market changes (Hamzah et al. 2018; Weng, Zailani, Iranmanesh, & Hyun, 2017) being proposed for their applicability in taxis in many countries (Ge et al. 2020; Nguyen-Phuoc, Su, Tran, Le, & Johnson, 2020; Wang, He, Yang, & Oliver Gao, 2016; Ye et al. 2018; Zhang, Honnappa, & Ukkusuri, 2020). The advantages it provides is that by using the MTBAs users keep informed at all times about the time, price, route and driver data of the vehicle (Weng et al. 2017). Users can fix the departure and destination location by GPS or by typing the location that drivers can easily reach (Chan et al. 2016). This type of application motivates the user to change their habit of using private transport to public transport (Kanti et al. 2018). In the literature, some research can be found on the factors that influence the intention to use, consumer satisfaction, quality of service, loyalty, among other aspects regarding public or private transport in different countries of the world, such as in Indonesia (Sumaedi, Bakti & Yarmen, 2012); South Africa (Govender, 2014); United States (Rayle, 2014 and Hong & Zhang, 2017); Vietnam (Khuong & Dai, 2016); and Malaysia (Balachandran & Bin, 2017), however, it can be identified by the recentness of the subject, that there is still a significant gap in the literature regarding the taxi industry, the use of apps in this sector and the consumer. In light of the foregoing, the purpose of this document is to identify what factors affect satisfaction and the intention to continue using the apps of the so-called transportation network companies or ERT.

Mobile applications in individual public transport

Based on the development of smartphone technologies and global positioning systems, various companies have emerged dedicated to mediating the agreement between users and providers of individual public transport services through downloadable applications on mobile devices, which makes, on the one hand, the user demands point-to-point transport services and, on the other hand, a group of private drivers offers the service by using the same application and their vehicles. These companies "are called Transport Network Companies or ERT" (Federal Commission of Economic Competition, 2015, p. 2). According to the Mexican Institute of Transportation (IMT, 2007), the transportation service is classified as private and public, subdividing the latter into "collective public transportation and individual public transportation (point-to-point taxi and route or subject to itinerary)" (Federal Commission for Economic Competition, 2015, p. 1). Within the individual public transport of passengers, the traditional taxi, ridesharing and ERT can be identified.

"Traditional taxis are subject to specific regulation of passenger transport and imply the provision of public service in exchange for a regulated charge. Ridesharing consists of sharing a car without

an economic transaction involved and, it usually occurs between people who know each other. ERTs use technological platforms to communicate passengers with independent drivers" (Federal Commission of Economic Competition, 2015, p. 2).

ERTs have taken two different forms:

- Complementary platforms are those that connect consumers of point-to-point transport services with taxi drivers registered in the public service modality. In Mexico, an example of these systems is Easytaxi and Yaxi.
- Independent platforms, which are those that through an application connect drivers who offer particular services to consumers. Examples of these platforms are Uber and Cabify (Federal Commission for Economic Competition, 2015, p. 2 - 3).

According to the Global Mobile Consumer Survey (GMCS) 2017 Mexico chapter, on average there are 14 applications installed on most mobile devices, and that in terms of payments shows that paying for a taxi (54%) is the most performed activity by users through the use of smartphones.

According to Statista eTravel Report 2019, it is observed that the number of users of mobility apps in the world to request a driver service (taxi, uber, cabify), rent a car or bicycle for short trips or share vehicles is considerable. Of the 43,034 respondents from 52 countries, China, Russia, Spain and the US occupy the first positions (51%, 38%, 35% and 35%, respectively), followed by Brazil (33%), the United Kingdom (30 %), France (26%), India (23%), Italy (21%) and Germany (20%).

Although Mexico is not among the ten countries with the most users of this type of application, it has taken significant steps in this industry. According to The Competitive Intelligence Unit (CIU) (January 20, 2020), transportation platforms have increased their preference among consumers over traditional alternatives. In 2019, 59.6 million (71%) of Internet users in Mexico made payments through an app or website. Of this percentage, 16.2% corresponds to transport applications, only below the payment of audiovisual content platform services (22.1%) and the sale of electronic products (17.8%). Within the transport service, the five leading players are Uber (80%), Cabify (14%), DiDi (4%), Easy Taxi (1%) and Beat (1%).

It is important to mention that its growth in the market will depend on the standards of service quality, reputation and price level perceived by users in its horizontal comparison and compared to traditional substitutes. In the same way, the increase in payment options and greater security in the provision of the service.

Theoretical model and development of hypotheses

Mobile commerce is one of the most favored areas for companies that have been able to adapt. According to Rojas (2019), applications give the consumer the impression that the service is tailor-

made for them, which encourages brand identification. In this way, the company can take the user by the hand throughout the purchase process, facilitate the transaction and knowledge or exploration of the product or service offered in a close and immediate language.

Intention to continue use

Behavioral intentions can be seen as the signals shown if the client continues to use the services of one company or switch to a different provider (Zeithaml *et al.* 1988). Therefore, through a better understanding of passenger involvement, more appropriate marketing strategies can be developed and adapted to services (Lai & Chen, 2011).

Satisfaction

Satisfaction can be defined as the consumer's feeling that the consumption of a product delivers results against a standard of pleasure or displeasure. This definition mirrors on one side, satisfactions cognitive nature, i.e. comparison between expectations and performance while on the other side, it mirrors on the afective nature which is the related pleasure feeling (Moliner, Sánchez, Rodríguez & Callarisa, 2007 cited in Olubusola, 2015, p. 2).

Mobile consumer user satisfaction (MCUS) can be defined as "a summary affective response of varying intensity that follows mobile commerce activities and is stimulated by several focal aspects, such as information quality, system quality, and service quality" (Wang & Liao, 2007, p. 384). The more satisfied the users are, then the higher the probability that the users will continue to use the current application (Oghuma et al., 2016; Kanti *et al.* 2018). In the same time, the results of several studies on satisfaction and intention to continue are positively accepted (Lai & Chen, 2011; Lee and Kwon, 2011; Kanti *et al.* 2018) including public transport services (Joewono and Kubota, 2007; Nathanail, 2008; Lai & Chen, 2011).

Perceived risk

The perceived risk was evaluated as an uncertainty about the possible negative effect of the use of products or services (Srivastava & Sharma, 2011) or also the degree of uncertainty of the consumer regarding the result of a purchase decision (Keong, 2016). The perceived risk plays an important role in the use or purchase online since it is related to the perceptions of the users (Currás-Pérez *et al.* 2013). In this context it is defined as the “uncertainty about the result of the use of innovation” (Ram and Sheth 1989; Miyazaki & Fernandez, 2001; Gerrard and Cunningham, 2003; Cruz, Barreto, Muñoz-Gallego & Laukkanen, 2010).

Research on technology adoption provides evidence that an individual's perception of risk is important when considering the acquisition of a new technology or service (Laforet and Li 2005, Yang 2005; Im *et al.* 2007; Sohail & Al-Jabri, 2014; Kanti et al. 2018).

In the context of mobile apps, the perception of risk is even more important due to the threat of privacy and security concerns (Luarn and Lin 2005; Reid & Levy, 2008). For example, fear of losing confidential information (Kuisma et al. 2007), hackers who can access your bank account by making unauthorized charges (Poon 2008), or fear to the loss or theft of a mobile device with stored data (Coursaris *et al.* 2003; Kwame, 2013).

System quality

Degree to wich individuals perceive that the system is satisfying, in terms of transfer speed and reliability (Kleijnen, et al., 2004 cited in Kumar & Ravindran, 2012).

Quality information

Ding and Straub (2008) define information quality as "the ability to provide information to benefit users in terms of accuracy, completeness and up-to-date" (Kumar & Ravindran, 2012).

Information is one of the important aspects for the client when making the decision to use and pay for a service. In matters of mobile apps, it is not the exception, and it could be said that the quality of the information presented acquires major importance. Having sufficient information guides consumers to make better decisions and allows them to more easily accept and continue using a product or service (Sripalawat et al. 2011).

Information is essential in any innovation diffusion process (Cruz et al. 2010) and plays a crucial role in reducing consumer resistance (Jun and Cai, 2001; Rogers, 2003; Cruz et al., 2010; Kwame, 2013).

Design quality

The quality of the design of the transport mobile app is another important aspect to consider. Some authors associate this characteristic as the device barrier, inappropriate device (Cruz et al. 2010; Sripalawat et al. 2011), design (Lee and Chung, 2009; Poey and Arffin, 2015) or interface design (Yu and Fang, 2009). In the mobile context, it can be defined as "the relative importance in the attributes of the services (screen size, keyboard, location, response time" (Laukkanen, 2007; Yang, 2009).

Table 1 shows some studies that have been carried out in the mobile context, specifying authors, hypotheses, context and country in which the study was carried out.

Table 1. Previous studies

Source (Type of study and Country)	Hypotheses	Context
Weng et al. 2017 (Empirical, Malaysia)	Confirmation → Satisfaction Confirmation → Perceived usefulness Perceived usefulness → Satisfaction Perceived usefulness → Attitude Perceived usefulness → Taxi apps continuance intention Perceived ease of use → Perceived usefulness Perceived ease of use → Attitude Perceived risk → Attitude Subjective norm → Attitude Subjective norm → Taxi apps continuance intention Satisfaction → Attitude Satisfaction → Taxi apps continuance intention Attitude → Taxi apps continuance intention	Mobile booking taxi application
Wang & Liao, 2007 (Empirical, Taiwan)	MCUS → Intention to reuse the m-commerce systems MCUS → Extend of good Word-of-mouth	MCUS
Vallejo, 2019 (Empirical, Ecuator)	Ease to use → "Taxi Verify" mobile app adoption Perceived usefulness → "Taxi Verify" mobile app adoption	Taxi verify (app)
Balachandran & Bin, 2017 (Empirical, Malaysia)	Tangible → Ride-sharing user satisfaction Reliability → Ride-sharing user satisfaction Price → Ride-sharing user satisfaction Promotion and coupon redemption → Ride-sharing user satisfaction Confort → Ride-sharing user satisfaction	Mobile apps of ride-sharing services
Justitia, Semiati & Ramadhini, 2019 (Empirical, Indonesia)	Route detection quality → Customer satisfaction Connection quality → Customer satisfaction Interaction quality → Customer satisfaction Content quality → Customer satisfaction Service quality → Customer satisfaction Customer satisfaction → Customer complaint Customer satisfaction → Customer loyalty	Online taxi mobile apps
Kumar & Kumar, 2016 (Empirical, India)	Innovativeness → Selection of Cab Services Price consciousness → Selection of Cab Services Coupon redemption → Selection of Cab Services	Taxi mobile apps
Olubusola, 2015 (Conceptual, NA)	Perceived ease of use → User satisfaction Perceived usefulness → User satisfaction User´s expectation → User satisfaction Perceived value → User satisfaction Screen size → User satisfaction Battery life → User satisfaction Context → User satisfaction Interruption → User satisfaction Privacy → User satisfaction	Mobile apps

	Wireless connectivity → User satisfaction User satisfaction → Addiction User satisfaction → Laziness	
Yang, Ye, Xie, Yan, Lu, Yang, Wang & Chen, 2020 (Empirical, China)	Perceived usefulness → Intention to accept parking App Perceived ease of use → Perceived usefulness Perceived ease of use → Intention to accept parking App Parking App attributes → Intention to accept parking App Trust → Intention to accept parking App Sociodemographic → Intention to accept parking App	Parking App
Yang, 2005 (Empirical, Singapore)	Innovativeness → Perceived usefulness Past adoption behavior → Perceived usefulness Knowledge → Perceived usefulness Technology cluster → Perceived usefulness Age → Perceived usefulness Gender → Perceived usefulness Specialization → Perceived usefulness Innovativeness → Perceived ease to use Past adoption behavior → Perceived ease to use Knowledge → Perceived ease to use Technology cluster → Perceived ease to use Age → Perceived ease to use Gender → Perceived ease to use Specialization → Perceived ease to use Perceived usefulness → Perceived ease to use Perceived usefulness → Perceived Attitude toward using Perceived ease to use → Perceived Attitude toward using	M-commerce
Wang, Wang, Wang, Wei & Wang, 2018 (Empirical, China)	Perceived ease to use → Perceived usefulness Perceived ease to use → Consumers´ intention to use ride-sharing services Perceived usefulness → Consumers´ intention to use ride-sharing services Perceived risk → Perceived usefulness (negative) Perceived risk → Consumers´ intention to use ride-sharing services (negative) Personal innovativeness → Perceived ease of use Personal innovativeness → Perceived usefulness Personal innovativeness → Perceived risk (negative) Personal innovativeness → Consumers´ intention to use ride-sharing services Environmental awareness → Consumers´ intention to use ride-sharing services	Ride-sharing app service
Razi, Tamrin, Nor, 2019 Empirical, Sri Lanka)	Performance expectancy → Intention to use e-hailing servies Effort expectancy → Intention to use e-hailing servies Trust → Intention to use e-hailing servies Enjoyment → Intention to use e-hailing servies	E-hailing app
Peng, Wang, He, Guo & Lin, 2014 (Empirical, China)	Perceived usefulness → People´s attitude toward using Perceived usefulness → People´s behavioral intention Perceived ease to use → Perceived usefulness Perceived ease to use → People´s attitude toward using Compatibility → People´s attitude toward using Subjective norm → People´s behavioral intention People´s attitude toward using → People´s behavioral intention Perceived playfulness → People´s attitude toward using	Call-taxi app

	Perceived playfulness → People´s behavioral intention Perceived Price level → People´s attitude toward using (negative) Perceived price level → People´s behavioral intention (negative)	
Lim, Yeo, Goh & Gan, 2018 (Empirical, Malaysia)	Perceived usefulness → Adoption ride-hailing apps Subjective norms → Adoption ride-hailing apps Perceived risk → Adoption ride-hailing apps Perceived playfulness → Adoption ride-hailing apps Perceived Price level → Adoption ride-hailing apps	Ride-hailing app
Liao, Chen & Yen, 2007 (Empirical, Taiwan)	Subjective norm → Behavioral intention Perceived usefulness → Behavioral intention Satisfaction → Behavioral intention Perceived behavior control → Behavioral intention Perceived usefulness → Satisfaction Disconfirmation → Satisfaction Perceived ease of use → Satisfaction Subjective norm → Perceived usefulness Disconfirmation → Perceived usefulness Perceived ease of use → Perceived usefulness Disconfirmation → Perceived ease of use Perceived behavior control → Perceived ease of use	E-service
Li & Liu, 2014 (Empirical, China)	User satisfaction → Continuance intention to use an e-service Perceived usefulness → Continuance intention to use an e-service Perceived usefulness → Satisfaction with an e-service Confirmation of user expectations → Satisfaction with an e-service Confirmation of user expectations → Perceived usefulness User satisfaction → User´s WOM behavior regarding an e-service Users´ continuance intention to use an e-service → User´s WOM behavior regarding an e-service Perceived usefulness → User´s WOM behavior regarding an e-service	E-service
Kanti et al. 2018 (Empirical, Indonesia)	Users' attitude towards using Go-Jek Application → Users' continuance usage intention Users' attitude towards using Go-Jek Application → Users' continuance usage intention Users´ satisfaction → Users' attitude towards using Go-jek Application Perceived usefulness → Users' continuance usage intention Go-jek Application Perceived usefulness → Users' attitude towards using Go-jek Application Perceived ease of use → Users' attitude towards using Go-jek Application Subjective norm → Users' continuance usage intention Go-jek Application Subjective norm → Users' attitude towards using Go-jek Application Perceived ease of use → Users' perceived usefulness Perceived risk → Users' attitude towards using Go-jek Application (negative) Perceived usefulness → Users' satisfaction Go-jek Application users´ confirmation → Users' satisfaction Go-jek Application users´ confirmation → Users' perceived usefulness Users´ compatibility → Users' attitude towards using Go-jek Application	Mobile taxi booking app

	Perceived playfulness → Users' attitude towards using Go-jek Application	

Derived from the previous theoretical analysis, the following hypotheses were raised:

H1: Information quality has a positive and significant impact on user satisfaction.
H2: System quality has a positive and significant impact on user satisfaction.
H3: Design quality has a positive and significant impact on user satisfaction.
H4: Perceived risk has a negative and significant impact on user satisfaction.
H5: Information quality has a positive and significant impact on the intention to continue using the app.
H6: System quality has a positive and significant impact on the intention to continue using the app.
H7: Design quality has a positive and significant impact on the intention to continue using the app.
H8: Perceived risk has a negative and significant impact on the intention to continue using the app.
H9: User satisfaction has a positive and significant impact on the intention to continue using the app.

The resulting theoretical model was structured in two mathematical equations. Equation 1 presents the mathematical model established for this study according to the literature consulted, where satisfaction (Y) is considered the dependent variable and the variables system quality (X1), perceived risk (X2), design quality (X3) and information quality (X4) are taken as independent variables.

Equation 1: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Similarly, in equation 2, the intention to continue using the apps (Y) is the dependent variable and the independent variables are: system quality (X1), perceived risk (X2), design quality (X3), quality of information (X4) and satisfaction (X5).
Equation 2: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$

Methodology

The present investigation used the quantitative approach. The main method of data collection was surveyed. The items of the questionnaire were adapted and modified from scales previously developed and validated with the appropriate coding for the conditions of young Mexican users.

Each item was measured on a 5-point Likert scale with responses ranging from "totally agree" to "totally disagree". The unit of analysis was the undergraduate student, user of private transport applications of the University Center for Economic-Administrative Sciences (CUCEA) of the University of Guadalajara. Previous experience was necessary to be able to evaluate satisfaction and intention to continue using this type of app. The sampling technique was random, with a size of 202 participants from the various educational programs. Of this number of applied surveys, once the data had been tabulated and reviewed, 144 good surveys remained (corresponding to 71.28%), eliminating the missing or null data. The software used for data analysis was SPSS. Cronbach's alpha and exploratory factor analysis were used for the validity and reliability of the data. Multiple regression was used to test the model.

Results

In this section, the results of the analysis of the data obtained are presented and discussed. First, the profile of the participants was obtained (Table 2) where it is observed that of the 144 participants, 39.6% were men, and 60.4% were women. Regarding age, 71.5% were in the range between 21 and 30 years, 27.1% were under 20 years, and 1.4% were over 31 years. Regarding monthly income, the two largest groups are polarized, since 32.6% earn less than $ 2000 and 31.3% said they have an income above $ 4001; the remaining 52% have an income that ranges between $ 2,000 and $ 4,000. When asked about the last time they had used the applications to request a transportation service, 65.3% had done so within the last 14 days (from 1 to 7 days and from one to two weeks). Regarding the question of how long they have been using the application, the majority (36.8%) have been using the application for more than a year. The most used application is Uber (95.8%), they generally use it on weekends (43.8%), pay both with card and cash (47.9% and 42.4% respectively), the request is made through a Smartphone (97.9%), and the main brands of the device were Apple (30.6%), Samsung (26.4%) and Motorola (12.5%).

Table 2. User characteristics

Variable	Frequency	Percentage
Gender		
Man	57	39,6
Woman	87	60,4
Age		
Less than 20 years	39	27,1
Between 21 and 30 years	103	71,5
More than 31 years	2	1,4
Monthly income		
Less than $ 2000	47	32,6
From $ 2001 to $ 3000	31	21,5
From $ 3001 to $ 4000	21	14,6
From $ 4001 to more	45	31,3

When was the last time you used the mobile applications to request a transportation service?		
Today	12	8,3
1 - 7 days ago	71	49,3
1 - 2 weeks ago	23	16,0
3 - 4 weeks ago	21	14,6
2 - 3 months ago	15	10,4
3 - 4 months ago	2	1,4
What was the application you used?		
Uber	138	95,8
Cabify	3	2,1
Easy taxi	2	1,4
City driver	1	,7
Since when have you used the private transport applications?		
Less than a month	8	5,6
1 to 6 months	46	31,9
7 to 12 months	37	25,7
More than a year	53	36,8
How often do you use it?		
Everyday	3	2,1
Two or three days a week	25	17,4
Weekends	63	43,8
Other	53	36,8
What is your form of payment?		
Cash	61	42,4
Card	69	47,9
Both of them	14	9,7
What type of mobile device do you use most frequently to access the private transport application?		
Smartphone	141	97,9
Tablet	1	,7
iPod touch	2	1,4
Who is the manufacturer of the device?		
Apple	44	30,6
HTC	4	2,8
Motorola	18	12,5
Samsung	38	26,4
LG	9	6,3
Nokia	2	1,4
Sony Ericson	1	,7
Other	28	19,4

Table 3 presents the results of the reliability and validity test, which correspond to Cronbach's alpha, Kaiser-Meyer-Olkin Test, Bartlett's Test of Sphericity, commonality, total explained variance and correlations (Table 4). All indicators were exceeding the minimum for validity and subsequent use.

Table 3. Results of the reliability and validity analysis

Variable	Items	Cronbach Alpha	Kaiser-Meyer-Olkin test	Barltlett's sphericity test (p value)	Item loading	AVE

System quality	SQ1	0,842	0,786	Chi squared 230,614 gl 6 p-value 0,000	,854	67,909
	SQ2				,842	
	SQ3				,813	
	SQ4				,785	
Design quality	DQ1	0,821	0,868	Chi squared 345,709 gl 10 p-value 0,000	,824	66,926
	DQ2				,866	
	DQ3				,861	
	DQ4				,766	
	DQ5				,768	
Information quality	QI1	0,875	0,831	Chi squared 383,645 gl 10 p-value 0,000	,842	68,044
	QI2				,810	
	QI3				,852	
	QI4				,827	
	QI5				,793	
Perceived risk	PR1	0,764	0,665	Chi squared 124,552 gl 3 p-value 0,000	,867	68,900
	PR2				,866	
	PR3				,752	
Intention to continuance to use	I1	0,753	,661	Chi squared 129,095 gl 3 p-value 0,000	,849	69,303
	I2				,860	
	I3				,752	

Table 4. Pearson correlations

	IQ	SQ	DQ	PR	S	ICU
IQ	1					
SQ	,649**	1				
DQ	,679**	,565**	1			
PR	,501**	,376**	,419**	1		
S	,620**	,601**	,548**	,533**	1	
ICU	,390**	,361**	,443**	,412**	,550**	1

**. The correlation is significant at the 0.01 level (bilateral).

Table 5 shows the results of the multiple regression and hypothesis testing. In model 1, where satisfaction was the dependent variable, it is observed that the quality of the information, the quality of the system and the perceived risk were approved, while the quality of the design was not significant in the result regarding its influence on satisfaction.

In model 2, where the intention to use was the dependent variable, only satisfaction and quality of design have a positive and significant impact on the continuity of use, the rest of the hypotheses were rejected.

On the other hand, it can be mentioned that in model 1, user satisfaction is explained by 50.3% by the quality of the information, the quality of the system and the perceived risk. And model 2, the intention to continue using the apps is explained by 32.3% by satisfaction and the quality of the design.

Table 5. Results of the Multiple Regression Analysis

	Variable	β standarized	*Value t*	*p-value*	Hypothesis result
Model 1	IQ	,211	2,267	,025*	H_1: Supported
	SQ	,292	3,668	,000*	H_2: Supported
	DQ	,130	1,573	,118	H_3: Not supported
	PR	,263	3,821	,000*	H_4: Supported
	F-value		37,215 (,000)		
	R		,719		
	R^2		,517		
	R^2 ajustada		,503		
	Variable	β standarized	*Value t*	*p-value*	
Model 2	IQ	-,075	-,682	,496	H_5: Not supported
	SQ	-,012	-,128	,898	H_6: Not supported
	DQ	,216	2,217	,028**	H_7: Supported
	PR	,147	1,746	,083	H_8: Not supported
	S	,407	1,114	,000*	H_9: Supported
	F-value		14,644 (,000)		
	R		,589		
	R^2		,347		
	R^2 ajustada		,323		

Model 1: Dependent variables: Satisfaction. Predictor variables: (Constant), Ease of use, Perceived risk, Response time, System quality, Information quality.

Model 2: Dependent variables: Intention to continue use. Predictor variables: (Constant), Satisfaction.

* $p < 0.001$ ** $p < 0.005$

Conclusions

In conclusion, it can be mentioned that it is important for companies to be at the forefront of technology since apps are an excellent tool or strategy, from the point of view observed, to welcome

the market, position themselves and facilitate the purchase processes between the company and the customers.

With mobile devices, companies can adopt a business mobility strategy, saving costs, gaining flexibility and being able to optimize processes due to obtaining customer information in real-time and improving corporate communications. Similarly, through the use of mobile marketing, the interaction between the company and its customers is promoted, facilitates the dissemination of offers and promotions, encourages purchases, improves customer loyalty and favors the image of the brand. All this was influencing the future of business around the world.

Given this, the transport network companies are here to stay and satisfy the needs of the consumer regarding individual public transport, emphasizing that a better knowledge of the user will lead to improving the service offered and with it the loyalty, continuity of use and promotion of Word of mouth from the user, reflecting in higher sales and therefore profits for companies.

References

Agyeman, S., Kwarteng, R. A., & Zurkalnaine, S. (2019). Principal component analysis of driver challenges in the shared taxi market in Ghana. *Case Studies on Transport Policy*, 7(1), 73–86. https://doi.org/10.1016/j.cstp.2018.12.001.

Akbulaev, N. (2020). The impact of the taxi service mobile applications on the financial condition of taxi companies. *International Journal of Scientific and Technology Research*, 9(2), 2144–2150.

Akimova, T., Arana-Landín, G., & Heras-Saizarbitoria, I. (2020). The economic impact of transportation network companies on the traditional taxi sector: An empirical study in Spain. *Case Studies on Transport Policy*. *0*–1. https://doi.org/10.1016/j.cstp.2020.02.002 February.

Balachandran, I. & Bin, H. I. (2017). The influence of customer satisfaction on ride-sharing services in Malaysia. *International Journal of Accounting & Business Management.* 5 (2). 24924/ijabm/2017.11/v5.iss2/184.196

Cetin, T., & Deakin, E. (2017). Regulation of taxis and the rise of ridesharing. *Transport Policy*, 76(September), 149–158. https://doi.org/10.1016/j.tranpol.2017.09.002.

Contreras, S. D., & Paz, A. (2018). The effects of ride-hailing companies on the taxicab industry in Las Vegas, Nevada. *Transportation Research Part A: Policy and Practice*, 115(November 2017), 63–70. https://doi.org/10.1016/j.tra.2017.11.008.

Cruz, P., Barreto, F. N. L., Muñoz-Gallego, P., & Laukkanen, T. (2010). Mobile banking rollout in emerging markets: Evidence from Brazil. *International Journal of Bank Marketing*, 28(5), 342-371.

Chan, J. W., Chang, V. L., Lau, W. K., Law, L. K., & Lei, C. J. (2016). Taxi App Market Analysis in Hongkong. *Journal Economy Business Management*, 4 (3), 239-242.

Coursaris, C., K. Hassanein, K. and Head, M. (2003). M-Commerce in Canada: An Interaction Framework for Wireless Privacy, *Canadian Journal of Administrative Sciences*, 20 (1), 54-73.

Currás-Pérez, R., Ruiz-Mafé, C., & Sanz-Blas, S. (2013). Social Network Loyalty: Evaluating the Role of Attitude, Perceived Risk, and Satisfaction. *Online Information Review*, 37 (1), 61-82.

Deloitte Insights. Estudio: Hábitos de los consumidores móviles en México, 2019. Consultado el 10 de agosto de 2020 de: https://www2.deloitte.com/content/dam/Deloitte/mx/Documents/technology/Global-Mobile-Consumer-Survey.pdf

Federal Commission for Economic Competition (2015). Opinión OPN-008-2015. Retreived August 12, 2020. From: https://www.cofece.mx/CFCResoluciones/docs/Mercados%20Regulados/V6/16/2042252.pdf

Ge, W., Shao, D., Xue, M., Zhu, H., Zhao, X., & Cheng, J. (2020). Urban taxi ridership analysis in the emerging metropolis: Case study in Shanghai. *Case Studies on Transport Policy*, 8(1), 173–179. https://doi.org/10.1016/j.cstp.2018.09.006.

Gerrard, P. and Cunningham, J.B. (2003). The impact of perceived risks on banking managers intention to outsource business processes – a study of the German banking and finance industry, *International Journal of Bank Marketing*, 21 (1), 16-28.

Govender, K. (2014). Public Transport Service Quality in South Africa: A Case Study of Bus and Min Bus Services in Johannesburg. *African Journal of Business Management*. 8(10) 317-326.

Harding, S., Kandlikar, M., & Gulati, S. (2016). Taxi apps, regulation, and the market for taxi journeys. *Transportation Research Part A: Policy and Practice*, 88 (December 2014), 15–25. https://doi.org/10.1016/j.tra.2016.03.009.

Hong Z.L.Y. & Zhang Z. (2017). An Empirical Analysis Of On Demand Ride-Sharing And Traffic Congestion: *Proceedings Of The 50th Hawaii International Conference On System Science*s.

Im, S., Mason, C.H., and Houston, M.B. (2007). Does innate consumer innovativeness relate to new product/service adoption behavior? The intervening role of social learning via vicarious innovativeness. *Journal of the Academy of Marketing Science*, 35 (1), 63–75.

Jain, L., Kumar, H., & Singla, R. K. (2014). Assesing Mobile Technology Usage for Knowledge Dissemination among Farmers in Punjab. *Information Technology for Development*, 21 (4), 1-9.

Joewono, T.B. & Kubota,H., (2007). User satisfaction with paratransit in competition with motorization in Indonesia: anticipation of future implications. *Transportation 34*, 337–354.

Jun, M. and Cai, S. (2001). The key determinants of internet banking service quality: a content Analysis, *International Journal of Bank Marketing*, Vol. 19 No. (7), 276-91.

Justitia, A. Semiati, R. & Ramadhini, A. N. (2019). Customer Satisfaction analysis of online taxi mobile apps. Journal of information systems engineering and business intelligence. 5 (1). http://dx.doi.org/10.20473/jisebi.5.1.85-92

Kanti, M. W., Anandya, D. & Rahardja, C. (2018). Continuance Usage Intention of Gojek Application in Surabaya. ICEMAB 2018. 10.4108/eai.8-10-2018.2288664

Keong, W. Y. (2016). Factors Influencing Passengers' Attitude and Adoption Intention of Mobile Taxi Booking. *The Social Science*, 11 (11), 2769-2776.

Kwame, R. (2013). Banking Innovation in Ghana: Insight of Students' Adoption and Diffusion. *Journal of Internet Banking and Commerce*, 18 (3).

Kumar, R. & Ravindran, S. (2012). An empirical study on service quality perceptions and continuance intention in mobile banking context in India. *Journal of internet banking and commerce*. 17(1).

Khuong M. N., & Dai N. Q. (2016). The Factors Affecting Customer Satisfaction And Customer Loyalty — A Study Of Local Taxi Companies In Ho Chi Minh City, Vietnam. *International Journal Of Innovation, Management And Technology*, 7 (5).

Kleijnen, M., Wetzels, M., & Ruyter, K. (2004). Consumer acceptance of wireless finance. *Journal of Financial Services Marketing*, 8(3), 205-217.

Laforet, S. and Li, X., (2005). Consumers' attitudes towards online and mobile banking in China. *International Journal of Bank Marketing*, 23 (5), 362–380.

Lai, W-T. & Chen, C.-F. (2011). Behavioral intentions of public transit passengers — The roles of service quality, perceived value, satisfaction and involvement. Transport Policy. 18, 318 – 325. 10.1016/j.tranpol.2010.09.003

Laukkanen, T. (2007). Internet vs mobile banking: comparing customer value perceptions, *Business Process Management Journal*, 13 (6), 788-797, https://doi.org/10.1108/14637150710834550

Lee, K.C. & Chung, N. (2009). Understanding factors affecting trust in and satisfaction with mobile banking in Korea: A modified DeLone and McLean's model perspective. *Interacting with Computers*, 21, 385 - 392.

Lee, Y. & Kwon, O. (2011). Intimacy, familiarity and continuance intention: An extended expectation–confirmation model in web-based services. *Electron. Commer. Res. Appl*., 10, 342–357.

Li, H. & Liu, Y. (2014). Understanding post-adoption behaviors of e-service users in the context of online travel services. Information & Management. http://dx.doi.org/10.1016/j.im.2014.07.004

Liao, C., Chen, J-L. & Yen, D. (2007). Theory of planning behavior (TPB) and customer satisfaction in the continued use of e-service: An integrated model. *Computers in Human Behavior*. 23, 2804–2822. 10.1016/j.chb.2006.05.006

Lim, K. B., Yeo, S.F., Goh, M. L. & Gan, A. X. (2018). Journal of Fundamental and Applied Sciences. 10(6S), 1132-1142. http://dx.doi.org/10.4314/jfas.v10i6s.74

Luarn, P., & Lin, H. (2005). Toward an understanding of the behavioral intention to use mobile banking. *Computer in Human Behavior*, 21, 873-891.

Mexican Institute of Transportation (IMT, 2017). Análisis de los Sistemas de Transporte. Retreived August 01, 2020. https://www.gob.mx/imt

Miyazaki, A., & Fernandez, A. (2001). Consumer perceptions of privacy and security risk for online shopping, *The Journal of Consumer Affair*, 35, 27–44.

Mohamed, M. J., Rye, T., & Fonzone, A. (2020). The utilisation and user characteristics of Uber services in London. *Transportation Planning and Technology*, 0(0), 1–18. https:// doi.org/10.1080/03081060.2020.1747205.

Nathanail, E., (2008). Measuring the quality of service for messengers on the Hellenic railways. *Transp.Res.* Part A 42, 48–66.

Nguyen-Phuoc, D. Q., Su, D. N., Tran, P. T. K., Le, D. T. T., & Johnson, L. W. (2020). Factors influencing customer's loyalty towards ride-hailing taxi services – A case study of Vietnam. Transportation Research Part A: Policy and Practice, 134 (March 2019), 96–112. https://doi.org/10.1016/j.tra.2020.02.008.

Oghuma, A. P., Libaque-Saenz, C. F., Wong, S. F., & Chang, Y. (2016). An Expectation-Confirmation Model of Continuance Intention to Use Mobile Instant Messaging. *Telematics and Informatics*, 33 (1), 34-47.

Olubusola, A. O. (2015). User Satisfaction in Mobile Applications, *Research Paper at School of Computer Science University of Birmingham. Retrieved from*, 2015, [online] Available: http://www.cs.bham.ac.uk/~rjh/courses/Research/TopicslnHCi/2014-15/Submissions/ajayi-oluwande.pdf.

Paronda, A. G. A., Regido, J. R. F., & Napalang, M. S. G. (2016). Comparative analysis of transportation network companies (TNCs) and conventional taxi Services in Metro Manila. 23rd Annual Conference of the Transportation (pp. 1–12). . August https://s3.amazonaws.com/academia.edu.documents/54055483/Comparative_Analysis_Uber_Grab_Taxi_Paper_Paronda_2_FINALrev06302016.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1517457700&Signature=KVlw86klvqMeM34kwPCSdDj0xLc%3D&response-content-dispositio.

Peng, L., Wang, H., He, X., Guo, D. & Lin, Y. (2014). Exploring Factors Affecting the User Adoption of Call-taxi App. 25th Australasian Conference on Information Systems. 8th -10th Dec 2014, Auckland, New Zealand.

Poey, L. & Arffin, Z. (2015). Consumers' Intention to Use a Single Platform E-Payment System: A Study Among Malaysian Internet and Mobile Banking Users. *Journal of Internet Banking and Commerce*, 20(1). http://www.arraydev.com/commerce/jibc/

Poon, W. C., (2008). Users' adoption of e-banking services: the Malaysian perspective, *Journal of Business and Industrial Marketing*, 23 (1), 59-69.

Ram, S. and Sheth, J.N. (1989). Consumer resistance to innovations: the marketing problem and its solutions, *Journal of Consumer Marketing*, 6 (2), 5-14.

Rayle L. (2014). App-Based, On-Demand Ride Services: Comparing Taxi And Ridesourcing Trips And User Characteristics In San Francisco; A Survey.

Razi, M., Tamrin, M. & Nor, R. (2019). Adopting e-hailing Application Among Malaysian Millennials. *The 7th International Conference on Cyber and IT Service Management (CITSM 2019).*

Reid, M., & Levy, Y. (2008). Integrating trust and computer self-efficacy with TAM: An empirical assessment of customers' acceptance of banking information systems (BIS) in Jamaica. *Journal of Internet Banking and Commerce*, 13(3), 1-18.

Rogers, E. (2003). *Diffusion of Innovations*, New York, Free Press.

Rojas, M. Q. (12 de Junio de 2019). La importancia de las apps móviles en las empresas. Obtenido de https://economiatic.com/importancia-apps-moviles-empresas/

Sánchez-Torres, J.A., Correa, H. S. & Gómez, I.C. (2020). Assessment of mobile taxi booking apps: An empirical study of adoption by taxi drivers in Medellín-Colombia. *Research in Transportation Business & Management*, https://doi.org/10.1016/j.rtbm.2020.100500

Sohail, S. & Al-Jabri, I. (2014). Attitudes towards mobile banking: are there any differences between users and non-users?. *Behaviour & Information Technology*. 3(4), 335-344.

Soemantadiredja, A., Vitayala, A., & Hermadi, I. (2015). Analysis Adoption of Innovation Go-jek Application. *International Journal of Science and Research*, 6 (3), 936-940.

Sripalawat, J., Thongmak, M., & Ngramyarn, A. (2011). M-banking in Metropolitan Bangkok and a comparison with other countries. *The Journal of Computer Information Systems*, 51(3), 67-76.

Srivastava, K., & Sharma, N. K. (2011). Exploring the Multidimensional Role of Involvement and Perceived Risk in Brand Extension. *International Journal of Commerce and Management*, 21 (4), 410-427.

Statista eTravel Report 2019. Retreived August 10, 2020. https://de.statista.com/statistik/studie/id/42170/dokument/etravel-report/

Sumaedi S.I, Bakti G. M. Y., & Yarmen M. (2012). The Empirical Study Of Public Transport Passengers' Behavioral Intentions: The Roles Of Service Quality, Perceived Sacrifice, Perceived Value, And Satisfaction (Case Study: Paratransit Passengers In Jakarta, Indonesia), *International Journal For Traffic And Transport Engineering*, 2(1), 83 – 97.

The Competitive Intelligence Unit (CIU) (January, 20, 2020), Consultado el 11 de agosto de 2020 desde https://www.theciu.com/publicaciones-2/2020/1/20/plataformas-de-transporte-y-comida-adopcin-y-preferencia

Vallejo, G. A. (2019). Aplicativo móvil para la utilización de taxis seguros en la Ciudad de Ambato. Trabajo de graduación. Modalidad: Proyecto de Investigación presentado previo la obtención del título Ingeniero en Sistemas Computacionales e Informáticos. Universidad Técnica de Ambato, Ambato, Ecuador.

Wang, Y-S. & Liao, Y-W. (2007). The conceptualization and measurement of m-commerce user satisfaction. Computers in Human Behavior, 23, 381 – 398. 10.1016/j.chb.2004.10.017

Wang, X., He, F., Yang, H., & Oliver Gao, H. (2016). Pricing strategies for a taxi-hailing platform. *Transportation Research Part E: Logistics and Transportation Review*, 93, 212–231. https://doi.org/10.1016/j.tre.2016.05.011.

Wang, Y., Wang, S., Wang, J., Wei, J. & Wang, C. (2018). An empirical study of consumers' intention to use ride-sharing services: using an extended technology acceptance model. *Transportation*. https://doi.org/10.1007/s11116-018-9893-4

Weng, G. S., Zailani, S., Iranmanesh, M., & Hyun, S. S. (2017). Mobile taxi booking application service's continuance usage intention by users. *Transportation Research Part D: Transport and Environment*, 57(October), 207–216. https://doi.org/10.1016/j.trd.2017.07.023.

Yang, K.C., (2005). Exploring factors affecting the adoption of mobile commerce in Singapore. *Telematics and Informatics*, 22 (3), 257–277.

Yang, A.S., (2009). Exploring adoption difficulties in mobile banking services. *Canadian Journal of Administrative Sciences*. 26 (2), 136–149. 10.1002/CJAS.102

Yang, C., Ye, Xiaofei, Y., Xie, J., Yan, X., Lu, L., Yang, Z., Wang, T. & Chen, J. (2020). Analyzing Drivers' Intention to Accept Parking App by Structural Equation Model. *Journal of Advanced Transportation*. https://doi.org/10.1155/2020/3051283

Ye, Q., Cen, J., Chen, X., & Zhen, H. (2018). How taxi operation change in the development of e-hailing APPs: A case study in Shanghai, China. *CICTP 2017: Transportation reform and change - equity, inclusiveness, sharing, and innovation – proceedings of the 17th COTA international*

conference of transportation professionals, 2018-January (pp. 2167–2177). https://doi.org/10.1061/9780784480915.229.

Yu, T. K. & Fang, K. (2009). Measuring the Post-Adoption Customer Perception of Mobile Banking Services. *CyberPsychology & Behavior*. 12(1). 10.1089/cpb.2007.0209

Zhang, W., Honnappa, H., & Ukkusuri, S. V. (2020). Modeling urban taxi services with ehailings: A queueing network approach. *Transportation Research Part C: Emerging Technologies*, 113 (November 2018), 332–349. https://doi.org/10.1016/j.trc.2019.05.036.

Zeithaml, V., Varadarajan, P. and Zeithaml, C. (1988), The contingency approach: its foundations and relevancy to theory building and research in marketing, *European Journal of Marketing*, 22 (7), 37-64.