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CONSUMERS' INTENTION TO ADOPT MOBILE TAXI BOOKING APPS: AN APPLICATION OF THE THEORY OF PLANNED BEHAVIOR

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ABSTRACT

Due to the drastic digitalization, the public transportation industry has transformed its service strategies by introducing a mobile application-based taxi service system. Mobile Taxi Booking (MTB) Apps have become very popular in Sri Lanka due to the abundance of smartphones. The study attempted to examine the customer intention to use online Taxi-Booking App's referred to the Theory of Planned Behavior research context. The descriptive survey-based approach was applied for the present and structured questionnaires were used to collect the data. Confirmatory factor analysis and structural equation modeling techniques were generally utilized for statistical analysis. The findings of this research study are attitude, perceived behavioral control, and subjective norms that had an important effect on behavioral intention to adopt mobile taxi booking applications in Sri Lankan consumers. Further findings help to e-hailing service providing companies and mobile apps developers to perform their service using effective marketing strategies for developing a marketing plan profitably and improve user-friendly mobile apps with value-added features.

Keywords: Taxi service industry, Mobile apps, Customer intention, E-hailing.

INTRODUCTION

The taxi industry plays an important role in offering public transport services to the urban transportation system. Taxis provide point-to-point passenger transport services and also they have generated many employment opportunities for the country workforce. Usually, the productivity of the country's workforce is highly dependent on the transportation efficiency of a particular country. Nonetheless, in the past few years, efficient taxi service was a hot topic in where the taxi service providing firms faced challenges due to the disparity between the taxi supply and passenger demand (Weinandy and Ryan, 2021; Shen *et al.*, 2015). Frequently, both parties were wasting their time in this service delivery process. Passengers faced difficulty in finding on-time picked-ups, and on the other hand, taxi drivers are wasting time by longer waiting to get their customers. These make higher traffic congestion in the roads, especially in peak hours, and also affect huge air pollution with the lower traveling speed of vehicles. Such incidents lead to consumer dissatisfaction with the service and the passengers used to make lots of complaints about the taxi service.

Because of recent rapid technological developments in the service industry, the operating procedures were also changed drastically (Kubanov *et al.*, 2019; Ibrahim *et al.*, 2019; Bakhir

and Pogorelov, 2018; Hanani *et al.*, 2018). In the taxi service industry, similar accelerated progress can be identified due to the advancements in the telecommunication industry and mobile and wireless networking technology. Higher smartphone usage and faster internet access were the main reasons for this change. Today, the smartphone has become the simplest way to acquire information through the internet, and with higher market penetration, it has become a part and parcel of day-to-day life. According to the world statistics data, there are 32 billion smartphone users worldwide and the global smartphone penetration has reached 41.5 percent in 2019. On the other hand, smartphones have many mobile applications (apps) that refer to software applications. In 2018, there were 174 billion users who had downloaded mobile applications. That is evidence of mobile app usage which is still growing day by day at a steady rate. With the higher user adoption rate, it is not a surprise to say that the mobile app industry is thriving. The majority of global downloads are free of charge. The availability of free-of-charge mobile applications is another reason for the higher mobile apps adoption worldwide. Those apps have been designed to serve as communication, games, social networking, browsing tools, etc. Similarly, Mobile Taxi Booking apps (MTB) have emerged by giving a new direction to the taxi service industry.

MTB applications are recent phenomena that have been developed in urban cities to deal with the dilemma of passengers and the taxi industry. They are also called e-hailing apps that have diffused as an emerging novelty to connect passengers and taxis as a bridge. This innovation has contributed to the rapid increment in the growth of the taxi industry. Passengers can make decisions to complete their mobility via using mobile taxi apps by requesting a ride. With the emergence of technology integration, mobile taxi apps have a disruptive revolution all around the world. Through the MTB apps, passengers can search the availability of taxis at a particular time and conveniently plan the ride by simply giving a few instructions. The familiarity of these apps was enhanced with the integration of graphical user interfaces and with GPS. These enhancements have been enabled the user to request a ride with the facility to recognize the nearest taxi drivers. After getting the request the drivers either accept or decline the trips. Before buying the service, consumers can read the driver's profile and it makes assured the legal license them. Most innovative MTB apps techniques profoundly reshaped the modern global taxi system. In 2019, the user penetration of the e-hailing market is 13.5% and is anticipated to hit 20% by 2023 (World Statista). Additionally, the revenue of the global ride-hailing segment amounts to US\$ 183,677 million in 2019 (World Statista).

There is a growing competition between these taxi apps service providers in consumer adoption due to their promotional marketing strategies. Concerning the different promotions offers consumers rapidly intended to use MTB app service providers to fulfill their transportation requirements. Among the traditional taxi service systems, the mobile app-based taxi service provides more benefits to the consumer, such as lower fees, different payment methods, discount offers, reliable service, etc. Besides, it will also enhance customer satisfaction and loyalty by offering customers great experiences (Brown and LaValle, 2021; Keong, 2016). Moreover, this ride-hailing concept benefits drivers, because they can get hired without waiting time anywhere, and also they can get a bonus with the number of travels that they completed. Furthermore, Peng *et al.* (2014) were encouraged in their study on taxi-hailing apps and that advocated the use of mobile taxi apps have reduced the unevenness among travelers and drivers.



In the Sri Lankan context, currently, more than fifty mobile taxi booking apps-based taxi service firms are operating in the capital and other urban areas. This emerging trend has shown its introduction level by having a huge rate of consumer adoption rather than traditional taxi service in Sri Lanka. The traditional taxi service is now going on the decline due to the MTB app-based taxi market which has created a new topic for debate and discussion in Sri Lankan consumers. This amazing trend of MTB apps makes a larger consumer adoption of it by changing their user behavior. In this regard, identification of factors affecting consumer adoption in mobile taxi booking applications would be an appealing study from a theoretical and industrial point of view. Therefore, this study has been undertaken to predict the factors affecting Sri Lankan consumer's behavioral intention to adopt mobile taxi booking applications concerning the theory of planned behavior.

Theoretical Background

The Theory of Planned Behavior (TPB) is an essential general cognitive model of how human action is directed (Ajzen, 1991; Conner and Armitage, 1998). TPB is an extended version of the Theory of Reasoned Action (TRA). The TRA model might not be adequate for forecasting behaviors in which behavioral volitional control is reduced and as a result, the TRA model was extended to avoid that impact when predicting user behavior, which is called TPB (Taherdoost, 2018). Later, TPB becomes one of the most common theories of understanding the innovation acceptance side of user behavior. Further, the TPB model provides descriptions of human behavior affecting informational and motivational factors (Conner and Armitage, 1998). TPB stated that attitude, Subjective Norms (SN), and Perceived Behavioral Control (PBC) foresee readiness to adopt new behavior and behavioral intention (Fishbein and Ajzen, 1975; Taylor and Todd, 1995). This theory commonly uses to study the backgrounds of the intention to use the information system and new technology (Choi and Park, 2020). Besides, the fields like healthcare, marketing, sustainability, and public relation, etc.

When discussing the listed variables in TPB, an attitude refers to a person's positive or negative viewpoint as respects the performance of a particular behavior (Davis, 1989). According to the study by Fishbein and Ajzen (1975), attitude is defined as a desirable or undesirable evaluation or review of the behavior of a person.

Another factor discussed in the TPB is the subjective norm (SN). It is defined as "the perceived social pressure to perform or not to perform the behavior" (Ajzen, 1991). According to Weng *et al.* (2017), the SN is interrelated with the normative views about the belief from some other fellow and the study also exposed subjective norms significant effect on the MTB apps services continuance usage intention by users.

In the TPB, perceived behavioral control (PBC) is another predictor of behavioral intention which in turn stimulates actual behavior. According to Ajzen (1991), PBC is outlined as the persons' perception of ease or difficulty of performing the behavior of concentration. It also implied how hard persons are organized to work and how much exertion is required to make the behavior. Several researchers have identified PBC as the key component when investigating the determinants of online shopping behavior (Choi and Park, 2020; Rehman *et al.*, 2019; Limayem *et al.*, 2000).



The dependent variable, behavioral intention is one of the major aspects discussed in TPB. The term behavioral intention refers to a person's perceived likelihood or subjective probability that s/he will perform certain behavior (Fishbein and Ajzen, 1975). The intention is the most common predictor that has an impact on behavior (Ajzen, 1991). Furthermore, behavioral intention is acted as part of a self-fulfilling instrument and initiative persons into doing something definitely. Also, as per some definitions, the intention is different from related concepts like aspiration and self-expectation.

Hypothesis Design

The TPB model attitude impacts behavioral intention which also influences the user behavior of the person. As per the findings, the information system usage and acceptance have been significantly impacted by the attitude (Revythi and Tselios, 2019; Siyam, 2019). Also, consumers are used to change attitudes over time with the new impressions they are evaluating (Shaouf *et al.*, 2016). Further, attitudes were found to have the greatest influence on behavioral intentions (Choi and Park, 2020). Further, Paul *et al.* (2016) have revealed that consumer attitude significantly predicts purchase intention. Concerning the transportation industry, taxi booking apps are used as numerous promotion methods to retain their customers' long-term by changing their attitudes towards those applications. Accordingly, the following hypothesis (H1) was proposed:

H1: Attitude has an important effect on the behavioral intention of mobile taxi booking apps among taxi service users.

As per Weng *et al.* (2017), subjective norms are positively related to attitude towards using mobile taxi booking applications among users. Moreover, it is a significant factor that predicts all the attitudes towards the behavior and perceived behavioral control factors (Chai *et al.*, 2020). The above idea has also been identified by Lim *et al.* (2018), in their study on consumer adoption behavior of e-hailing apps in Malaysia. Accordingly, the following hypothesis (H2) was proposed:

H2: Subjective norm has an important effect on behavioral intention of mobile taxi booking apps among taxi service users.

The perceived behavioral control (PBC) would have an optimistic effect on e-commerce recognition. Some studies have been attempted to explain the effect of perceived behavioral control on consumer purpose to purchase and use online systems. Further, when studying the consumer behavioral intentions in the context of e-commerce, perceived behavioral control is one of key factors commonly investigate (Pena-García, 2020). This view is echoed by Hansen *et al.* (2018) who looked at the factors influencing user intention noting that perceived behavioral control has a significant positive interactions in predicting behavioral intention. Accordingly, the following hypothesis (H3) was proposed:

H3: Perceived behavioral control has an important effect on the behavioral intention of mobile taxi booking apps among taxi service users.

Purchase intention is directly influenced by actual behavior on the adoption of e-commerce (Limayem *et al.*, 2000). According to Sheppard *et al.* (1988), there are no significant problems of control of behavior that can be anticipated through the purposes with significant accuracy. Gieure *et al.* (2020) also studied the relationship between intentions and behavior. Accordingly, the following hypothesis (H4) was proposed:



H4: Behavioral intention of using mobile taxi booking apps has an important effect on the actual behavior of taxi service users.

MATERIALS AND METHODS

Data Collection

This study was done by a descriptive survey. Descriptive surveys were aimed at establishing the factors affecting taxi consumer's behavioral intention to use mobile taxi booking applications. The target population of the present study is international and local taxi consumers in Sri Lanka. The study was preceded by a convenience sampling technique which is a non-probability sampling among taxi service users in Sri Lanka. The data was collected by a survey questionnaire and shared via taxi drivers in Sri Lanka. Totally 214 responses were obtained and among them, 181 responses were identified as valid, to proceed to the analysis stage. Structured questionnaire facilitated to collect more accurate data from the target audience. The language of the survey will be the English language as it is the second language in Sinhala and can be used not only by international but also by local people in the country. The questionnaire was comprised of three parts. The primary part of the questionnaire included several demographic questions to get the main idea on a sample profile. The second part consists of questions on the exogenous variable and the third part contained questions about endogenous variables.

Variables and Measurement Scales

Through a detailed review of the related literature on TPB, 15 items were devised as a measurement scale of four main variables of the study. The questionnaire adopted a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The identified constructs of the model were evaluated using the multiple-item measurement scale. To measure the dependent variables, behavioral intention, the measurement scale developed by Limayem *et al.* (2000) in their research on the adoption of e-commerce was mainly referred to. Besides, the factor of the subjective norm was measured by using the scale of Tommasetti *et al.* (2018). The scales for the attitude and perceived behavioral control were adapted from the Rouibah *et al.* (2009). All these adopted items were modified by focusing on the carried out study.

RESULTS AND DISCUSSION

Sample Profile

According to the descriptive analysis of the sample profile, male respondents comprised 44.7% of the total respondents, whereas, female respondents comprised 45.3% of them. In terms of age, the majority of the respondents (35.9%) were between 31 and 40 years old. The age of other respondents accounted for less than 18 years, 18-25, 26-30, 41-50, and more than 50 years old at 5%, 28.2%, 15.5%, 8.8%, and 6.6%, respectively. In terms of the monthly income of the respondents, 24.9% of respondents earn less than Rs. 20,000 per month, 50.8% participants earn Rs. 20,000 to Rs. 40,000, 17.1% in between Rs. 40,000 to Rs. 60,000 and 7.2% of respondents earn more than 60,000 rupees per month. Concerning the educational attainment of the respondents, there has a quite high showing more than 54.7% are bachelor's degree owners. 29.3% attained some high school, 16% attained a master's or above degree. Among the respondents, 59.7%, 20.4%, and 13.8% have used the internet for more than 7 years, 3 to 5 years,



and 5 to 7 years, respectively. There were 5.5% of the people who spent money on taxi services in their daily life and 23% of respondents were low spenders' for the taxi service.

Measurement Model

To verify the appropriateness of the data set, Exploratory Factor Analysis (EFA) was done by using SPSS software. Maximum likelihood factoring estimation through the Promax rotation was employed for checking the results in factor analysis. First, to determine if the responses given with the sample are adequate or not, Kaiser Meyer Olkin (KMO) test was done and the value 0.920 which means excellent sampling adequacy for the test was obtained. To recognize the correlation matrix as an identity matrix, Bartlett's Test of Sphericity was carried out. The model has explained 72.37% of the total variance. Most of the factors were loading over 0.7 in the pattern matrix. Since there was one validating issue with one item of attitude construct, analysis proceed after removing that particular item from the measurement scale. Using that, findings of the factor analysis indicate the likelihood to go subsequent analysis. Then the reliability of each factor was completed. Reliability is tested by referring to the Cronbach's alpha value of each item in the output result. To proceed with the analysis, a minimum level of 0.7 of reliability is required (Nunnally, 1978). Acceptable reliability measures were received for all factors examined (Attitude = 0.848, Subjective Norms = 0.862, Perceived Behavioral Control = 0.972, and Behavioral Intention = 0.893).

Afterward, to analyze the constructs' validity, a Confirmatory Factor Analysis (CFA) was carried out with the evaluation model. In addition, this analysis evaluates whether the evaluating tools have accurately measured the theories of the research. Goodness of Fit (GFI) = 0.919, Adjusted Goodness of Fit (AGFI) = 0.874, Root Mean Square Residual (RMR) = 0.032, Normed Fit Index (NFI) = 0.933, and Comparative Fit Index (CFI) = 0.975 indicated that they generally satisfied the validity evaluation standards (Table 1).



Table 1. Model Fit Results of the Measurement Model

Index of Fit	Chi-Square	(df)	P	CMIN/DF	GFI	AGFI	NFI	CFI	RMSEA
Value	133.54	87	0.001	1.535	0.919	0.874	0.933	0.975	0.055

Furthermore, convergent validity was analyzed. According to Hair *et al.*, 2018, convergent validity is an approach to look for another measure of the model and then correlated them with the summated rule and high correlations specify that the scale is measuring its envisioned concepts. There are two ways to investigate the convergent validity of the model. The one method used in the analysis was by looking at the average loading factors that were found in factor analysis. All the loading factors were greater than 0.7, then, the convergent validity was proved by the measurement model. Another way to measure convergent validity is by calculating the Average Variance Extracted (AVE). AVE value implies the amount of construct variance concerning the variance generated by measurement error.

A further step was followed to obtain the discriminant validity of the study. This was processed by comparing the Average Variance Extracted (AVE) and share variance estimates (square correlations) values. Discriminant validity of the model was achieved by getting higher share

variance estimates (MSV) than AVEs in all cases. The results summary has been shown in **Table 2**.

Table 2. Discriminant Validity Measures

	AVE	MSV	Intention	Attitude	Subjective Norms	PBC	Actual
Intention	0.682	0.402	0.826				
Attitude	0.557	0.536	0.634	0.746			
Subjective Norms	0.616	0.403	0.589	0.635	0.785		
PBC	0.748	0.536	0.540	0.732	0.553	0.865	
Actual	4.511	0.027	0.164	0.085	0.027	0.092	2.124

Structural Model

After accomplishing the good fit from the confirmatory factor analysis, structural equation modeling was developed by using AMOS Software. It was helpful to assess the statistical relationship between each construct in the model. In addition, the findings of the empirical causal model are indicated in **Figure 1**.

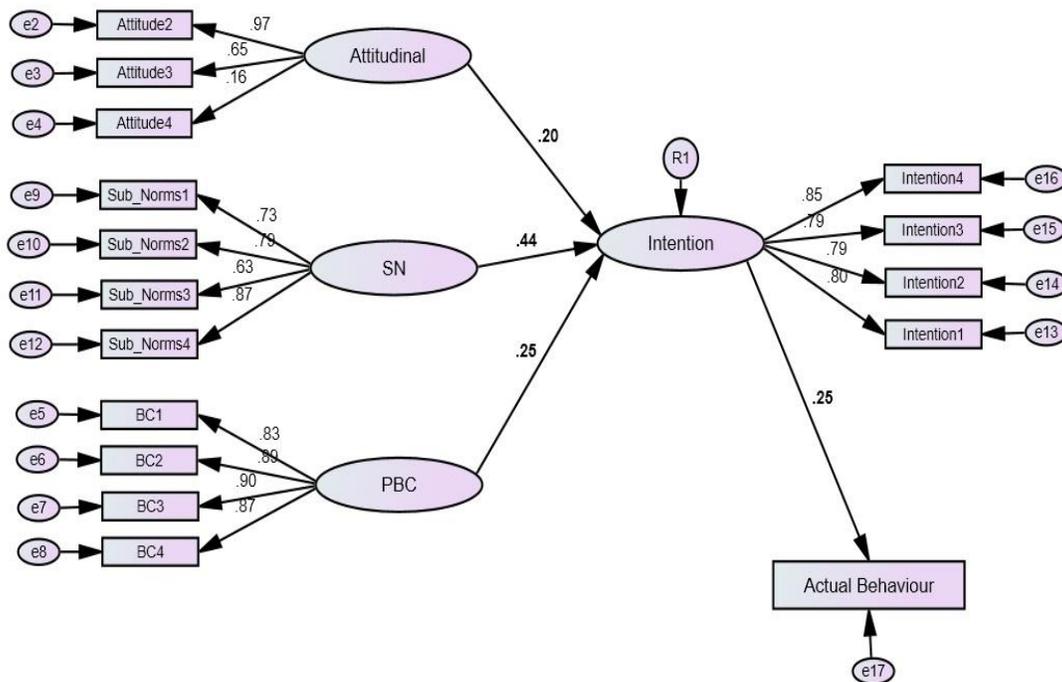


Figure 1. Structural Model Output

Chi-square = 291.542 / Degrees of freedom = 177 / Probability level = .000

The model fit of the structural model was measured, and generally, satisfied validity evaluation standards were obtained. The obtained model fit results are given in **Table 3** below.

Table 3. Model Fit Results of the Empirical Causal Model

Index of fit	Chi-Square	(df)	P	CMIN/D F	GFI	AGFI	NFI	CFI	RMSEA
Value	604.03	92	0.000	3.305	0.829	0.747	0.848	0.887	0.113

Hypothesis Testing

H1: Attitude has a significant effect on the behavioral intention of mobile taxi booking apps among taxi service users.

To test the above hypothesis H1, the relationship between attitude and behavioral intention was investigated. This was analyzed by following the path analysis technique in AMOS. According to the test results, the null hypothesis of “There is no significant effect on the behavioral intention of mobile taxi booking apps among Sri Lankan consumers” can be rejected at the 95% significance level ($p > 0.05$). Moreover, the model shows a moderate implication of consumer attitude on the behavioral intention of using mobile taxi apps by giving a Squared Multiple Correlation (SMC) value of 0.196. It implies that when consumer attitude goes up by 1 standard deviation, their intention of using mobile taxi apps goes up by 0.20 standard deviations.

H2: Subjective Norm has a significant effect on behavioral intention of mobile taxi booking apps among taxi service users.

In the present research, to test hypothesis H2, the relationship between subjective norms and behavioral intentions was investigated. This was done following the path analysis of the AMOS technique. The results highlight that subjective norm has a significant effect on the behavioral intention of mobile taxi booking apps among Sri Lankan consumers ($p < 0.05$). Then the null hypothesis of there has no significant impact on the behavioral intention of mobile taxi booking apps among Sri Lankan consumers can be rejected at a significant level of 0.05. It also revealed that there is a positive relationship with the prediction weight of 0.365.

H3: Perceived behavioral control has a significant effect on the behavioral intention of mobile taxi booking apps among taxi service users.

To test the above-mentioned hypothesis H3, the relationship between perceived behavioral control and behavioral intention was examined by using the path analysis. According to the outcomes, perceived behavioral control has a significant effect on behavioral intention of using mobile taxi booking apps among taxi service users. Since the p-value is less than 0.05, the null hypothesis of perceived behavioral control has no impact on the behavioral intention in mobile taxi booking applications and can be rejected. The results proved that there is a positive relationship between perceived behavioral control and behavioral intention (SMC=0.229, $P < 0.05$).

H4: Behavioral intention has a significant effect on the actual behavior of using mobile taxi booking apps among taxi service users in Sri Lanka.

The hypothesis H4, which means that the behavioral intention has a significant effect on the actual behavior was also examined by the path analysis. As per the path analysis results, the behavioral intention has a significant effect on adopting mobile taxi booking apps among Sri Lankan consumers at a 95% level of significance level ($p < 0.05$). Then the null hypothesis of behavioral intention has no impact on the actual behavior can be rejected at the significant level



of 0.05. Furthermore, results show that behavioral intention and actual behavior has a positive relationship (SMC = 0.251, P = 0.001).

CONCLUSION

To become a nascent industry, transport service amplified the number of mobile taxi booking apps for promptly reaching destinations without facing more trouble for passengers. Therefore, this study focused on the consumer's behavioral intention to use the electronic application to get the service. By referring to past studies and theories, the conceptual model has developed referring to the theory of the planned behavior model as the underlying framework. Accordingly, statistical analysis was carried out to test the designed hypothesis in the study.

The present finding of this study has shown that factors of the theory of planned behavior significantly affect the adoption of mobile taxi booking apps within the Sri Lankan service context. That means attitude, perceived behavioral control, and subjective norms have supported the behavioral intention of the consumers to use the MTB apps. When considering the new innovative technology, it also proved that there is a significant effect on the behavioral intention of consumers. So, following specific strategies, implies that the service-providing firms can obtain a larger market share through MTB application adoption.

When comparing all tested variables, subjective norms have shown the highest impact on customers' behavioral intention. In other words, it implies that society has shifted to accept mobile commerce applications as an innovative and comfortable way of receiving the service.

This creates a favorable platform for the service offering firms to move forward since there is social pressure to adopt these applications. With such a change in society, service offering firms can adopt users without much difficulty. On the other hand, the positive implication of perceived behavioral control is an indication of users' perception of user-friendly and easiness. Further, customers' favorable evaluations towards such application adoption were also noted in this study. Since all studied variables influence customer intention, these can be taken as a positive point for service offering firms to promote this attribute. Through the promotions and by educating customers on the use of electronic services, firms can enhance the MTB application adoption rate since there is a favorable influential environment even from society. Moreover, enhancing the level of understanding will be beneficial to reduce the resistance to the application use.

In conclusion, consumer attitudes perceived behavioral control, and subjective norms have a positive effect on consumer's behavioral intention to use MTB applications between Sri Lankan consumers. As a result, by facilitating more user-friendly mobile applications with more value-added promotions, taxi service offering firms can easily grab the market.

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