

## **MOBILE APP-BASED TAXI SERVICES AND CUSTOMER SATISFACTION: AN EMPIRICAL REVIEW FROM LAHORE CITY, PAKISTAN**

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### **Abstract**

*This study was aimed to evaluate customers' satisfaction using mobile app based taxi service in Lahore city. Study investigated six service quality parameters that three online taxi companies i.e. Careem, Uber and A-Taxi offer to their customers. Both data primary and secondary was gathers through field survey and from companies' desks respectively. Data was analyzed through correlation and regression models to derive valid information about taxi service. Results showed that Careem was more reliable and preferred (78%) taxi service followed by Uber (75%) and A-Taxi (70%). It is concluded that among six service quality factors, four i.e. convenient us of mobile app, Driver behavior, Time Reliability and Price Affordability indicated significant impact on customers satisfaction. Mobile app based taxi service is more comfortable and safer than rickshaws. It can be further concluded that mobile app based rides had significant impact on the growth of taxi industry. The study recommended that fare should be rational and customers should not be inappropriately swap for rides and government should develop a regulatory framework for taxi numbers, fares and service standards.*

**Keywords:** Mobile Taxi App, Service quality, customer satisfaction, Transport Industry

## INTRODUCTION

In big cities for moving around becomes exceedingly convenient to depend on public transport and rented cars due to heavy traffic and few parking places. In recent years, mobile app-based taxi services have become well established. This pattern allows people to take benefit of comfortable ride rather than using personal vehicles and security troubles. Mobile app-based taxi services have become a right choice as the efficient service is available all the time. The global market of smartphones has become increasingly diverse due to sophisticated mobile applications i.e. apps. These apps are pieces of software installed onto personal phones to attain the services like entertainment, communication, transportation, shopping, mapping etc. There are a number of mobile apps-based taxi services offering their services to connect smartphone users seeking taxi services in their locality. These smart apps operate in a manner: locate passengers, drop them to their destinations and according to fare structure based on time and distance collect money from passengers. Mobile app-based taxis have potential for positive impacts on urban transportation and can reduce the dependence on the private motor vehicle use.

In big metropolitan cities of Pakistan, like Karachi, Lahore, Faisalabad, Rawalpindi and even in capital city Islamabad, due to the presence of low level of public transport services, people prefer private vehicles either cars or motorcycle. To cope these issues, online taxi services like Careem and Uber have emerged in Pakistani taxi market. Mobile apps have made it much easier for passengers to avail taxi service with multiple choices. The providers of online taxi services continuously update their technology to match their customer needs and to rival in the competitive marketplace. Once a ride is secured through a mobile app of Uber and Careem, the details of driver (name & picture) and car information (model, number and color) is displayed on customers' mobile screen to track through global positioning system (GPS). The present study is unique in the sense that no such study has been conducted till date in Pakistan before. It seeks to know how far the passengers are satisfied with the mobile app-based taxis in terms of service and fare affordability. Customers' satisfaction and service quality and major factors will be three important yard-sticks to measure the performance of this transport mode in perspective of Pakistan.

Hill and Brierley (2017) measured customer satisfaction as a sum of overall attitude developed by customers on the basis of experience when a product or service is used. According to Kotler & Keller (2009) the customers have their legitimate expectations. If their expectations are met by the service providers then it can be said that customers are satisfied. If performance is much better than expectation then customer satisfaction level is very high.

According to customer satisfaction is a most important concern for all those organizations that wishes to create and keep a fair competitive advantage.

Caruana (2002) explained that difference exist in the dimensions of customers' perceived services and expectations. Hussain et al. (2015) concluded that the service quality may assume various aspects: physical quality, interactive quality and corporate image quality. Zeithmal et al (2002) described service quality as both pre- and post service aspects. This study focuses on mobile app-based taxi services, so physical quality relates to the tangible aspects of service e.g. car condition. Interactive quality is concerned to the level of two-way flow that occurs between service provider and customer. Corporate quality is connected to the image or perception of service provider company. Rabiul Islam et al. (2014) concluded that reliability of services as well as waiting time seems to be the most important cause of customer satisfaction. There is a connection between customer satisfaction and service quality.

Horsu & Yeboah (2015) proved that high quality service can increase customer satisfaction. Service quality, comfort, reliability, safety, price affordability and driver's attitude influence the taxi passenger satisfaction. Similarly Imran R. (2014) concluded that shared taxis are satisfied with cost, ease of payment and travel time. Ross (2015) during a study conducted in Washington suggested that service quality includes vehicle condition, drive attitude, wait time for taxi arrival. Customers have also been influenced with convenience of accessibility, ease of online taxi booking, convenience of drop off at destination and adequate travel time for a journey. The research gap of this study may justify as it was one of its kinds as there was no previous study available on the subject in the context of Pakistan. This study may be helpful to analyze the impact of service quality and passenger satisfaction particularly in Lahore. The study empirically tests the level of price affordability, security and comfort offered by Uber Careem and A-Taxi in the economy or business class service category.

### **Research objectives**

The main purpose of the study was to examine how quality services in taxi affect customer satisfaction especially when mobile apps are used to avail taxi services. The specific objectives of this study were:

1. To analyze whether passenger are satisfied from mobile app-based taxi services.
2. To examine relationship between service quality factors and taxi passenger satisfaction.
3. To suggest better regulations for transportation authorities regarding customer protection and effective monitoring of taxi services.

## RESEARCH METHODOLOGY

### Research Design

This research is a primary study in nature and it was carried in Lahore city. Lahore is the second largest city of Pakistan and its population is nearly 11,126,285 (Pakistan Bureau of Statistics, 2017). Uber and Careem are two famous mobile app-based taxi services operating in this city. This research adopted descriptive design.

### Population and Sampling

Primary data has been collected through personal interviews conducted with mobile app-based taxi users. Data was gathered through a combine effort of authors and trained survey facilitators hired for data collection. The concerned population of Lahore has been taken into account. Male-female population ratio in Lahore from the data set of Pakistan Bureau of Statistics has been taken into account to check the accuracy of male-female distribution in the sample. Overall sample size was comprised of 300 passengers using Uber, Careem and A-taxi service. Nonprobabilistic convenience sampling technique was used for sampling of data. Secondary data has also been made available from service provider companies i.e. Uber and Careem.

### Data Collection

A research questionnaire was developed for target customers in Lahore to make a quantitative measurement. The questionnaire contained both types of questions viz: closed questions and a few open-ended questions based on customer satisfaction and service quality factors. The questionnaire contains 20 questions grouped into five categories, which are as follows: three questions for respondent demographics. Two questions for mobile applications category. Three questions for driver category. Two questions for time category. Three questions for price category. Three questions for car category. Four questions for overall satisfaction. However for collecting valid information non-internet passengers were not targeted. Some questions remained incomplete, so they were not used in analysis. Due to time and resource constraints sample size was enough to make generalization from estimated results.

### Dependent variables

Dependent variable in this study was the general satisfaction of customers by using Uber and Careem taxi services from mobile apps. The two scale of satisfaction, were “yes” and “no”. the scale of “yes” and “no” take numerical values 2 and 1 respectively to calculate the average or mean value for analysis.

## Independent variables

The service quality factors were referred towards the independent variables. These factors were categorized as (i) Convenient use of Mobile App, (ii) Driver Behavior, (iii) Time Reliability, (iv) Safety (v) Price Affordability and (vi) Vehicle Condition.

## Research Hypothesis

The supposed relation between the service quality factors: Mobile App Convenience, Driver attitude, Time Reliability, Price Affordability and Car Condition with the general customer Satisfaction has been examined in this study. The main hypothesis in the study at hand examines the relation between customer satisfaction and service quality factors of mobile app-based taxi services. Other hypotheses might be as under:

H1: Convenient use of Mobile App positively and significantly influences Taxi Passengers.

H2: Driver behavior has positively and significantly effects on Taxi Passengers.

H3: Time Reliability positively and significantly affects Taxi Passengers.

H4: Safety factor in using taxi positively and significantly on Passengers.

H5: Price Affordability affects positively and significantly on Taxi Passengers.

H6 : Vehicle Condition positively and significantly affects Taxi Passengers.

## Analytical Model

The analysis model seeks to examine the relationship between some factors of service qualities and taxi customer satisfaction. The abbreviation CSMDTSP has been used to refer to the model of the study. A list of variables under each factor was further segmented. The mean factor value was calculated using the average of its related variables. Service quality was measured by the five service quality dimensions in the model under consideration. The assumption was that major five factors might have an impact on customer satisfaction using online taxi service. Multiple regression analysis was used to check whether there are significant relationships among the different variables. Data analysis has been performed using one dependent variable (Customer Satisfaction) and five independent variables (service quality factors) namely Mobile App Convenience, Driver Attitude, Time Reliability, Price Affordability and Car Condition by running the multiple regression analysis.

$$CS = \beta_0 + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \beta X_5 + \beta X_6 + \varepsilon_0$$

Where as

CS= denote the customer satisfaction

X1= represent convenient use of mobile app

X2= represent Driver behavior

X3= represent time reliability

X4= denote sense of security and safety

X5= represent Price affordability

X6= represent vehicle condition

$\beta$ = denote the intercept of equation.

## RESULTS AND DISCUSSION

### Overview of General Satisfaction of Customers using Mobile Taxi App

Results derived from collected data have been discussed and elaborated in from different perspectives. Customer satisfaction for taxi service provided by three companies in overall was relatively high (72%). By comparing customer satisfaction for three taxi service available in Lahore city, the value for Careem was high (78%) in average, while for Uber was (75%) and for A-Taxi customer satisfaction was (70%). The convenience for using mobile applications developed by taxi companies have been examined by asking respondents the question about its friendly usage, customer call center or complaints. The mean value for convenient usage of mobile app was 3.371 out of 5.00 (67%). The old age customers are unable to use latest mobile app features, so majority of them accompany their children for using mobile app. The call center service is not so good and sometime GPS system did not work properly to exactly search customers' position. Driver behavior was scored 4.12 (82%) which was very good. Driver behavior was evaluated in terms of ethics (politeness, honesty and dress), car speed, route knowledge and help with luggage. The factor of time reliability represent a weak correlation with taxi customer satisfaction (66%). Customers' satisfaction with regard to security and safety while travelling through taxi was evaluated and it showed that they feel safer & secure (94%) when use mobile app based taxi service. It might be due to registration of taxi drivers and vehicle data with taxi companies. The chances of theft or any mishap can be reduced as companies have complete data of their drivers and location of taxi.

Table 1 Mean Value, Percentage and Correlation of Factors Used

Factors	Mean value	Percentage	Variance	Correlation
Overall customer satisfaction	3.634	72	0.711	0.308
(i) Careem App	3.891	78	0.714	0.441
(ii) Uber App	3.753	75	0.806	0.472
(iii) A-Taxi App	3.513	70	1.672	0.392
Convenient use of Mobile App	3.371	67	1.384	0.371

Driver Behavior	4.096	82	0.932	0.174
Time Reliability	3.773	75	0.582	0.372
Safety	4.673	93	0.542	0.089
Price Affordability	2.891	58	0.568	-0.174
Vehicle Condition	3.812	76	0.721	0.043

Table 1...

The common method of fair calculation is: base price + fare per Km + fare per unit of time wait. The system of mobile-app calculate fare itself and customers have to accept it. Customers have no option of price negotiation. The mean value of customer satisfaction for price affordability was 2.981 out of 5 (58%) and variation was very high on (1.74). The low value might be different taxi services i.e. Auto, Go or Luxury etc. The importance of car condition and model has an average value of 76% among the respondents. The correlation between vehicle condition and customer satisfaction was almost zero (0.043). A zero value of correlation between two factors suggest that there is no relationship between two variables. This result reflect that taxi passenger using mobile app based taxi service are not very much impacted from card model or cleanliness condition. During survey, majority of respondents' don't care about car model, type i.e. normal vs luxury, private vs licensed taxi, driver vs owner of car etc.

### Results of Multiple Regression Analysis

The Table 2 and 3 represented association between customer satisfaction and taxi service quality parameters. The predictors were the variables i.e. mobile app convenience, driver behavior, time reliability, price affordability and safety while dependent variable was general satisfaction of customers.

Table 2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	0.814	0.565	0.532	0.547	0.56	36.372	5	416	0.000

The indicator of goodness of fit "R square" is equal to 0.565 which indicates that 56.5% of the effects on taxi customers are attributed to service quality parameters as mentioned in our regression model. The significance value of F-Statistics is 0.000 which is lower than 0.05. Model showed a good fit to data and regression result is significant.



Table 3 ANOVA Outcomes

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.448	5	2.489	36.372	0.00
	Residual	32.764	411	0.8		
	Total	45.212	416			

As the null hypothesis is formulated that there is no significant difference between two variables whereas alternate hypothesis denotes that there is a significant difference between variables. To examine whether there is significant relationships among six predictors and customer satisfaction, multiple regression analysis was performed with Microsoft Excel and E-View software. The obtained results are presented in Table 4.

Table 4 Results of Multiple Regression Model

Model Parameters	Coefficients	Std. Error	T value	Significance
Constant	1.086	0.133	8.165	0
Convenient use of Mobile App	0.143	0.062	2.306	0.041
Driver Behavior	0.132	0.056	2.357	0.037
Time Reliability	0.061	0.028	2.178	0.013
Passenger Safety	0.149	0.191	0.78	0.469
Price Affordability	-0.034	0.014	-2.428	0.018
Vehicle Condition	0.081	0.126	0.642	0.563

The coefficients of taxi service quality parameters showed positive impact on five independent variables while negative for one variable i.e. price affordability. These results provide evidence for the acceptance of four hypothesis and rejection of two hypothesis.

The null hypothesis for convenient use of Mobile app for taxi service is rejected and alternative hypothesis is accepted. Results in Table 5 showed that T statistics is 2.306 and p-value is 0.041. So this variable is significantly different from zero and thus important in the model under consideration. The features of mobile apps used for taxi service have strong impact on customer satisfaction. The mobile app provide a convenient way to get a ride, choose an appropriate payment method, select the suitable vehicle category and raise a complaint if any. The mobile app give a chance of flexibility to customers. Taxi service is available all the day, 24 hours and 7 days of week.



The coefficient of driver behavior towards customers is also statistically significant. Results proved to reject null hypothesis and accept the alternative. The coefficient showed that Driver behavior showed a strong correlation with general customer satisfaction, Table 5.

Time reliability has positive and significant impact on customer satisfaction. Model result provided T value as 2.178 and it is significant at 5 percent level of significance. The result proved that this factor is significantly different from zero, thus reject null hypothesis and accept the alternative. Customer may feel satisfied when using mobile app and they do not need to wait for long time for taxi arrival. It may help to save their travel time to reach the desired destination. Safety factor while using taxi service through mobile app showed a positive impact although it is not statistically significant. Due to complete database of vehicle and driver particulars registered with online taxi service provider companies, there is no need of worry for theft or abuse. Mobile app provide the details of car registration number, driver name and mobile number before the arrival of taxi. So passengers can send it to their family members, particularly for females if they are travelling alone, so they feel safe in these taxis. The customer may complaint about taxi service to company directly as well as to public transport regulatory authority.

Results in Table 5 showed that price factor has a positive and significant impact on customer satisfaction. T-statistics is -2.248 while it is significant at one percent level of significance. Hence, we may reject the null hypothesis and accept the alternative. As customers always seek affordable price whenever they want to use some service. They feel comfortable when they have to pay reasonable taxi fare to service providers which calculate trip cost based on predefined formula. The promocodes make it cheaper especially when customers are travelling with few friends then they can easily divide the bills.

Vehicle condition factor showed a positive impact although not statistically significant. Thus accept the null hypothesis and reject the alternative. It might be due to respondent feeling that they does not bother about the car inside cleanliness. The cars of these companies are of latest model and comfortable. Customers mostly focus on price affordability and time reliability as car condition is not their prime objective for travelling.

The model would take the following form for the measurement of customer satisfaction:

$$CS = 1.086 + 0.143X_1 + 0.132X_2 + 0.061X_3 + 0.149X_4 - 0.034X_5 + 0.081X_6 + e$$

## CONCLUSIONS

Passengers who use taxi service through mobile apps were found to be 72 % satisfied. The study found a significant impact of service quality parameters such as convenient use of Mobile App, Driver Behavior, Time Reliability, Safety, Price Affordability and Vehicle Condition. Four of these factors showed significant impact on customer satisfaction in both correlation and

regression analysis. Mobile App convenience, Driver Behavior and Time Reliability affected customer satisfaction positively, while Price Affordability indicated a negative impact, which might be due to non-negotiation power with taxi drivers as mobile app calculate taxi fare automatically. The study found that Careem taxi customers were generally more satisfied (78%) because drivers know routes very well plus fare charges are very affordable. The Uber taxis are second preferred services among respondents (75%) while the preference for A-taxi reached at 70 percent. The most important finding of this research study is the difference level of customer satisfaction between modern mobile app-based taxi service and traditional public transport system. The results derived from this paper can be helpful for policymakers to understand the impact of mobile app based rides and improve effective regulation.

## RECOMMENDATIONS

Although mobile app based taxi service have been launched recently in Pakistan but it showed a tremendous growth. Based on survey information and the customers' perception, following suggestion and interventions may be recommended for further growth of online taxi sector in Pakistan:

- The companies providing taxi service through Mobile app should improve its location services.
- Taxi fare need to be more attractive and reasonable to people, so that a large customer base can be retained.
- The companies should also compensate customers for a ride if it is cancelled due to technical issues or drivers' fault.
- Under workload conditions drivers makes them swap rides inappropriately which is a flaw that can reduce customer trust & experience of quality ride.
- Policy-makers should develop a series of regulation plans to control the situation in online taxi rides.

## WAY FORWARD

This study mainly confined to Lahore city only, its results may be generalized with some limitations to other cities which are undergoing similar changes in the area of taxi service. Therefore to precisely assess customers' needs and requirements, it is desirable that some more in depth studies may be conducted in other metropolitan cities. Better and larger sample size be used to avoid any bias and assessed more perfectly general satisfaction of customers.

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