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Measuring Customers’ Satisfaction and Preferences for Ride-Hailing Services in a Developing Country

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Abstract: Ride-hailing services play an important role in developing countries where conventional transport systems are not enough to meet the needs of commuters because of increased populations. This form of transport has gained much popularity in developing regions because of the inclusion of motorcycles and rikshaws in ride-hailing services. To the best of the authors’ knowledge, there has been little research on passengers’ behavior towards these ride-hailing services that focuses on social protection and the fare system in developing regions. Therefore, this research study is aimed at investigating the behavior of commuters towards these ride-hailing services in Lahore, which is the second largest city in Pakistan and can be considered as a case study of a developing country. A total of 531 useable valid responses were collected through face-to-face interactions, including the sociodemographics (SEDs) and behavior of commuters towards these services. The results of an explanatory factor analysis (EFA) and structural equation modeling (SEM) revealed that some of the significant latent variables of these ride-hailing services are comfort, convenience, privacy and security, the fare system, social protection, and safety. The commuters’ overall evaluation of these services is positive and affects their present and future preferences. The structural coefficient between convenience and the variable of present preference is significant and negative, which shows that there are respondents who infrequently use ride-hailing services despite having high satisfaction. The riders’ satisfaction with privacy, security, social protection, safety, and comfort has a positive and direct impact on their present preferences as the structural estimates are positive, which means that the higher their views on privacy, security, and comfort, the more frequently they intend to use ride-hailing services for commuting. Increased social protection, safety, privacy, and security will improve the evaluations of the commuters and influence their present preferences for these ride-hailing services. Even though there are regulations on these ride-hailing services, some concrete policy interventions are needed for improvements in commuters’ overall evaluations of these services in order to influence their future preferences. The findings of this research study, if applied in the real world, can improve the overall evaluation of the commuters and positively influence their present and future preferences for these ride-hailing services.

Keywords: ride-hailing services; commuters’ satisfaction; travel behavior; app-based services; travelers’ attitude; developing country; Lahore
1. Introduction

With the rapid increase in the population of the country and undistributed development in different areas, Pakistan is facing a major challenge: rapid migration to big cities. This change in migration has placed an extra burden on the feeble public transport infrastructure in urban areas, which is not sufficient enough to accommodate the demand from users [1,2]. Urban areas have sustained growth, better education, healthcare, and employment opportunities to offer, which attracts residents from the surrounding areas to settle down and look for opportunities to improve their quality of life. However, the current public transport system is unable to meet this sustained growth in population and has failed in some cases to keep pace with the requirements of commuters [2]. This has compelled private service providers to dive into the transport sector and noticeably change its dynamics based on the evolving and changing demand of the commuters. Gone are the days when commuters must wholly or totally depend upon the creaky and dingy public transport system that offers nothing but inconvenient and unsafe transport services [3,4].

The quality of public transport is quite low in Lahore because the government has not focused much on transit-oriented demand. Therefore, the emergence of ride-hailing services is independent of the existing systems of transport and non-connectivity between the main feeder routes and the paratransit systems in the city. Thus, the existing system of public transport is not sufficient enough to meet the needs of the commuters, and it has given rise to ride-hailing services in the city. It is pertinent to mention that there are two main operators that control the ride-hailing services in Lahore, namely, Uber and Careem. However, recently, Careem has been acquired by Uber, and now they operate under the umbrella of the same company. However, these ride-hailing services are relatively new in the city, hence the need to determine the commuters’ perceptions of these services. Sociodemographic and infrastructural features vary from region to region, and they influence the success of transportation projects and particular policy measures. In this way, Lahore has a specific public transport infrastructure that consists of a multitude of paratransit and mass transit systems. Despite the presence of multiple transport modes, the lack of a public transport infrastructure that can meet the needs of travelers compels them to opt for alternative transport modes that are efficient in terms of travel time and the safety and security of their users.

In the last few decades, Lahore has witnessed some major infrastructural changes that have given rise to personal and shared mobility options in the city [5]. These have gained sufficient traction, leading to their general acceptance among commuters. This phenomenon is evident from the emergence of different on-demand cabs, autorickshaws, and other ride-hailing services, which have made commuting easier, faster, more convenient, and safer. These services make it possible for commuters to be dropped off near to the location of their choice, which minimizes their travel time [4]. Another reason for the acceptance of these ride-hailing services is that they can be booked via smart phone applications, which show the real-time location of the transit service and the estimated fare to be charged at the end of the ride [6].

However, there is an absence of strict rules and regulations for governing the operations of these service in developing countries. These services sometimes suffer from some core issues that can alter the commuters’ perceptions of or behavior towards them [6,7]. Some of the prominent issues that can deteriorate the service quality of these ride-hailing services include: safety and security (especially for female riders), the unambiguous fare system that can be manipulated by drivers, and the social protection of data and privacy in case of any misconduct or incident [8]. Therefore, it is imperative to discuss and explore these core issues that make the rides of the commuters less attractive. Lahore is the second biggest city in the country, which makes it a good choice as a case study to investigate the behavior of commuters towards these services. Additionally, as these ride-hailing services offer a good alternative to the existing public transport system, it is therefore imperative to determine the perceptions of travelers about these services (Uber and Careem) in Lahore, because they offer a faster travel time, safety, and security, especially for female travelers.
This need makes a good agreement to explore the intentions of travelers about these services so that concrete policy measures can be suggested to improve the services of this ride-hailing transport system in the city.

2. Literature Review

Mobility solutions such as the ride-hailing services, demand responsive transport (DRT), and carpooling are becoming popular in many urban and metropolitan areas of the world. The pandemic has underscored the need to incorporate these services as complementary to the public transportation in order to serve various areas of weak demand [9–11]. Evolving city models and technological developments will also need to consider such forms of transportation provision to improve the planning of developing cities and especially smart cities [9,12–14]. These solutions, however, create many operational challenges that are needed to be solved to make them more efficient and sustainable over time. For example, determining the number and location of parking spaces, finding time- or emission-optimal routes, developing synchronized schedules among ride-sharing users, and, above all, knowing the user’s perception and behavior. Therefore, in order to evaluate the perceptions and preferences of the commuters about ride-hailing services, Lahore city was considered as a perfect example from a developing country where public transport does not meet the needs of commuters. Different aspects of the commuters’ satisfaction with ride-hailing services were extracted from the relevant literature and are summarized as subsections as follows.

2.1. Comfort and Convenience

Comfort and convenience are one of the core factors that are considered by the commuters when riding a transit service. One of the important factors that can motivate customers to use these ride-hailing services are their comfort and convenience aspects [15]. The simple use of the smart phone application can help the customer to choose when and where to ride at the comfort of their choice of the fare, vehicle type, model, and vehicle condition [16]. The emergence and presence of these ride-hailing services has prompted the ease of booking these transit services and liberty in choosing the pick-up and drop-off locations for the commuters [17]. Some researchers have explored this phenomenon of comfort and convenience [18], yet some of the pertaining issues in the contexts of developing nations are unclear, and discoveries are unambiguous [17,19]. Another advantage of these ride-hailing services over the conventional public and taxi services is that they can offer pick-up and drop-off services at locations that are not reachable by conventional transit services or troublesome for them to offer. These ride-hailing services offer great help to commuters by simply pinning the drop-off locations in the urban system. Rayle et al. [8] inferred that the waiting time for a ride-hailing service is usually less as compared with the conventional taxi services, which makes the former an attractive alternative and choice of travel over conventional transit services in the cities.

2.2. Privacy and Safety

Privacy of data and the safety of commuters is of great concern, especially in the case of female travelers when choosing to commute through a ride-hailing service. This is one of the core concerns that can be of great importance for female travelers especially, in conservative societies [2,5,20]. These ride-hailing services can offer a great alternative to conventional transit services because of their privacy and safety inspection [21]. There are pertinent rules and regulations in place that ensure proof of protection for commuters using these ride-hailing services [19,22,23]. Before a driver is assigned to the duty, there is proper background check to ensure that they have a proper driving license and have properly obtained the training to drive these ride-hailing services [8]. Therefore, if these rules and regulations are fully applied in their best spirits, they can really enhance the safety and privacy concerns of female travelers in conservative environments.
2.3. Fare Collection System

These ride-hailing services use the fare collection system through the administration of the application. The customers are made aware of the tentative fares, which will be charged at the end of the ride. This gives the commuters convenience and liberty to choose the vehicle type, model, and all the other required information for a comfortable ride [3,24]. Sometimes, these ride-hailing services also use discounted prices to attract commuters. As it has been observed, fare subsidies can attract the commuters. Sometimes, the commuters compare the existing fare structure with the discounted prices and then evaluate their travel choices. Hensher et al. [25] concluded that lower prices have the tendency to attract more commuters towards a transit service if it offers some discounted options to travel with better service quality. On similar patterns, Andreassen [26] and Eboli and Mazzulla [27] found that reduced fares tend to attract more travelers, and it is pertinent to mention that if the service is meeting the needs of the commuters. However, it is pertinent to mention that their findings include the larger data of low-income respondents (mostly students), which can offer some bias in the findings and are not necessarily representative of the overall evaluation of the population response.

2.4. Social Protection

Social protection is one of the important phenomena which affects the behavior of the customers about a service and product. Social protection means managing, preventing, and overcoming the situations that adversely affect the well-being of commuters in ride-hailing services [16]. Most of the times, these ride-hailing services have well-developed rules and regulations; however, with the passing of time, their compliance with the regulations deteriorate, especially in developing countries where the enforcement of laws is not fully equipped because of the poor infrastructural management systems [3,6]. For example, the strict regulations on the fare systems, complaints about the misbehavior of drivers, legal protection from the police in case of emergencies, and recovery of missed items in vehicles are some of the prime examples that affect the social protection and lower the satisfaction of customers towards these ride-hailing services [28]. It is believed that the social protection of a service is of utmost importance for its feasible and sustainable existence in the system [4]. Therefore, it is important to explore the behavior of customers surrounding their social protection while using these ride-hailing services.

With advances in technology, these ride-hailing services have become quite popular in developing countries, which offer little or no support to the public transport system for meeting the needs of customers for their daily commute. These services have the potential to influence the mode choice behavior of travelers, particularly if the public transport infrastructure is not sufficiently enough. Based on the reasons mentioned above, no notable research has been conducted on the ride-hailing services in Lahore, considering the fare collection systems and the social protection dimensions of the respondents. Therefore, in order to fill the gap in the body of the literature, this research study is conducted to model the behavior of the users and assess their satisfaction with these services in the context of Lahore.

3. Methods

3.1. Questionnaire Design and Survey

A comprehensive questionnaire was designed in order to extract the response of the respondents about these ride-hailing services. Lahore was considered as a case study for the response collection because it is the second largest city in the country, and the population of the city has increased exponentially because of the increased educational, economical, and healthcare opportunities [29]. Another reason for the selection of Lahore as an example is because the current public transport system in the city is chaotic and cannot meet the needs of the travelers. Furthermore, Lahore is among the first cities in the country where these ride-hailing services started their operations [1]. The survey locations were selected very carefully in order to extract the correct responses, and the
areas with highest number of rides were selected as the base stations for the collection of the data. The surveyors were properly trained and explained in the simplest way to make them understand the contexts of the questionnaire survey to answer any of the questions asked during the survey process. Some of the busiest places, such as bus stops, shopping plazas, educational centers, and commercial places, were selected to make the surveying process easy so that a good number of responses could be collected without putting in extra labor. The convenience-based sampling technique was used for the sake of data collection, and the questions in the questionnaire survey were kept short and concise so that exact responses and information could be collected for better evaluation.

3.2. Specifications of Data Analysis

The customer satisfaction index (CSI) was computed to check the overall evaluation of the respondents about different dimensions of the service quality attributes. Then, an explanatory factor analysis was also employed to observe the relationships between different latent variables. The technique of maximum likelihood (ML) was used for the computation of the factors with varimax rotation. The value of the factor loading used 0.5 as a cut-of-point value for the extraction of the factors. The values of the Cronbach’s alpha were also computed to check the internal consistency between the commuters and checking the reliability of the latent variables for the evaluation of the observed variables, and a value of 0.70 was deemed to be acceptable. However, the literature suggests that a value greater than 0.80 is preferred [30]. All the extracted factors confirm that the latent variables had good reliability, and the values of the Cronbach’s alpha were greater than 0.70. Then, these extracted latent variables were used to construct the structural equation model (SEM) to observe the direct and indirect relationships between the latent variables. SEM is a multivariate statistical technique which can allow the researchers to include the observed and latent variables in the model and check the reliability of the data through the indices of goodness-of-fit parameters [31]. The literature suggests that the values of RMR and root mean square error of approximation (RMSERA) between 0.05 and 0.08 are considered acceptable. However, the values of the other parameters such as adjusted goodness-of-fit (AGFI), goodness-of-fit index (GFI), and the comparative goodness-of-fit index (CFI) should be more than 0.9 for the better fit of the model and the data in the model [31]. In addition, the value of the ratio between \( \chi^2 \) model fit statistics and the degree of freedom should be between 2 and 5 for an acceptable model fit.

4. Results

4.1. Descriptive Statistics

A total of 531 usable responses were collected through the administration of the questionnaire survey by using the convenience-based random sampling technique. The results showed that 81.73% of the respondents were male users while 18.27% of the respondents were female users. It is pertinent to mention here that female mobility in Pakistan is sometimes restricted because of social, cultural, and safety-related issues. Similar findings have also been reported by [22,32] that around 80% of the trips in the country are male-dominated as compared with 20% of the female trips. This is one of the reasons that female participation in this research study is low compared with their counterparts. The data also revealed that around 55.74% of the respondents were below the age of 30 years. This confirms the fact that most of the travelers who are using these ride-hailing services are young people who are more aware of the use of technology and have the know-how to book these services through the application on their smart phones. This also confirms that young, educated people are more frequent users of these services, along with the fact that around 64% of the current population of the country is below the age of 30 years [2]. The distribution of the respondents based on their education also reveals that around 60% of the respondents are university students or at least graduated with a bachelor’s degree. This again confirms the fact that educated people are the most frequent users of these ride-hailing services. These statistics can be correlated and confirmed with other
studies that are conducted on the ride-hailing services, which demonstrate that young and educated individuals are the most frequent and common users of these application-based transit services. The statistics in Table 1 also showed that students are the most frequent, constituting around 39.74% of the overall respondents. Again, it confirms the findings reported by other research studies conducted in this domain. The detailed distribution of the respondents can be seen in the following Table 1.

| Characteristics       | Category   | Frequency (N) | Percentage (%) |
|-----------------------|------------|---------------|----------------|
| Gender                | Male       | 434           | 81.73          |
|                       | Female     | 97            | 18.27          |
| Marital status        | Single     | 359           | 67.61          |
|                       | Married    | 172           | 32.39          |
| Age (years)           | Under 20   | 61            | 11.49          |
|                       | 21–30      | 296           | 55.74          |
|                       | 31–45      | 114           | 21.47          |
|                       | 45–60      | 53            | 9.98           |
|                       | Above 60   | 7             | 1.32           |
| Education             | Primary    | 6             | 1.13           |
|                       | High school| 52            | 9.79           |
|                       | College    | 87            | 16.38          |
|                       | Bachelor   | 323           | 60.83          |
|                       | Master and above | 63   | 11.86          |
| Profession            | Student    | 211           | 39.74          |
|                       | Private employees | 174 | 32.77          |
|                       | Civil employees | 50  | 9.42           |
|                       | Others     | 96            | 18.08          |
| Monthly income (PKR)  | Under 30,000 | 246 | 46.33          |
|                       | 30,000–50,000 | 136 | 25.61          |
|                       | More than 50,000 | 115 | 28.06          |
| Car ownership         | Yes        | 163           | 30.70          |
|                       | No         | 368           | 69.30          |
| Motorcycle ownership  | Yes        | 419           | 78.91          |
|                       | No         | 112           | 21.09          |
| Driving license       | Yes        | 238           | 44.82          |
|                       | No         | 293           | 55.18          |
| How long have you been using the Uber/Careem services | Never | 8 | 1.51 |
|                       | Less than year | 235 | 44.26          |
|                       | 1–2 years   | 197           | 37.10          |
|                       | 3–5 years   | 65            | 12.24          |
|                       | More than 5 years | 26 | 4.90        

4.2. Distribution of Satisfaction with Service Quality Attributes

Figure 1 shows the distribution of the respondents on their overall satisfaction with the service quality of these ride-hailing services. As can be seen, most of the responses lie between the moderately satisfied and satisfied range. However, there are a few domains where the respondents are not satisfied, and these domains need the special attention of the regulating authorities and policy-makers that control the operations of these ride-hailing services. For example, around 145 (27.39%) respondents have serious concerns about the social security of their lost items in the company. In some of the incidents, if the commuter lost his/her item in these ride-hailing services and then complained to the operating company about this issue, there was not a corrective and satisfying response from these regulators that could put the commuters at ease and resolve the issue conveniently. On similar patterns, around 104 (20%) of the respondents are dissatisfied
with the discounts offered by these ride-hailing services, which can attract more commuters. As reported by Andreassen [26] and Eboli and Mazzulla [27], if some discounts are offered, the commuter can adapt and change their traveling behaviors towards these services. The overall evaluation of the respondents also shows that they are very much dissatisfied with the protection from the government in case of a driver’s misconduct with the riders while using these ride-hailing services. On the contrary, 298 commuters are very much satisfied with the driver’s experience and skills (56.12%), 233 with the driver’s compliance with the traffic rules (43.87%), and 251 with the vehicle condition and maintenance (47.26%). The overall evaluation of the commuter’s satisfaction with the ride-hailing services can be seen in Figure 1.

Figure 1. The overall evaluation of the commuters’ satisfaction with ride-hailing services.

4.3. Estimation of Customer Satisfaction Index (CSAT)

The customer satisfaction index (CSAT) is a measure that is used to evaluate the overall performance of customers about a service or a product. It is calculated based on the interaction experience of the respondents with the business, service, or product. In most of the cases, the respondents are asked to rate their evaluations on a five-point Likert scale system that is then converted into a percentage system from 0 to 100, in which 0 refers to the least (none) satisfaction of the customers and 100 shows the complete satisfaction of the respondents with a product or service [33]. The general equation to calculate the CSAT for a five-point Likert scale is as follows:

\[
CSAT = \frac{\text{The total number of 4 and 5 responses}}{\text{Number of total responses}} \times 100 = \% \text{ of satisfied customers} \quad (1)
\]
It is important to mention that the CSAT is a relationship metric and a touch-point metric. It can be used to evaluate the overall customer relations and end-to-end experience and to capture the feedback after individual customer interactions with the service. Figure 2 shows the CSAT of the travelers about ride-hailing services in Lahore.

**Figure 2. Customer satisfaction index (CSI).**

### 4.4. Exploratory Factor Analysis

An exploratory factor analysis (EFA) was conducted to extract the logical factors from the responses. This factor analysis was performed using the maximum likelihood method and varimax rotation technique. Rotation of factors was conducted to explore the interpretable factors on satisfaction attributes. Five factors were explored using this factor analysis: convenience, comfort, privacy and security, fare system and social protection, and security. They were named based on the nature of their observed variables from the perspectives of the respondents. A factor loading of 0.5 was used as a cut-off point for this purpose. It means that the observed variables with factor loading less than 0.5 were excluded from the analysis. The Cronbach’s alpha values were estimated for all five factors and were more than 0.7. These values show that these factors have an acceptable level of reliability and the internal consistency of the responses. The first factor of convenience depicts that there is a high consistency among respondents in the evaluation as factor loading values are higher than 0.5. The commuter’s satisfaction is high, with attributes such as easiness in booking a ride, arrival reliability, service directness, and accessibility within the city. The comfort factor shows that the respondents have high satisfaction with environmental control and sitting-comfort attributes of the service. In the privacy and security factor, the respondents have shown a good level of satisfaction with these concerns, the driver’s attitude, and roadside waiting time, though indicators such as the social security from the company, complaints handling, and night-time security have low satisfaction and factor loadings. The satisfaction level with the special discounts and fare system factors. However, the factor loading of the special discount variable is a little low in comparison to other variables, as shown by the results of the fare system factors. However, the factor loading of the special discount variable is also higher than other variables in the same factor. The results of the factor loading and average responses show that the respondents’ satisfaction is high with the observed variable of police protection, the presence of the government regulations, and government
protection of female riders, as the factor loadings are more than 0.7. The factor loading of the driver’s skills and experience variable is close to 0.5, which shows that there is a less internal consistency among respondents in the evaluation of this variable (Table 2).

Table 2. Results of rotated factor loading using maximum likelihood method.

| Observed Variables                                      | Mean | Convenience | Comfort | Privacy and Security | Fare System | Social Protection and Safety |
|----------------------------------------------------------|------|-------------|---------|----------------------|-------------|------------------------------|
| Easiness in booking a ride                               | 3.463| 0.786       |         |                      |             |                              |
| On-time arrival of service providers                     | 3.330| 0.743       |         |                      |             |                              |
| Directness of the service                                | 3.460| 0.692       |         |                      |             |                              |
| Service accessibility within the city                    | 3.379| 0.665       |         |                      |             |                              |
| Route following information from drivers                 | 3.326| 0.597       |         |                      |             |                              |
| Air-conditioning of vehicle                              | 3.527| 0.770       |         |                      |             |                              |
| Sitting comfort                                          | 3.520| 0.765       |         |                      |             |                              |
| Vehicle internal environment                             | 3.497| 0.752       |         |                      |             |                              |
| Vehicle condition and maintenance                        | 3.682| 0.594       |         |                      |             |                              |
| Privacy of personal information                          | 3.301| 0.842       |         |                      |             |                              |
| Security of personal belongings                          | 3.243| 0.821       |         |                      |             |                              |
| Roadside waiting for the service                         | 3.309| 0.673       |         |                      |             |                              |
| Driver’s attitude during traveling                       | 3.569| 0.610       |         |                      |             |                              |
| Social security from the company for lost items          | 2.855| 0.577       |         |                      |             |                              |
| Complaints handling from the company in case of emergency| 3.264| 0.568       |         |                      |             |                              |
| Security during night traveling                          | 3.390| 0.547       |         |                      |             |                              |
| Special discounts                                        | 2.798| 0.812       |         |                      |             |                              |
| Fare calculation methods                                 | 3.209| 0.748       |         |                      |             |                              |
| Fare level and structure                                 | 3.083| 0.609       |         |                      |             |                              |
| Fare collection system                                   | 3.471| 0.536       |         |                      |             |                              |
| Police security in case of emergency while using the service| 3.552| 0.781       |         |                      |             |                              |
| Government protection and support for driver’s misconduct with female riders | 3.315| 0.749       |         |                      |             |                              |
| Presence of government regulations related to ride-hailing services | 3.499| 0.706       |         |                      |             |                              |
| Social protection from the government in case of an accident | 3.252| 0.664       |         |                      |             |                              |
| Driver’s compliance with traffic rules                   | 3.499| 0.646       |         |                      |             |                              |
| Driver’s experience and skills                           | 3.540| 0.501       |         |                      |             |                              |
| % of variance explained                                  | 18.256| 15.639   | 13.450 | 11.634 | 10.453 |
| Cronbach’s Alpha                                         | 0.810 | 0.801    | 0.783  | 0.726  | 0.717  |
4.5. Structural Equation Modeling of Satisfaction

A structural model was developed of commuters’ satisfaction and preferences with the ride-hailing services. It was hypothesized that the commuters’ satisfaction with various service quality attributes influence their present preferences with the ride-hailing services. The satisfaction with the service quality also influences the future preferences through present preferences as a mediator variable. The results of the factor analysis were utilized to develop the measurement equations, and the measurement equations were combined to construct a structural model. All the measurement equations were significant at a 1% level of significance. The results of structural equations are shown in Figure 3. The structural model shows that the extracted factors have strong association with each, as the correlations are positive and significant at a 1% level of significance. The structural coefficient between the convenience and present preferences variables is significant and negative, which demonstrates that there are respondents who use ride-hailing services at a low frequency despite having high satisfaction [33]. The structural estimate between convenience and present preferences is also negative and significant at a 1% level of significance. It shows that the service access issues, difficulty in the ride booking, and the route followed by drivers have a significant influence on riders’ preferences [2]. The satisfaction with the privacy, security, social protection, safety, and comfort attributes has a positive and direct impact on the present preferences of the riders, as the structural estimates are positive and significant. It means that the higher the beliefs are on the privacy, security and comfort attributes, the higher the intentions will be to consider the ride-hailing services for commuting. All five factors, i.e., convenience, comfort, fare system, privacy and security, and social protection and safety, explain almost 19% of the variance in the present preferences variable. The structural correlation between the present preferences and future preferences variables is positive and highly significant. It shows that the future preferences of the riders with these services are highly dependent on their present experience and satisfaction with the service quality attributes. The present preferences variable explains almost 24% of the variability in their future preferences. The structural model has an acceptable level of reliability, as the indices of the goodness-of-fit parameters fall within the limit or near to the permissible values [31].
Figure 3. Structural system of commuters' satisfaction and preferences. *** Significant at 1% ($p < 0.01$); ** significant at 5% ($p < 0.05$); * significant at 5% ($p < 0.10$).

5. Conclusions and Policy Implications

This research study is aimed at exploring the factors associated with commuters’ satisfaction about ride-hailing services in a developing country, considering the city of Lahore as a case study. A comprehensive questionnaire survey was developed, and a total of 531 valid responses were collected through face-to-face interviews. The evaluation of these ride-hailing services from the viewpoint of the commuters is important in a developing country where these services are considered as the substitution of the conventional public transport system. The commuters’ satisfaction index was calculated, and it was revealed that the commuters are more satisfied with the driving skills and experience of the drivers, vehicle condition, maintenance, and drivers’ attitude with the commuters during traveling. However, they are more concerned about safety, the security of personal information, traveling discounts and fare systems, and protection of lost items.

The extracted factors were calculated, and they were comfort, convenience, fare system, privacy and security, and social protection and safety. The results of the explanatory factor analysis (EFA) revealed that the internal consistency of the measured variable is good and within an acceptable range, as the values of the Cronbach’s alpha for all of the latent variables are more than 0.7, confirming the fact that these latent factors can explain the behavior of commuters regarding these ride-hailing services [31]. The relationship among the different latent variables was extracted using the structural equation modeling technique, and it was revealed that the factors of convenience, comfort, fare system, and
social protection and safety have a positive and significant relationship with the privacy and security of the ride-hailing services. The evaluation of the commuters of these factors and their overall satisfaction were quite satisfactory, despite facing some of the challenges while using these ride-hailing services. The evaluation of the commuters confirmed that they have their present preferences in using these ride-hailing services and would continue their future preferences if these latent variables were improved to enhance their evaluation and satisfaction with these services. It can be confirmed that the attitude of the commuters towards these ride-hailing services could be improved if more emphasis is put on the social protection and safety of the commuters and lost items in the services [7, 34]. It has been observed that the evaluation of the commuters of these services is much less positive when they forget any item in these services, because most of the time the lost item is not recovered, and even when complaints are made to the operating companies, the requests are not met with any satisfactory response.

It can be confirmed from the results of the structural equation model (SEM) that the overall evaluation of the travelers towards these ride-hailing services about their present and future preferences is positive. This positive attitude towards these ride-hailing services can be used for modeling the behavior of the commuters for the encouragement of their behaviors among present and future riders of these services. However, it is pertinent to mention that these behaviors about the convenience, safety and security, fare system, and social protection can be improved with the provision of the better coverage of these services and their strict regulation by the transportation department of the government [18]. Because it has been observed that the service provider is least responsive in dealing with the complaints of customers as well as failing to provide social protection in the case of any mishap [5], which strictly shows that the service quality of these ride-hailing services has deteriorated over a period of time and has not been amended as per desires and regulations, then it might lead towards the lesser satisfaction of the customers [8]. If proper protection is provided against the misbehavior of drivers, it can be useful in modeling the behavior of the commuters and the safety and security of these services. Therefore, it is extremely important to properly enforce the rules and regulations under the umbrella of local government in order to ensure the social protection of commuters in these ride-hailing services. A proper check on the monitoring and training of the drivers can improve the overall satisfaction of the commuters with these services [35]. It is important that the local government should strictly formulate the rules and regulations related to the drivers’ permits, education, riders’ data, and vehicle registrations so that a prompt action can be taken in the case of any mishap. It will further boost the safety and security aspects of these services. In order to improve the potential riders and increase the travel share of ride-hailing services, it is pertinent to promote the safety and security of these services so that riders may feel comfortable to travel with these services, and similar findings have been reported by several studies [5]. The flexibility in traveling offered by these services can be an important aspect that can be utilized to attract the users of private vehicles [7]. The service providers can use some discount voucher system or marketing programs in order to improve the image of these services among travelers [5, 22, 25]. For this purpose, the electronic, social, and print media can be an important source of information to riders. These findings report that the overall attitude of the commuters about these services is positive, and it can be used for attracting potential users who are conscious of the security aspect, fare system, and social protection of these ride-hailing services.

Some of the implications that can be deducted from the findings can be suggested as follows. It is important that the fare structures should be regulated by the local government and other regulatory bodies so that the discrepancies between the actual fares and the charged fares can be avoided. The insecurity of female riders, the absence of proper rules and regulators for maintaining the serviceability of the ride-hailing services, and drivers’ attitudes can be among the main core impediments that can influence the perceptions of the riders about these services. It can be argued that the existence of proper rules and regulations that strictly monitor the behavior of drivers can improve the rideability of the
users on these ride-hailing services. Therefore, it is very much important to improve the regulations and monitoring of these services under the umbrella of local government so that strict compliance with the regulations can be ensured and the social security of the users can be improved. The strict compliance of drivers is related with regulations such as driving licenses, vehicle conditions and cleanliness, and drivers’ education, which can play a positive role in improving the safety and social security of users. The government agencies should also focus on the development of technology for monitoring these ride-hailing services, and the cases of incidents should be strictly dealt with to make drivers vigilant and responsible.

 Likewise, as in all other studies, this study also has some limitations. It did not include all the aspects of satisfaction with these ride-hailing services. Only a few aspects were considered in the evaluation of the service performance in this research study. Moreover, the responses of the respondents are solely based on their social desirability, which might include some bias in their evaluations. For the continuation of this research study, non-users of these ride-hailing services would also be included in the next phase, and more service satisfaction dimensions could be explored in order to extract the factors that influence travelers’ satisfaction. Such studies can cover more dimensions regarding the improvement of these ride-hailing services. Furthermore, their traffic and environmental effects can also be evaluated in future research works.

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