

USER SATISFACTION AND SYSTEM EFFICIENCY TOWARDS RIDE SHARING SERVICE: STUDY ON UBER BANGLADESH

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ABSTRACT

Like many other countries, ride sharing services are gaining popularity in Bangladesh nowadays, particularly in the city areas due to many added advantages including dynamic responsive systems. Several studies have been taken place on the different aspects of ride sharing services in home and abroad, but very few in developing or emerging countries context. Moreover, the performance of this ride sharing services from users' viewpoint of a developing country like Bangladesh have not been studied yet. This study evaluates users' satisfaction of using app-based ride sharing service 'Uber'- a leading app-based ride sharing service – in Dhaka, Bangladesh in terms of service quality, system efficiency, safety, security, mode choice etc. A comprehensive questionnaire was developed, and 500 random samples were collected using online questionnaire survey technique. All of the samples were collected particularly for Dhaka respondents. Findings show users' perception through qualitative and quantitative analysis regarding choice of Uber, Bangladesh. Several other factors such as safety and security are also discussed. The study also performed a thorough analysis of each parameter to examine how they are inter-related. The preliminary analysis shows that user satisfaction mostly attributed with the riding safety and security. On the other hand, destination display system, customer care service, pricing of the ride has the most contributions to the system efficiency. This research work concludes with some recommendations and future research directions that will help policy makers to develop a regulatory framework for Uber and other ride sharing services in order to cope with the rapid emergence of new travel business models (mobility-as-a-service) for establishing sustainable mobility in Bangladesh.

Keywords: Ride Sharing, Service Quality, System Efficiency, Safety, Security.

1. INTRODUCTION

One of the main indicators for economic growth in developing countries such as Bangladesh, is the progress of transport and communication networks. Online based ride-sharing service (RSS) is one of the major advancements in the transport sector in recent years. Bangladesh, being a developing country, has just entered into this race of huge ride sharing services facilities. Bangladesh Road Transport Authority (BRTA) has approved 12 ride sharing companies in line with the Ride-sharing Service Guidelines 2017 to legalize their services in the country. The services of Pick Me Ltd, Computer Network System Limited, Obhai Solutions Ltd, Chaldaal Limited, Pathao Limited, Easier Technologies Ltd, Akash Technologies Ltd, Sejesto Ltd, Shohoz Ltd., Uber Bangladesh Ltd, Buddy Ltd and Akiz Online Limited were approved to get the enlistment certificates from the BRTA recently (Shawki,2019). In a year, the ride-share industry in Dhaka is approximated 2 lakh and inhabited a 23 percent share in transportation services, also Uber followed by Pathao are the two-giant ride-sharing economy conquerors (Sadat,2018). Megacity Dhaka's population has sky rocketed to about 2 crore residents due to increased income opportunity and emergence of industry. Huge migration is taking place in Dhaka city from other parts of the country and hence increasing the intercity and intracity transport and travel demands day by day. (Akhter,2018). Bus, laguna, microbus, CNG and rickshaw (public transportation modes) include 80% of the traffic in Dhaka Metropolitan Area (ESCAP, U., 2018). Mixture of these motorized and non-motorized vehicle is common even on the major road making the entire traffic operation poor. According to World Bank analysis, this chaotic mixture of motorized and non-motorized that is high-speed vehicles and low speed vehicles has brought down the average vehicle speed in Dhaka to 7 km per hour and causing congestion as well. From the mobility analysis published in Dhaka Structure Plan 2016-2035, it was found that on an average working day about 21 million trips take place in the DMA area. To explain this phenomenon, a slow speed but easily affordable vehicle like rickshaw can occupy only two passengers on an average. To accommodate a huge chunk of medium earning professionals, a lot of rickshaws are available on the road which eventually decreases the average speed on a particular road. Meanwhile, number of private cars are increasing but a lot of room is unutilized resulting in the traffic system's counter productivity. On the contrary, bus has a good capacity and potential to solve all the road-traffic problems, but it lacks security especially for women. Paratransit services have a lot to contribute here as in it the potential to address issues such as- speed, availability, security to solve traffic congestion, which costs the economy 3.2 million working hours every day (Mamun, 2017). Under these circumstances, like many other cities in the world, smart phone-based services like RSS are gaining popularity in Dhaka city as it can save time in terms of instant pick-up and drop-off through mobile application. Moreover, they can assure better quality of transportation network by providing real time availability 24/7. With the increasing demand and popularity of RSS around the world, many researchers are focusing their research interest on these services. Number of studies have already been done on different aspects in home and abroad. In Cape Town, South Africa, a case study is performed by Carmody and Fortuin (2019) to understand the contribution of the ride sharing services to employment opportunities and shaping the economy. In Mexico City, a case study on Uber's services was conducted by analyzing policy and market environment (Sigfried RJ Eisenmeier,2018). Cai et al., (2019) studied the environmental benefits of RSS in Beijing, China. Also, in Bangladesh, some researches have also been done to identify factors/variables accountable for satisfaction as a service mobility using different technique (e.g. put area and ref). However, Uber being the gigantic as well as the highly emerging ride sharing company in Bangladesh requires more research focusing on different areas including users' satisfaction and system efficiency etc. Hence, this study attempts to evaluate users' satisfaction of using 'Uber' as an app-based ride sharing service in Bangladesh in terms of service quality, system efficiency, safety, security, mode choice etc. The study also examines the present scenario of Uber service by evaluating service provided in Dhaka by Uber Bangladesh. At the very outset, study also highlights on the demographics of Uber users in Dhaka city and the parameters contributed to user satisfaction of the users and system efficiency. A comprehensive questionnaire was developed, and 500 random samples were collected using online questionnaire survey technique. Findings show users' perception through qualitative and quantitative analysis regarding choice of Uber, Bangladesh. Several other factors such as safety and security are also discussed. The study also performed a thorough analysis of each parameter to examine how they are inter-related. The analysis shows that user satisfaction mostly attributed with the riding safety and

security. On the other hand, destination display system, customer care service, pricing of the ride has the most contributions to the system efficiency. Future prospects and challenges to be overcome also shed a light on at the end of the research. Analyzing commuters and incorporating their views, opinions and observations to the existing service, recommendations are made for policy implications for improvement of the overall Uber Bangladesh service.

2. LITERATURE REVIEW

Dynamic and adaptable transportation service like RSS is critical to any country's economic development since it improves urban mobility. There have been many studies on Ride-hailing services around the world. Chan and Shaheen (2012) explored the past, present, and future of ridesharing in North America. Beer et al. (2017) made a comparative analysis on the ride hailing regulations in 15 different cities in the United States. Researchers from home and abroad also studied multiple research models to optimize the dynamic service. Chaudhry et al. (2018) focused on the aspect of passenger safety in ride-sharing services. Ashkrof et al. (2020) focused on driver's behavior and preferences from a focus group analysis. They proposed a conceptual model that frames the relationship between drivers' tactical and operational decisions and related factors. Agatz et al. (2012) outlined the optimization challenges that arise during developing technology to support ridesharing and survey related operations, research models. Ni et al. (2018) proposed a privacy-preserving ride-matching scheme for selecting feasible ride-share partners in Ride Sharing Services. A wide variety of factors contribute to user's decision making to take a ride-sharing service including commuting, privacy, comfort, social interaction, and environmental protection (Olsson et al., 2019). However, commuters' perception and expectation are a huge concern which needs strict attention. This depends on several factors. Vilakazi and Govender (2014) studied consumer expectation and perception match and found riding comfortability, better service performance, charges, picking and dropping time, riding security are factors here. Lee et al., (2017) observed in their study that policy change, safety, security, surcharge, and education are controlling variables that people look into prior to taking ride-sharing services. Nonetheless customer satisfaction and service quality are intrinsically tied with each other (Homburg et al., 2011). Service quality depends on a few numbers of factors as studied by researchers from different perspectives. Customer satisfaction and service quality are intrinsically tied with each other (Homburg et al., 2011). Service Quality analysis also known as SERVQUAL analysis based on – reliability, tangibility, assurance, empathy, and responsiveness – these 5 factors, are performed on customer satisfaction for Uber and Pathao ride sharing services in Dhaka city (Ghosh, 2018). Study analyzes that these service quality dimensions have significant impact on user satisfaction (Dey et al., 2019). Tushar et al. (2020) studied the ride-offering plan in Dhaka City to how this vehicle framework executes various transportation issues. Sakib and Mia (2019), in their study, the current status, prospects, and challenges of ride-sharing services in Bangladesh are analyzed.

Although researchers from both home and abroad have studied various methods for determining the efficacy and effectiveness of ride-sharing services. However, very few studies focus on the performance of company-specific ride-sharing services. Dhaka's traffic scenario is in a chaotic situation. Hence it is of utmost importance to understand whether the ride sharing services are suitable or fit this particular situation. In this regard, peoples' views are needed to be assessed. Hence this study chose Uber as a ride sharing service company to evaluate peoples' views for the service they get. This study bridges a gap between users' pragmatic viewpoint and customer satisfaction/expectation by constructing various factors which influence their choice on using Uber's ride sharing service.

3. METHODOLOGY

3.1 Questionnaire Structure

A preliminary questionnaire was prepared following an extensive literature review on the study field, which included different variables relating to users' perceptions, satisfaction. The preliminary questionnaire is shared with a number of specialists in order to obtain their feedback to know if there is

any room for further modification. The final questionnaire is prepared taking experts views into account. The questionnaire comprises in total 38 questions. The questionnaire is segmented into four sections. The very first segment was about the demographics of the respondents (age, profession, income, gender etc.). It contains questions that has qualitative answers. The second part was about driver's characteristics i.e., driver's behavior and attitudes towards obeying of traffic rules. The third part was about vehicle quality (cleanliness, riding comfortability etc.). The last part was about system efficiency (Trustworthiness of Billing System, efficiency in picking and dropping off etc.). The respondents are asked to mark checkboxes from their point of view and determine the current situation of the service. The last question was about the Overall Satisfaction. The five- point Likert-scale, ranging from 1 = Very dissatisfied to 5 = Very satisfied were used for evaluating the attributes. These numerical responses are applicable for second, third and fourth sections respectively.

4. RESPONDENTS CHARACTERISTICS

This survey analysis provided some interesting perspectives on how users are adapting with the Uber service provided in Dhaka city. In this section, at first, we will look into the average demographics of the respondents and understand their views.

4.1 Demographics of the Respondents

Table 1: Qualitative responses from the respondents in terms of frequency and percentage

Category	Classification	Frequency(N=500)	Percentage
1. Gender	Male	297	59.4%
	Female	198	39.6%
	Other	5	1%
2. Age	<14	1	0.2%
	14-29	422	84.4%
	30-44	64	12.8%
	45-60	8	1.6%
	>60	5	1%
3. Occupation	Govt employee	56	11.2%
	Private employee	83	16.6%
	Self-employed	17	3.4%
	Student	329	65.8%
	Unemployed	15	3%
4. Monthly income (in thousands)	0-25	337	67.4%
	25-75	116	23.2%
	75-150	31	6.2%
	150-300	6	1.2%
	>300	10	2%
5. Vehicle ownership	No vehicle	376	75.2%
	One vehicle	112	22.4%
	More than one vehicle	12	2.4%
6. Preferences for the daily trip	Public transport	137	27.4%
	Personal vehicle	119	23.8%
	Ride-Sharing Apps	122	24.4%
	Others (Rickshaw/CNG etc.)	122	24.4%
7. Average no of trips per day	1-2	392	78.4%
	3-4	95	19%
	5+	13	2.6%
8. Day of your trip(mostly)	Week day	170	34%

	Weekend	56	11.2%
	Both	274	54.8%
9. Most of the trips you make	Single	377	75.4%
	Double or with family	123	24.6%
10. Purpose of using Ride-Sharing services	Work trips	169	33.8%
	Social activity	101	20.2%
	School/University	110	22%
	Shopping	28	5.6%
	Others	92	18.4%
11. Frequency of using Ride-Sharing services	Once in a day	120	24%
	Once in a week	118	23.6%
	Once in a month	34	6.8%
	Occasionally	228	45.6%
12. What made you use Ride-Sharing Apps?	Unsatisfactory service of public transports	220	44%
	Operational and high maintenance of personal vehicle	41	8.2%
	Convenience and comfort served by ride sharing facilities	239	47.8%
14. What do you think about the fare?	High	239	47.8%
	Worth the service	254	50.8%
	Low	7	1.4%
15. Normal waiting time from call to pickup	<5 minutes	86	
	6-10 minutes	280	17.2%
	11-15 minutes	105	56%
	>15 minutes	29	21%
			5.8%
16. How long will you wait to avail the trip?	<5 minutes	91	
	6-10 minutes	244	18.2%
	11-15 minutes	137	48.8%
	>15 minutes	28	27.4%
			5.6%
17. What did you prefer for your daily trip when there was no "Ride-Sharing Apps"?	Public transport	150	30%
	Personal vehicle	80	16%
	Others (Rickshaw/CNG/Taxi etc.)	270	54%
18. After using these Ride-Sharing Apps, do you still feel the need for a personal vehicle?	Yes	347	69.4%
	No	153	30.6%
20. As your answer is "No", what is the reason behind it?	Lack of security	168	72.7%
	Lack of comfort ability	46	19.9%
	Excessive stoppage		
	Longer travel times	2	0.9%
		15	6.5%

5. ANALYSIS AND RESULTS

5.1 Users' satisfaction and system efficiency

Table 2 represents the mean and standard deviations of Likert-scale value of the observed variables in the questionnaire survey related to users' level of satisfaction and system efficiency. These questions have numerical values (1-5, Likert scale). This helps us to understand better the entire scenario of the factors that should be looked into. Variable that has a mean close to 3 means the respondents are neutral (neither satisfied nor dissatisfied) for that particular factor. Higher than 3 meaning the respondents/users are satisfied with that. On the contrary, closer to 1 or 2 meaning they are dissatisfied with that parameter. Table shows that most of the variables have means around 3 a bit or more than 3 meaning the users are more in the range of neutral to satisfied. Overall satisfaction level is 3.55 fall under the category in between neutral and satisfied. Among the discussed variables for service quality point of view users are mostly satisfied with Riding Comfortability (mean=3.56) and for system efficiency point of view users are mostly satisfied with the Mobile Application of Ride-Sharing Apps (mean=3.74). Considering the overall ranking containing all the parameters users are mostly satisfied with Mobile Application of Ride-Sharing Apps (mean=3.74) followed by Riding Comfortability (mean=3.56) and Efficient in Arriving at Destination (mean=3.49). Users are least satisfied with the Charges of Ride-Sharing Apps (mean=2.93) and Ride-Sharing Apps' Customer Care Service (mean= 2.99).

Table 2: Preliminary statistics of the variables related to users' satisfaction and system efficiency

Description ^a	Mean	Standard Deviation	Rank	Overall Ranking
Driver's behavior	3.41	0.64	4	7
Driver's attitudes towards obeying of traffic rules (maintaining speed limit, overtaking tendency, maintaining signals etc.)	3.23	0.84	9	13
Quality of the Vehicle	3.43	0.71	3	6
Cleanliness of the Vehicle	3.35	0.79	8	12
Riding Safety	3.36	0.83	7	11
Riding Comfortability	3.56	0.71	1	2
Riding Security	3.40	0.79	5	8
Trustworthiness of Billing System	3.37	0.90	7	10(b)
Driving Skill of the Drive	3.39	0.77	6	9
Efficient in Picking You up	3.13	0.95	10	14
Efficient in Arriving at Destination	3.49	0.87	2	3
Mobile Application of Ride-Sharing Apps	3.74	0.75	1	1
Upgradation of its Application Regularly to Improve Service	3.37	0.79	4	10(a)
Ride-Sharing Apps' Service in Connecting you to the Drivers	3.46	0.81	3	5
Ride-Sharing Apps' Destination Display System	3.47	0.85	2	4
Ride-Sharing Apps' Customer Care Service	2.99	0.93	5	15
Charges of Ride-Sharing Apps	2.93	0.88	6	16
How satisfied are you with overall Ride-Sharing Apps' Services?	3.55	0.71		

^aQualitative Scale: 1= Very Dissatisfied, 2= Dissatisfied, 3= Neither dissatisfied nor dissatisfied, 4= Satisfied, 5= Very Satisfied

5.2 Riding Safety

Safe riding is the most common concern for any riding vehicle. From the graphs it is seen that, for riding safety out of 500 respondents 248 are completely or partially satisfied and 73 respondents are

dissatisfied and the rest are neutral. 230 out of 500 respondents said they feel while using ride sharing services. Among those 248 people, 133 are male users and 111 are female users. And among the 73 respondents 57 are male and 15 are female. Figuratively, 44.78% male and 56% female are satisfied while around 20% of the male and only 7% are female dissatisfied with the riding safety. Hence safety is a concern. Further analysis revealed that respondents who are dissatisfied (both male and female) are mostly bike users. Bike has a history of causing major accidents almost on a regular basis in Bangladesh (Pervaz et al.,2020). Figure 2 shows us that among all the people who are concerned about the safety 79.5% of them are bike users and only a handful of them (20.5%) are car users.

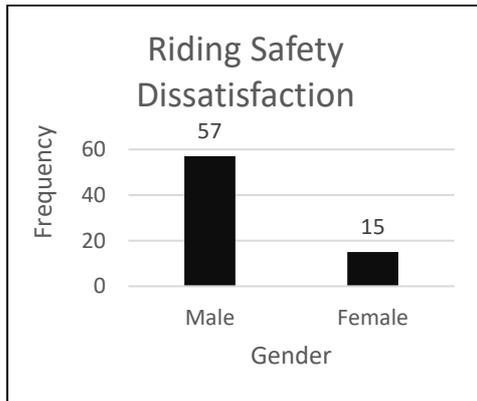


Figure 1: Riding Safety Satisfaction

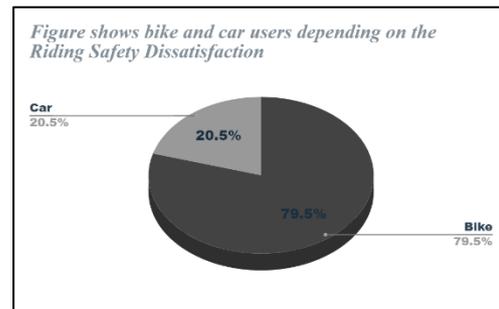


Figure 2: Riding Safety dissatisfaction based on transport mode

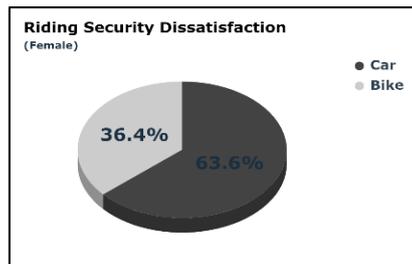


Figure 3a: Riding Security Dissatisfaction (Female)

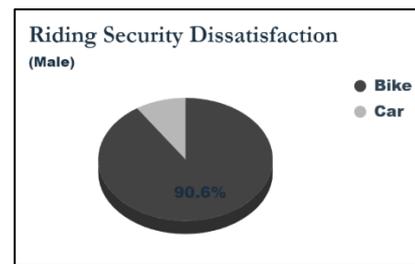


Figure 3b: Riding Security dissatisfaction (Male)

5.3 Riding Security

From start of the journey till reaching the destination, security is a huge concern especially for female riders. Figure 3 shows 61.3% of the male users and 37.1% of the female users are dissatisfied with the security. Interestingly, this aspect of riding safety varies within gender. Female users are seen to be dissatisfied for the car service and more male users are dissatisfied with the bike service. Figure 3 (a) and 3 (b) shows among the 37.1% of the female, 63.6% are car users whereas among 61.3% of the male 90.6% are bike users. similar to our findings, Sharma and Das (2017) also observed in their research that women in India are also hesitant to take a ride, particularly at night, due to security concerns. For car, this can be solved by aiding the ride with strong watchdog network and dash cam online transmission (Benish Chaudhry et al.,2018).

5.4 Choice for Carpooling

When asked about the choice- if they wanted to take the carpooling option (Uberpool) that will reduce trip cost, around 32.7% (88) of the female users agreed and 47.6% (110) disagreed on the fact and around 66.5% (179) male users agreed and 51.1% (118) disagreed. The percentage of women unwilling for carpooling represent around 63% of the entire female respondents of the survey whereas male members represent only around 40 % of the total respondents. The main ..reason found for carpooling

unwillingness is Lack of security (72.7%) followed by Lack of comfortability (19.9%), (6.5%) Longer travel times, Excessive stoppage (0.9%) Furthermore, it is found that female users are more unwilling to share the ride with others due to lack of security (around 55% females). Also, out of 500 people 268 agrees to carpool and 235 (Figure 5) of them are aged between 14-29. This means younger generation are willing to share the rides with strangers than the other age range. This finding is also similar to the findings by Malichova et al., (2020). They found in their research people aged 16 to 49 are more likely to share rides with people they know or even strangers.

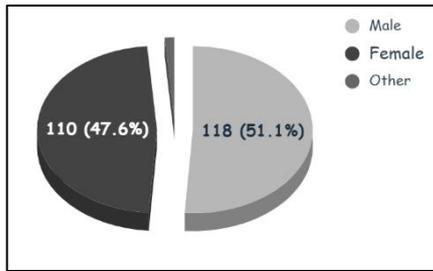


Figure 4: Carpooling Disagree Percentage

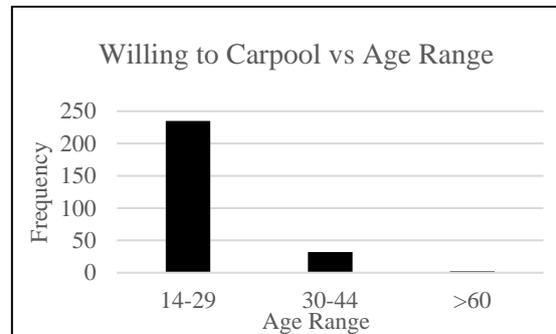


Figure 5: Willingness to carpool vs age range

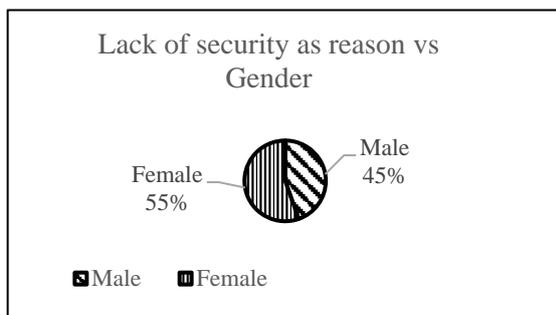


Figure 6: Lack of Security (Male Vs Female)

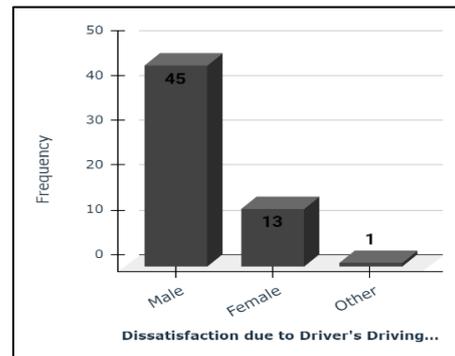


Figure 7. Frequency of male and Female due to Dissatisfaction of Driver's Skill

5.5 Driving Skill

Driving skill of the drivers is of utmost importance as well. Reckless driving of the drivers causes accident and this scenario is frequently seen in Bangladesh. Demographics show that upon asking the satisfactory level based on driving skill of the drivers, male members have much dissatisfaction compared to female members. Uber has been reported to hiring unskilled drivers without checking previous record neither their competency to do the job (Cynthia et al.,2019). 45 male users 13 female users out of 59 respondents are completely or partially dissatisfied with the driver's driving skill. These 45 males and 13 female users represent the 75.5% of the entire male respondents and 22% of the entire female respondents. Hence male users are found to be more dissatisfied this is due to the same above-mentioned reason which is male tend to use the bike service more often when they travel alone. On the other hand, very few females take the bike service even if they are travelling alone. Bike drivers tend to disobey the law more which in terms lead to accidents.

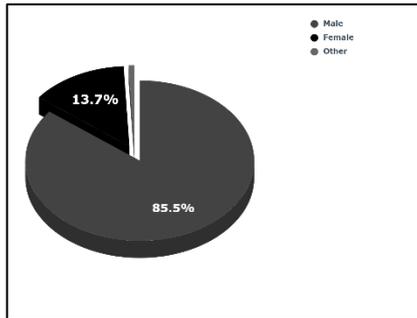


Figure 8. Bike User Percentage

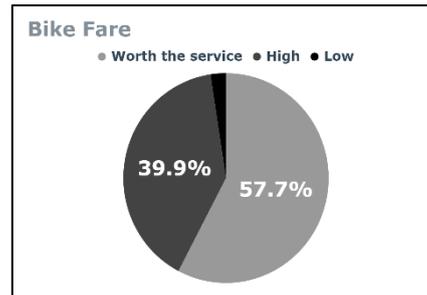


Figure 9: Bike Fare

5.6 System Efficiency

For the system efficiency point of view mobile application service like upgradation, destination display system, service in connecting to the drivers play vital roles. Also, it includes ride fare, customer care service etc.

Charges contribute significantly to the service. Our analysis shows charge has the lowest mean of 2.93 depicting it is more inclined to dissatisfaction range. Figure beside below show car users consider the fare to be higher than bike users. Almost 58% of the bike users consider the fare to be worth the service while 44% of the car users think so. On the contrary around 40% bike users consider fare to be high whereas around 56% car users consider the same.

It is seen users give the most priority to Mobile Application, Destination Display System and how this system Connects them to drivers. Apart from the charges, trustworthiness towards the charge also is a concern for the users. During the peak hours' fare is a bit high. Also, the charge that shows prior to the starting of the ride change later in some cases due to congestion or travel time or other factors as reported by the users. Upgradation of the app is another criterion for system efficiency and UBER works on that continuously. Most of responders are pleased with the mobile application as well as their Customer Care service, which is always available. These findings are supported by Hosru & Yeboah, 2015 as they claim- confirming the pick-up call to the rider or driver through the apps, GPS monitoring, trip time, driver behavior, timeliness, cleanliness of the vehicle, pricing structure, and so on are all some controlling parameters to provide better service (Hosru & Yeboah, 2015). Moreover, Vilakazi and Govender (2014) are two scholars who that studied integrity towards service, planned maintenance, reliability, and performance regarding resolving conflict, security, smoothness of service, ride fare, and riding comfortability can all improve commuter perception.

6. CONCLUSION AND RECOMMENDATIONS

This study attempted to evaluate the users' stated level of satisfaction, taking service quality and efficient systems parameters into account when using Uber as a Ride sharing service mode in Dhaka. From this analysis, it is evident that user satisfaction with Uber is dependent on most of the parameters presented in this paper. For most of the parameters, the mean varies from 3 to 4, which fall in between neutral and satisfactory levels. As seen, riding safety and security impact a lot and can be said to be two of the most indicating variables that drive people's attention to ride sharing services. To conclude major findings with a proper recommendation, the following should be taken care of:

- Despite having used RSS once, the majority of those who responded are willing to utilize a personal vehicle. This is owing to the personal vehicle's versatility.
- Bikers are more dissatisfied with the service in terms of safety. Hence, existing helmet laws must be rigorously enforced for bike riders and drivers.
- Even while costs are more prone to dissatisfaction, it is more crucial for car users. Carpooling with other passengers may be a viable solution to this issue.

- Users, particularly women, are hesitant to carpool for a variety of reasons, the most common of which is a lack of security. Furthermore, security is a major worry, particularly for car users. As stated by Benish Chaudhry et al. (2018), assisting the journey with a watchdog network, distress alarm, and live transmission might encourage more passengers to share the ride with others. As a consequence, the ride fare can be significantly reduced.
- Ride-sharing services in Bangladesh are governed by regulations enacted by the Bangladesh Road Transport Authority (BRTA 2017), but these are very rudimentary and do not cover all of the steps required to make the services sustainable.

This research can be further progressed by performing physical surveys. Due to COVID-19, it was not possible to do field surveys and collect data manually. Moreover, by performing several models like SEM or different machine learning techniques will yield better result. Future research also could focus on some different directions such as impact of ride-sharing services on mode choice behaviour, congestion etc.

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