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A Comparative Study For Measuring The Quality of Dhaka City Transportation System: Survey Based

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Abstract—Dhaka is the capital of Bangladesh and one of the most populous countries in the world. The population of Dhaka has grown at a huge rate in the last few decades and is expected to grow similarly in the coming decades. As a result, population density is increasing, meaning that a large population has to be accommodated in a small area. This is disrupting other activities of Dhaka city. Among the disrupted activities, the condition of the Dhaka Transportation System is absolutely pathetic. Because of this, traffic jams are constantly being created in Dhaka city and people spend their necessary time sitting in traffic jams for hours. Our research paper discusses the Dhaka Transport System. We have worked with 300 data sets and a research paper based on feedback from all of them. By discussing with them, several problems were found, such as: overpopulation, more vehicles, non-observance of the traffic system, not driving carefully, poor mechanical condition of vehicles etc. All these problems have been discussed in the research paper and solutions have been given to make the transportation system in Dhaka city work well in a systematic way.

Index Terms—Bus Service, intercity Bus Service, Dhaka Bus Service, Comparative Study, Survey Analysis.

I. INTRODUCTION

Dhaka is the capital of Bangladesh. Dhaka is one of the most populous countries in the world. Rain has been regarded as the center of administrative, commercial, cultural, economic and political life since independence. As the population growth rate has been increasing in the last few decades, it is expected to increase in the same way in the coming decades. As in Dhaka, the population rate is increasing day by day and there is constant urbanization. Dhaka is also known as mega city in the world due to the many mega projects launched in Dhaka since last decade. Proper management of public transportation is one of the most important aspects of a city. Because if not properly managed, a huge traffic jam will be created in a city, so a city's transportation system needs to be efficiently managed to improve living conditions. Public transportation in Dhaka city is mainly used by middle class and lower class. This entire transportation system of Dhaka should be evaluated from the perspective of passengers so that the problems of public transportation come up. Also, those who use private cars should know that they are using private cars after having any shortcomings in the public transportation system. If these lacunae can be solved then the number of private cars will decrease and traffic congestion will decrease. In terms of traffic congestion, the current condition of transportation in Dhaka city is very deplorable. The existing traffic system in Dhaka city is struggling to control this large number of people and transport, as a result the traffic system of Dhaka is now questionable. The gateway to the country and the capital of Bangladesh is now ranked as the 26th megacity in the world. Also, this populous city is known as the 10th most populous city in the world. Between 1951 and 2001, the population of Dhaka city has increased by more than 20 and 30 times, respectively, and the development process of Dhaka city, i.e. mega projects, is also being implemented rapidly [3]. Such rapid population growth is having a major impact on the transport sector to provide education, employment and social amenities to the residents. The Dhaka metropolitan area is home to a population of over 17 million within an area of 1528 km, which is about 10% of the total population of Bangladesh. and projected that the population would rise above 20 million by 2019. Dhaka is one of the most densely populated cities in the world with more than 47,000 people living per kilometer. [7] Now is the time for a developing city like Dhaka to ensure the public transport system along with the growing population. About 30 million DMRs are generated daily, of which 47% of trips are completed by bus. Public bus transportation services are not enough to meet this huge demand. [7]. A series of criteria are used to characterize a transportation service such as: reliability, service programming, comfort, and more. Things to look comfortable and feel comfortable while on the go are considered top criteria. If a person driving a private car can move to the public bus system, then the large number of private cars in the country will decrease and as a result

the population of Dhaka city will also decrease. Dhaka city's public transportation system is characterized by overcrowding, congestion, high accident rate, inadequate traffic management and current air pollution problems. The existing public transports are unusable, very weak and cannot meet the demand of the people. Despite the important role of buses in the city of Dhaka, at times the services do not adequately meet their demand. The transport system of a city or a country can take the country and city to the top of success. Transport system is very important if we want to keep pace with the present era i.e. if we want to take the country and city to the end of development. A single and efficient transport system maintains the mobility of all classes. As a result, the country can use its resources, relieve traffic congestion, ensure the longevity of resources and be responsive to the environment. That is, a well-organized public bus transportation system will attract various high-income people to travel by car, thereby reducing traffic congestion. In this research method, a developing city in Dhaka, the capital of Bangladesh, explains the reasons for their dissatisfaction with using the public transportation system and how to improve the quality of public bus services from the people's perspective. It can be seen that those who live permanently in Dhaka city face more transportation related problems. Therefore it is very important to plan the bus service quality satisfactorily to develop a sustainable and high quality urban transport system for Dhaka city. Therefore, it is essential to identify the existing deficiencies in public buses. Since this public transport system is delivered directly to the public, the ultimate quality of service perception from the users can be assumed as a result.

The research paper has shown that Bangladesh bus transportation system has the use of traffic but it is not properly applied. As a result passengers are reluctant to use the bus transportation system. This paper is designed to explain why commuters are reluctant to use the bus transportation system and how to increase usability. The next part of the paper discusses the literature review. Then the next part is included in the method part. Then the discussion section and finally the conclusion of the paper is given.

II. LITERATURE REVIEW

The main objective of writing a literature review is to gain knowledge about the analysis that exists in the study of a particular subject and to present that knowledge in the form of a written statement. Many studies have been published on Transport System Management, which are discussed in detail below. This paper only discusses the bus road conditions, frequency and service quality through interviews with passengers. Various conclusions are drawn based on the 12 respondents [1]. This paper discusses how to solve the bus problem. Current private cars, non-motor vehicles, traffic congestion etc. have been identified as problems. And public bus service, fixing roads, not illegal parking have been considered as solutions [2]. This paper discusses the intercity mode, intracity mode and intercity to intracity bus services of Dhaka. The survey found that bus trains and launches accounted for 76,

9 and 15 percent of the passenger numbers respectively. And it is also seen that there is no good connectivity service with big stations, big roads, big launch terminals [3]. This research paper deals with assessing the overall potential of the article bus service and the quality-of-service provision. Besides, it is possible to provide better services in these facilities of Dhaka city (reducing congestion, environmental pollution, unreliability, delay and providing better services) [4]. In this research paper an android app is developed for bus service. Here separate system is created for driver, passenger and administrator, there is created with name of the buses, travel distance, travel cost, and road map for driver and passenger. On the other hand, adding, removing or diverting routes are created for administrators as needed [5]. This research paper analyzes the quality, safety and security of Dhaka city bus service and customer satisfaction with the service provided. Passengers are dissatisfied for three reasons, they are - Unsafe driving practice, poor boarding, and alighting facilities and lack of law enforcing agency surveillance [8]. In this paper, speed, temperature, noise, jerking etc. are measured using Arduino microcontroller to observe the comfort of the bus. Two things can be observed from this study, a) comfort increases when transport speed increases, b) comfort decreases when temperature, jerking and SPL bar increase [9]. This research paper discusses the achievement of customer satisfaction of Dhaka bus service. The results show that most of the people are not satisfied with the bus service. The reason for dissatisfaction is - unsafe driving practices, poor boarding and alighting facilities and lack of law enforcing agencies surveillance. Besides irregular service provided by buses, regular overcrowding, lack of good standard buses and lack of cleanliness etc. Besides irregular service provided by buses, regular overcrowding, lack of good standard buses and lack of cleanliness etc. are the causes of unrest [11]. This research paper is based on interviews with university students using two models namely SIMPLE and RESCA. There are four issues raised- 1) reliability; 2) comfort; 3) service; 4) responsiveness and empathy; 5) safety and security; 6) affordability; 7) vehicle access [12]. This research paper discusses about bus service quality. By collecting data from 100 commuters, some important things have been extracted, such as quality of ride, cost efficiency, comfort, convenience, safety security, service effectiveness and service personnel. After insuring these, the quality of public bus services will increase [15]. Valuable opinions of 303 respondents are discussed in this research paper. Most passengers here consider DCBS safer than other bus services [16]. This research paper investigates the overall quality of bus service in Dhaka city. Here, two MLR models are used to calculate the accuracy, full model (model1)-72.3% and radius model (model2)-69.7% [17]. In this research paper, three deep learning models such as GRNN, PNN, PRNN based on predicting bus service quality research are presented. Here both GRNN is 76.30% and PNN is 75.60% performed better than PRNN is 57.30% [18].

III. METHODOLOGY

By constructing a google from we collect a total of 104 data for our research work. The work procedure is discussed in detail in the following sections:

A. Study Design and Work Procedure

A survey has been conducted to find out what kind of experience the country's people have about the bus service in Bangladesh. This survey tries to find out what problems they face or what kind of services they want.
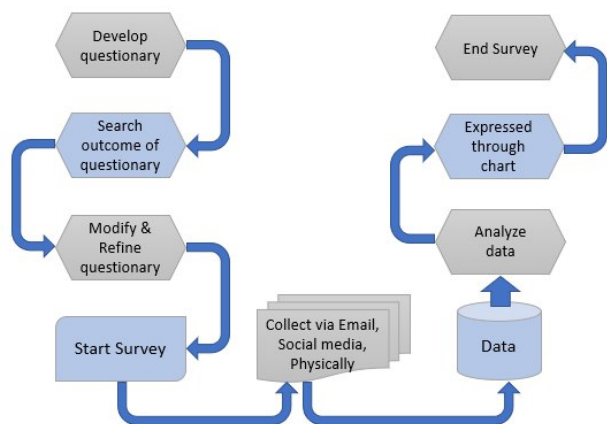

Fig. 1. The Work Procedure of the Survey

B. Importance The Survey of Bus Transport System

It is possible to know the pros and cons of the current transport system through a thorough survey. In our daily lives, we have to go to different places for daily work. For this, we are directly and indirectly dependent on transport. We use this transport to facilitate our way of life. We are doing this survey to know how this transportation .and also how to provide us with benefits or what difficulties we are facing and how we can make it more suitable. Here people tell us their opinions about what problems they are facing and what could have been done better. We have conducted this survey based on their requests. Through this, we can quickly identify the problems in people's daily life. We can work to solve their problems. By doing this survey, we can determine their needs and what works best for them. By doing this survey, we can make a good plan for future transportation. Due to these exact reasons, our service is beneficial. And it will play an excellent role in our survey.

C. Data Collection Survey Form Details

We have collected data from a total of 104 people of different professions and categories to know the current status of the transport system in Dhaka city. What is the current transport system for Dhaka city? We have to take much important information from ordinary people. Here they tell how satisfied they are with their current transport system and also how to improve this bus transport system. We had to take their various opinions to know all these critical opinions. In

TABLE I
SURVEY FORM QUESTIONNAIRES DISCUSSION

Parameter Name	Description
Educational institution	We choose these parameters by analyzing what data comes from which educational institution.
Age	Choose what kind of people of all ages are involved here.
Location	Analyze who has been added to our paper from which area.
Browsing	In this section, we analyze who is browsing the net with what kind of things.
Used Govt. Apps	There are two options in this parameter 1. Yes. 2. No. Using these parameters, we take data from people on whether they use government apps.
Popular apps	This is a multiple-choice question. Here social media, health, food, travel, games, mobile banking and sports, these options can be used to find out which type of apps are more popular.
No of Used Govt. apps	From these parameters we know how many govt. apps the participants used.
Currently installed	From these parameters we know how many govt. apps are currently installed on the participants' mobiles.
Recently used	From these parameters we know how many government apps the participants are currently using.
Satisfied	This parameter has two options. 1. Yes 2. No Using these parameters, we get feedback from users whether they are satisfied or dissatisfied.
Why not satisfied	This is a multiple-choice question. This parameter tells users what reasons they are dissatisfied.
How "JOGAJOG" apps popular	This is a multiple-choice question. This parameter is used by users to increase the popularity of "JOGAJOG" apps what features are required.

our survey form, we have taken only essential data from them. First, we took their age to know which age group is using this transport more. After that, we took information about their gender, through which we confirmed whether people of either sex, male or female, were using this transport. Then we wanted to know about their educational qualification to make sure that people of any level are traveling this transport more. At the same time, to analyze more deeply, we wanted to know who their profession is and what job they are currently engaged in.

We know their permanent address and the district where they are now staying. And we also asked whether they are presently staying in Dhaka or not. We also asked how many times they travel to Dhaka city every day so that we can get their feedback in depth. After taking all the above data, we have learned from them how satisfied they are with the present transport system. If they are happy, then for any service, they are comfortable. And if they are not satisfied, then we have the opportunity to choose or say the reason why they are not satisfied. And finally, we have taken their important, informed opinion on how we can provide better service to this bus transport system.

IV. Result Analysis

This section represents the total amount of collected data on many types of graphs. One graph for one different question answer. Which helps to easily understand the opinion of the respondents. Every graph is discussed on it above section.

After completing data collection we analyze 104 answers and in figure 2 we can seen that most respondents are aged 18-24 (95.2%). However, the number of users aged 25-34 (3.8%) is slightly the age group of 35-49 (1%). There is no response from people aged 13-17 and 50+.
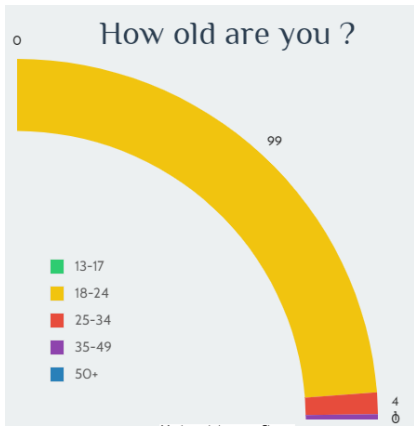
Fig. 2. Illustration of the answer amount of question 1: How old are you?

In figure 3 we can seen that, most of the participants of our survey are male which is 90.4% from total respondent. And female respondents are 9.6%.
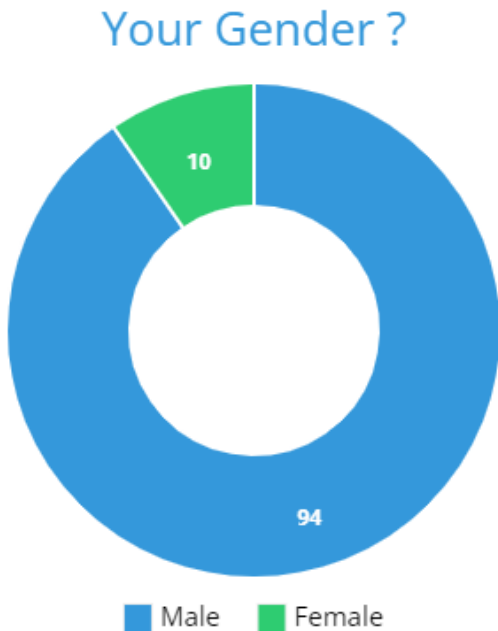
Fig. 3. Illustration of the answer amount of question 2:Your Gender?

In figure 4 we can seen that, analysing all data it shows that most of the response are come from University student which

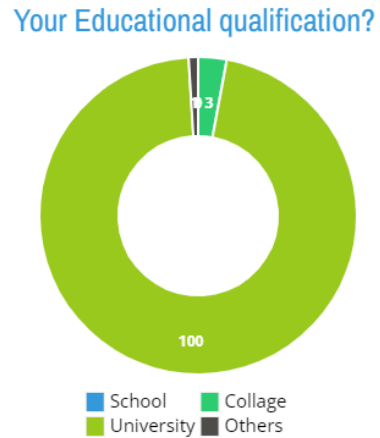is 96.2%. 2.9% from college students and 1% from others level students.

Fig. 4. Illustration of the answer amount of question 3:Your Educational qualification?

In figure 5 we can seen that, here highest percentage is 94.4% and it's students. 2.9% people are service holder and 1.9% are searching for jobs. Remaining 1% responded come from other occupation people.
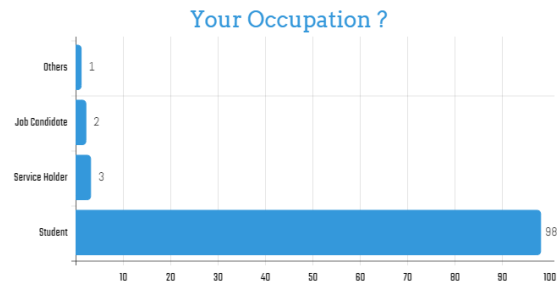

Fig. 5. Illustration of the answer amount of question 4:Your Occupation?

In figure 6, from total respondents we can be seen that most of the respondents are from Dhaka and the percentage is 48.1%. 4.8% of people's hometown is Chittagong.6.7% from Rajshahi,1.9% from Khulna,2.9% from Sylhet, 17.3%from Rangpur,15.4% from Mymensingh, 2.8% from Barisal.
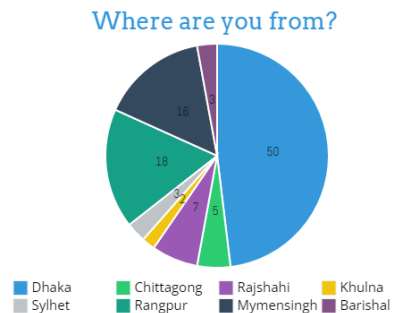

Fig. 6. Illustration of the answer amount of question 5:Where are you from?

In figure 7, from total respondent who are come from different cites, 100% of people are currently stay in Dhaka city.

Fig. 7. Illustration of the answer amount of question 6:Are you currently located in Dhaka?

In figure 8, when we analyze the data from the collected data, we can see that in response to the question of how many people travel in Dhaka regularly and how many people do not, 71.2% have given the opinion that they travel inside of Dhaka every day and 28.8% people do not travel every day.
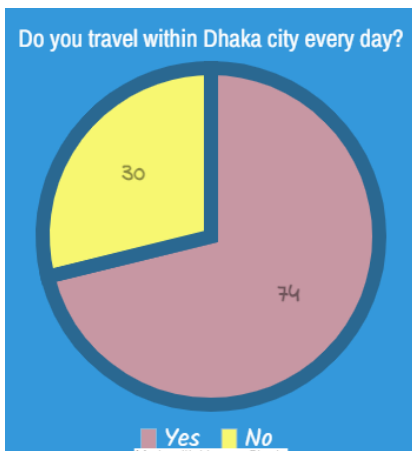

Fig. 8. Illustration of the answer amount of question 7:Do you travel within Dhaka city every day?

In figure 9 we can seen that, among those who travel regularly in Dhaka, many travels within Dhaka 1 or more times per day, and many travel 1/2 times a week or a month. By analyzing our collected data we can see that 40.4% of people travel 1 or more times a day, 28.8% travel 1o r 3 times per week and 30.8% travel sometimes a month.

In figure 10 we can seen that, when the regular commuters in Dhaka city were asked about the amount of people inside the bus when they travel, 9.65% people said that the number of passengers was normal and 90.45% said that the number of passengers was much more than normal.
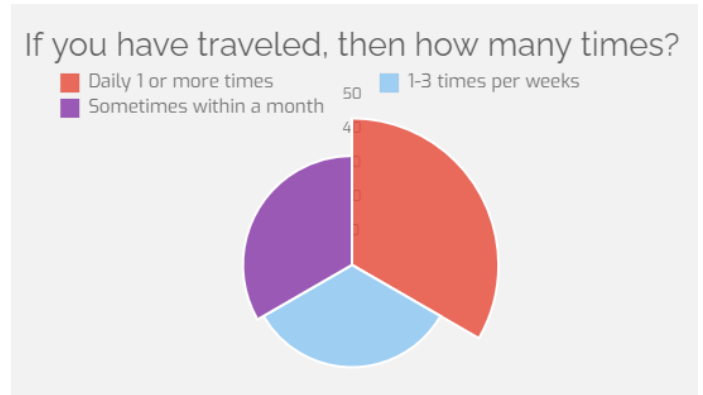

Fig. 9. Illustration of the answer amount of question 8:If you have traveled, then how many times?
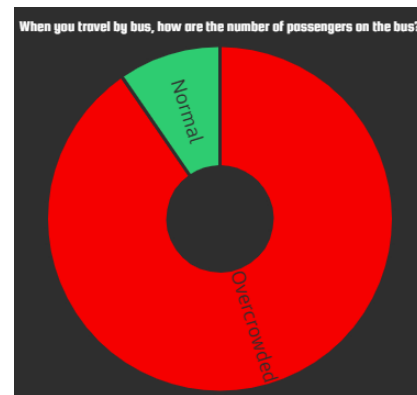

Fig. 10. Illustration of the answer amount of question 9:When you travel by bus, how are the number of passengers on the bus?

In figure 11, when the survey participants were asked to share their opinion about the condition inside of the bus, 10.5% responded that the condition is good and 89.5% people responded that the condition of the bus is very poor.
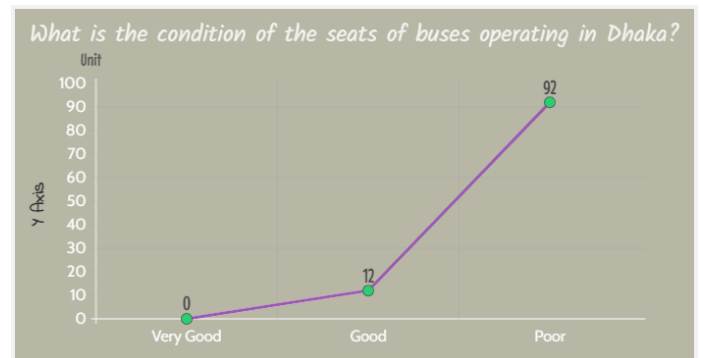

Fig. 11. Illustration of the answer amount of question 10:What is the condition of the seats of buses operating in Dhaka?

In figure 12, when the respondents were asked about the service of the buses by four parameters, 1% people said that they like the service very much and 1.9% gave a good opinion. And the rest 34.6%'s opinion was average and 62.5% of people

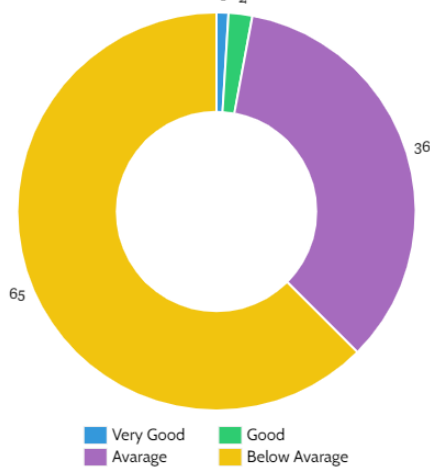felt the service quality was less than average.

Fig. 12. Illustration of the answer amount of question 11:How is the bus route service in Dhaka city?

In figure 13, When we asked survey participants why if they liked the bus service, 69.2% responded that they didn't like it for any reason. And among the rest who opined that they like bus services, 11.3% like it for good driving, 13.5% people like it because of not carrying extra passengers, 16.2% like it for not charging extra fare, and 12.3% people like bus service as the drivers drive on time.
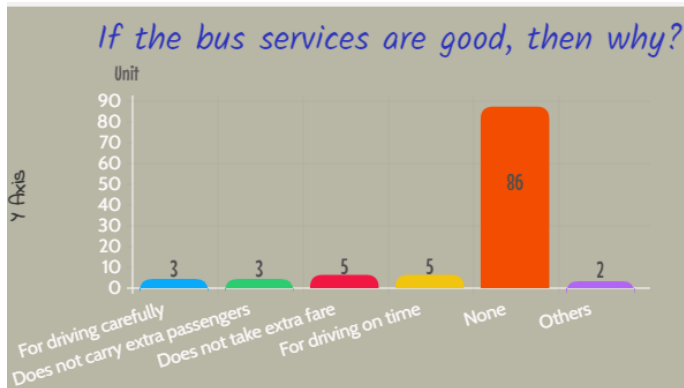

Fig. 13. Illustration of the answer amount of question 12:If the bus services are good, then why?

In figure 14 we can seen that, in contrast to the previous question when we asked survey participants why if they disliked the bus service, 2.2% responded that they did not dislike it for any reason. And among the rest who opined that their bus services are bad, 74.8% of the total respondents feel bad because the condition of the buses inside and outside is not good, 50.4% people feel bad because they charge extra fare, 54.7% It feels bad for drivers and helpers misbehaving with passengers, 58.3% feel bad for sick competition of one bus driver with another driver.
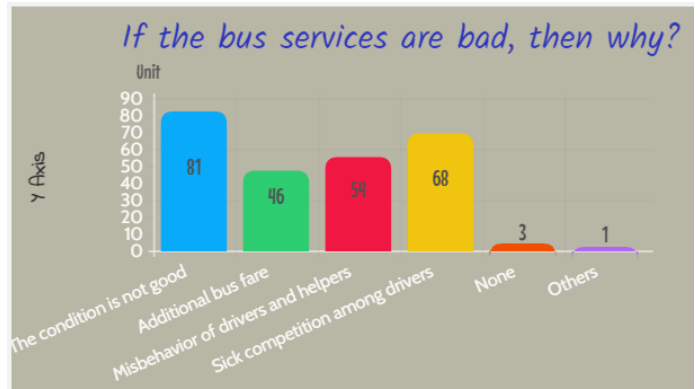

Fig. 14. Illustration of the answer amount of question 13:If the bus services are bad, then why?

In figure 15 we can seen that, from the survey respondent, we try to know their opinion on how the current bus service can be improved by giving 5 options most of the respondents select all of the given options. From the total response, 72.7% of people agree with the option that Buses must be operated by skilled and trained drivers.66.9% of people give the opinion of training the drivers and helpers how to treat passengers well. 48.2% of people give the opinion to adjust bus fares slightly.55.4% of people give the opinion to check bus fitness regularly and 55.4% of people give the opinion on rebuilding the Buses which does not have fitness certificate.
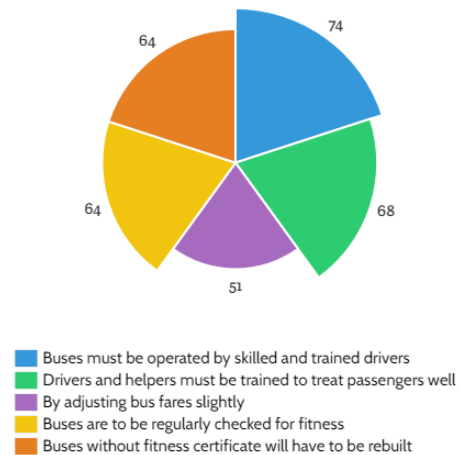

Fig. 15. Illustration of the answer amount of question 14:How do you think buses can provide better service?

V. RESULT DISCUSSION

From the opinion given by the survey participants, it is clear that most of the people traveling in Dhaka city are not satisfied with the current transport system or service. There are many reasons for this which are analyzed below based on the opinion of the participants and discussed how to solve the problem are: Most of the transport system we are using in our country is

inefficient and they don't have fitness certificates. Also most of the drivers do not have driving licenses. In 2018, Bangladesh Road and Bridge Minister Obaidul Quader said in Bangladesh Pratid newspaper that there are only 18 lakh driving licenses in the country despite 35 lakh vehicle licenses. This report shows that the number of skilled drivers in our country is almost half. In order to keep our country's transport system beautiful and safe, our country's drivers need to have 100% licenses to drive vehicles. Drivers should be trained in good manners so that they can always behave and treat passengers well. Along with the driver, the helpers have to be smart about who and what they are related to. An additional driver should be kept for long journeys. The car supervisor has to take the right decision and nothing can be done without the permission of the supervisor. Many bus drivers charge more for bus fares. This problem must be solved. For this, a list of fixed fares issued by the Bus Samati should be kept in every bus. And if any driver charges more than the fixed fare, the driver and the vehicle owner should be fined by the bus company. For this, direct bus communication with passengers should be made easier. By this, those who collect additional scaffolding will not be able to take this scaffolding. Students must pay half the fare correctly. Males will not sit in seats reserved for females. The number of seats for women should be increased in every bus. And age should be done for women to sit in women's seats and men should sit in men's seats. A car should have all the fitness required to run on the road. For example, fans should be provided on every bus. The bus should have all the necessary lights. The seating arrangements should be comfortable. And the seats should be kept a little empty. Every seat must have a seat belt. And all passengers must wear seat belts after taking their assigned seats. First aid kits should be kept on the buses. Passengers cannot be taken more than the allotted seats. The bus will not stop anywhere except at the designated bus station. Do not drive with the mindset of overtaking. The vehicle cannot be driven at a speed higher than the specified vehicle speed. Passengers should try to reach their destination in time. Buses should stop taking passengers on the road. The safety of passengers must be ensured on the bus. When passengers get off the bus, the bus should be parked at a designated place so that other buses do not have to wait. And passengers can get off safely and safely. To make the journey of the passengers safer and more beautiful, check up on everything on the bus regularly. If possible, the vehicle should be checked up before starting the journey. Vehicles that do not have fitness certificates should be stopped from driving. Every vehicle should have a live tracking system. Before the start of the bus journey, you have to fill up the Jalani as required. It is possible to make the journey of the passengers more beautiful and comfortable by following the mentioned rules properly. Appropriate laws should be passed in this regard. Violators of the above laws will be dealt with to the fullest extent of the law. In this way, it is possible to improve the bus transport system for the passengers traveling by bus.

VI. CONCLUSION

This research paper of ours mainly discusses about transportation system of Dhaka city. We have collected 300 data from the people of Dhaka city by setting the questionnaire through Google form. Graphs of various questions are discussed from those data. The collected data has been analyzed and the steps to be taken to solve the transportation system problems of Dhaka city have been discussed in detail.

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