

User opinion on Bus Priority Lane: Case study from Sri Lanka.

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Abstract: The bus priority lane is an excellent way to encourage public transport. And BPL helps to reduce traffic congestion. The bus priority lane is reducing the travel time of BPL users at peak times. This research aims to implement the BPL by getting opinions from passengers and operators (Drivers & Conductors). Through conduct, the survey from passengers and operators/ can identify the problems, additional expectations, and current BPL situation. The analysis is based on the survey of user opinion. Three types of survey were conducted under this research. High number of passengers and non-BPL users have used their trips for work purpose. More than 75% of passengers, operators & non-BPL users agreed that BPL will saving their travel time.

Keywords: Bus priority lane, User opinion, transportation, public transportation, Sri Lanka.

1. INTRODUCTION

Buses have been the primary transport mode in Sri Lanka. Most of the residents try to avoid using bus transportation due to low speed, lack of comfortability, and less punctuality. Congestion is a huge problem in many countries. Some cities are doing good to reduce this problem. In Colombo city also, traffic congestion is the main problem. This traffic congestion will lead to many other problems and challenges in the city. Bus priority lane (BPL) is an excellent solution to reduce traffic congestion. And BPL is good to improve public transportation. It may reduce private vehicle users because BPL is reducing travel time. This research's study area is started from the Moratuwa junction to the Maliban junction in Galle Road. Bus priority lane is already introduced in Galle road. Now the focus is getting the opinion about the current situation from users. BPL was first introduced on 15th August 2017, from Kurusa Junction in Moratuwa to the Katubedda Junction on Galle Road.

1.1 Overall bus priority lane networks in Colombo city

There are 6 BPL networks in Colombo city. Such as/ Moratuwa to Maliban junction, savoy cinema at Wellawatta to Pittala junction, Slave island to Pettah, Slave island to Technical junction, Maradana to Borella, and Ayurveda junction to Pilduwa junction. Figure 1 shows the details of these locations.

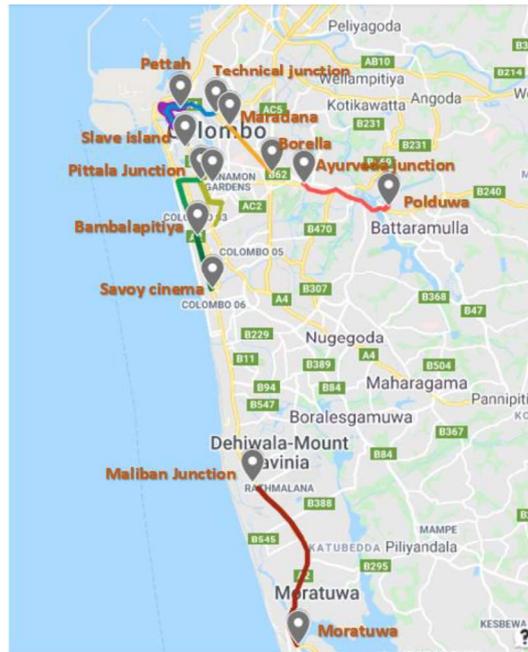


Figure 1. locations of existing BPL networks

The bus priority lane network details show in Table 1.

Table **Error! No text of specified style in document.** Bus priority lane networks in Colombo city in 2020

BPL networks		Extent of BPL network (km) (Approximately)
Start	End	
Moratatuwa	Maliban junction	4.6
Savoy Cinema, wellawatta	Pittala junction	4.50
Slave island	Technical junction	3.8
Maradana	Borella	3.3
Ayurveda junction	Polduwa junction	3.1
Slave island	Pettah	2.5

1.2 Statement of the problem

In peak time, most of the passengers are using the bus priority lane. Problems identified in Bus priority lane. These are Most of the users are not following the rules during the peak time (6 AM – 9 AM), lack of knowledge about the bus priority lane to the users, lack of awareness about the Bus priority lane and operational issues like overtaking within single lane.

1.3 Objective of the study

The goal of this research is to identify user opinion on bus priority lane. The following objectives are considered in getting the user opinion.

- 1) Identify the current issues in bus priority lane implemented in Galle Road.
- 2) Obtain the users (passengers, operators (drivers and conductors) and non-BPL users) expectation from Bus priority lane (BPL).

3) Evaluate the with and without BPL scenario.

1.4 Importance of the study

Sri Lanka needs a transit priority measure to handle urban traffic congestion constrained by built-up environment. Adding more capacity in terms of construction of flyovers and elevated roads would not provide a long term solution to the heavy traffic congestion. But Bus priority lane will be able to mitigate the issue to some extent.

Bus priority lane also improves the lane discipline of both bus drivers and private vehicle users due to the dedicated lane. Bus lanes will shorten the travel time for bus users by escaping from the general traffic congestion.

2. LITERATURE REVIEW

The increasing of the private vehicle usages creates various issues in the urban environment of developing and emerging countries. Countries are trying to control these issues in various ways. Sri Lanka implemented Bus Priority Lane in 2017 along Galle road in Colombo.

The main objective of this study is to identify the usages and effectiveness of Bus priority lane to mitigate the traffic congestion. The percentage of rail, bus, car, bike & cycle, and walking usages was studied considering different trip purposes students, workers, business, going home, and private using model share distribution (Sakamoto et al., 2007). (Courage et al., 1978) studied the public opinion to bus priority lane for buses and carpools in Miami. Also their research concluded that the system acceptance and familiar with bus and car-pool priority lane systems in important for its success.

Agrawal et al. (2013) studied the public opinion on policies and strategies governing the operations of bus lanes in major congested urban centers where the bus lanes do not completely exclude other users. Hensher & Waters (1994) analyzed the light rail and bus priority systems along with high occupancy vehicle (HOV) and proved the least cost and flexibility in BPL while stressing the importance of users awareness.

The research is about the contribution of expert opinion to the design of high capacity bus priority systems in brazil. There are three types of expert bits of knowledge considered; such as facts, models, and opinion (Tyler, 1991). Public transport is most important to urban areas. Private vehicles can create competition for public transportation. Passengers are discouraging public transport for low speed. This paper explained the impact of public transport lane on the operating speed of buses. Most problems are caused not only by technical faults, but also by a considerably increased number of private cars. The authors explained the speed of busses that how to affect the passengers' opinion. (Burinskienė et al., 2016). This report is explained about the policies and strategies governing the bus lanes' design and operations in major congested urban centers. This report focuses on the bus lane that operates in mixed traffic conditions primarily targeted planners and policymakers interested in learning more about the development and implementation of bus lanes in other cities.

3. RESEARCH METHODOLOGY

3.1 Introduction to methodology

The secondary data (traffic counts, bus surveys, and user (passengers, operators and car users) opinion surveys) collected from 2017 were used for this research. For revalidation purpose, a sample scale primary data also were collected in 2020.

3.2 Sample design

There are so many approaches to estimate sample designs from the researchers. Sample design is the mean of gathering data about bus priority lane from users of research and it is a definite plan for gathering data from related populations. It guides to take the sample size with the relevant population. This research is related to the passengers, operators, and non-BPL users, therefore the survey data collected from three stakeholders.

3.3 Sampling techniques

Solvin's formula was used for finding the sample size. Slovin's Formula provides the sample size (n) using the Known population size (N) and the acceptable error value (e).

$$n = N / (1 + Ne^2)$$

The vehicle count data were used for calculating the sample sizes. The location of the vehicle count data is Rathmalana Airport along Galle road. The survey was done on 28th July 2020. This vehicle count data duration was 6 AM to 9 AM the same as the BPL operation time along the Galle road during the morning. The vehicle count data statistics is shown below in Table 2.

Table 2. Summary of vehicle count data.

Date	Location	Time (am)	Inbound/ outbound	Busses in bus lane
28.07.2020	Rathmalana Airport	6:00 – 9:00	Inbound	368

According to the vehicle count data, 368 busses are going through the BPL lane during 6 AM to 9 AM. Considered 60 number of passengers are using a bus, when calculating the population size of passengers using BPL lane.

3.4 Sample size

The sample size is defining the sample would consider collecting for the actual data. The sample size refers to the number of participants or observations included in a study. This number of the sample size is usually represented by n. There are two statistical properties in the size of sample influences: the precision of our estimates and the study's power to draw conclusions. According to the Solvin's formula, approximately 455 samples were taken from the passengers. 115 number of sample size was taken from operators, and 420 were taken from the non-BPL users for this research.

Table 3. details of collected sample size.

	Collected sample size
Passengers	455
Operators	115
Non-BPL users	420

3.5 Data collection

The primary data collection was carried out on the 11th of September 2020. There are sixteen (16) number of survey data conducted from passengers. Seven (7) locations were selected for this primary data collection survey. These are Kattubedda, Zoysa Puram, Ratmalana, Dehiwala, Wellawatta, Rawathwatta, and Colombo 2.

The secondary data used for this analysis were collected on 15 October 2017 from three different users: bus passengers, bus operators and non-BPL users who are using private vehicle.

3.5.1 Bus passenger survey

This survey was designed for getting opinions from bus passengers on Galle road. There was four number of locations selected to get opinions from passengers for the bus passengers survey. A questionnaire survey of bus passengers was carried out in Katubedda, Bambalapitiya (Infront of majestic city), Kollupitiya, and Rawathawatta on the 25th of October 2017. Mainly considered the passengers who are using bus priority lane by bus.

Survey location of Katubedda is included under the study area of this research, but other locations will analyze to get more information for this research. The focus of this survey is getting user opinion from the bus passengers.

Table 4. passengers survey interview summary

No.	Location Description	Number of interviews of Bus passengers	Total
1	Katubedda	75	455
2	Bambalapitiya	120	
3	Kollupitiya	125	
4	Rawathawata	135	

3.5.2 Bus operators survey

This survey was designed to get opinions from bus operators in Galle road. Drivers and conductors were considered as operators. This survey was carried out on the 25th of October 2017. The survey was executed for 12 hours from 6 AM to 9 AM. The main consideration of this survey was getting the opinions from operators. This survey was taken in Panadura and Rawatawatta.

The opinion was taken from the route number of 100 and 101 operators. The origin and destination of these buses are from Moratuwa to Pettah and from Panadura to Pettah. These buses are using the BPL lane through their bus routes.

Table 5. operators survey interview summary

No.	Location Description	Number of interviews of Bus operators	Total
1	Panadura	55	115
2	Rawatawatta	60	

3.5.3 Non-BPL users survey

The survey of Non-BPL users is about the opinion about the bus priority lane. The users were considered who are not using the bus priority lane. Private vehicle users including under these non-BPL users. This survey was carried out on the 25th of October 2017. The survey was executed for 12 hours from 6 AM to 6 PM. The main consideration of this survey was to get opinions from Non-BPL users. This survey was taken in Katubedda, Kaldemulla, and Kollupitiya.

Table 6. Non-BPL users' survey interview summary

No.	Location Description	Number of interviews of non-BPL users	Total
1	Katubedda	94	420
2	Kaldemulla	133	
3	Kollupitiya	193	

4. RESEARCH ANALYSIS

4.1 Analysis of the Primary data collection survey

Primary data collection conducted on 11th of September 2020. 16 surveys were conducted as the pilot survey testing. According to the pilot survey, most of the passengers' opinion about time management features, passengers' comfortability, and safety within the journey was no change compared with other performance except safety during the step-up/step-down. The 3 years times after introduced bus priority lane in Galle road, the many passengers' opinion was not changed about these features., BPL should need to be continued in Galle road as the analysis of the performance rate of primary data collection survey.

4.2 Analysis of the passengers' bus survey

The secondary data was used for this analysis. The awareness of bus priority lane is very important to follow the rules of BPL. There are 455 number of passengers that were conducted for the survey.

4.2.1 Trip purpose

Colombo city is a commercial area in Sri Lanka. The commercial area is using for profit businesses, these are office complexes, shopping malls, restaurants, service stations, commercial activities, wholesale buying and selling, a financial establishment, and retail business. This is the introduction to the commercial area. People are moving their destination for many purposes. It can be work, school & education, Personal, social, business, recreational, and other purposes. It can be long or short trips. The trip purpose is one of the important factors in this analysis. There are 455 size of surveys analyzed for this trip purpose from passengers.

- **Trip purpose with BPL awareness**

The following figure 2 shows the trip purpose with BPL awareness of passengers.

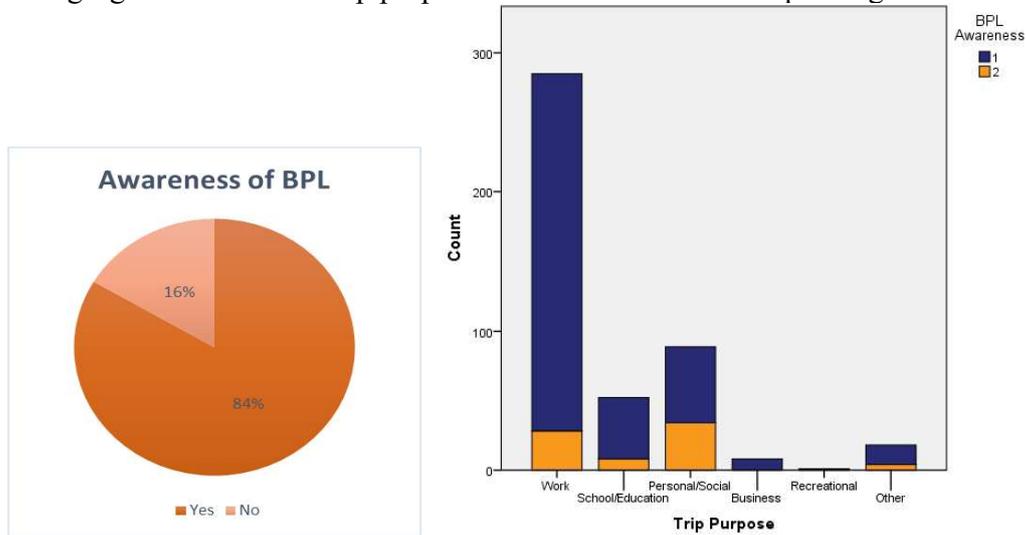


Figure 2. Trip purpose with BPL awareness of Passengers

According to this Analysis, overall, 84% of passengers have awareness about the bus priority lane. Many people using Bus priority lane for work purposes. very a smaller number of passengers was used public transportation for recreational and business purposes. High number of passengers who were using public transportation for work purposes, have more awareness about BPL.

- **Trip purpose with Average time delay/ saving due to bus lane.**

As the opinion about the delay and saving of passengers, 83% of passengers agreed that bus priority lane saves travel time. And the rest of the passengers are not agreed that BPL is saving travel time. the below Figure shows the trip purpose with time delay/ saving due to BPL.

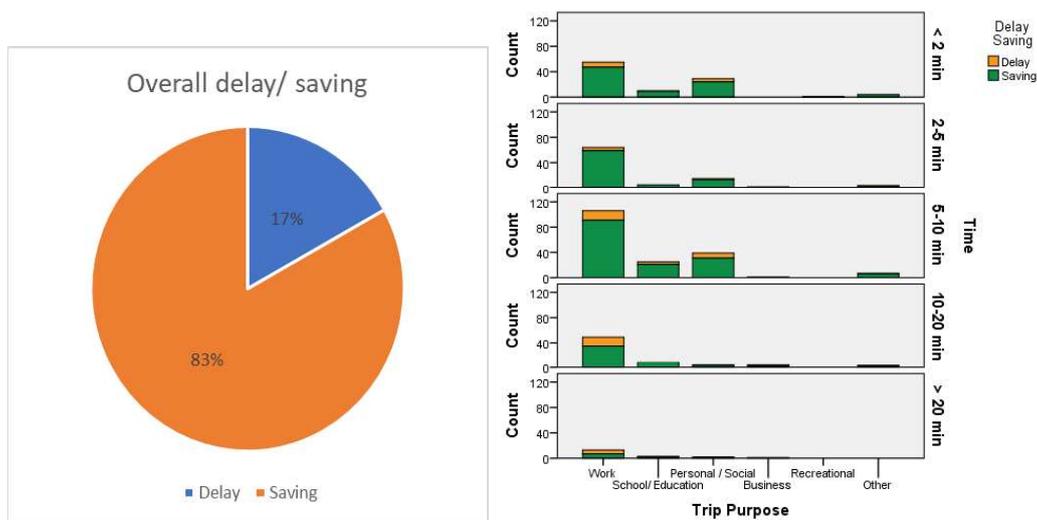


Figure 3. Trip purpose with average time delay/ saving due to BPL.

According to this analysis, majority of passengers said that BPL was saving the time. And 5-10 minutes is the most saving time by BPL in each category of trip purpose. Very less number of passengers said that BPL saving more than 20 minutes.

4.2.2 The performance levels.

This research's focus is identifying users' opinion about the bus priority lane in Galle road. Performance level of the BPL's features show below Figure 4.

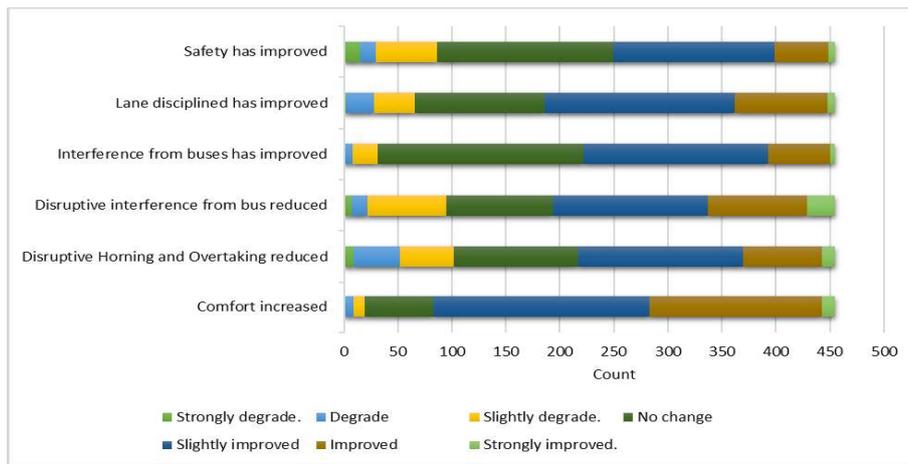


Figure 4. Performance level

According to the data, passengers agreed that bus speed, lane discipline, waiting time, interference from buses, safety, and halts was slightly improved after introduced bus priority lane. Most of the passengers were agreed that interference from buses has reduced after the bus priority lane introduced.

4.2.3 Origin and destination of passengers

According to the survey which were conducted in 2017, Colombo city is the most trip attraction place. Figure shows the details of the trip origin and destination below.

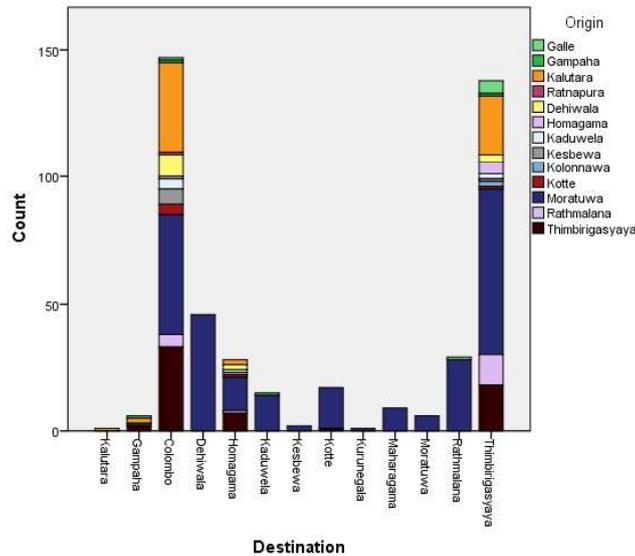


Figure 5. Origin and Destination of Passengers

According to this analysis, very large number of the passengers were doing their trips within Colombo District. There are 13 DS divisions in Colombo District. DS divisions of Colombo district considered for this analysis. Colombo (32%), Thimbirisyaya (30%) and Dehiwala (10%) are the most attraction DSD in Colombo district when compare with other DS divisions. Moratuwa (55%), Thimbirisyaya (13%) and Kalutara (12%) are the most generated DS divisions in Colombo District. The majority of passengers generated their trips from Moratuwa. And some passengers were doing their trip to Colombo District from Galle, Gampaha, Kalutara & Ratnapura District.

4.2.4 Passengers' opinion about the benefits/problem of BPL

The secondary data was used for this analysis. Passenger opinion is very important to implement the bus priority lane. Because they are the users of the BPL. Passengers have experienced the in-bus priority lane when they travel from a place to another destination. The opinion can positive or negative. And it can be benefits or problems. The following user, opinion was got through conduct the survey.

1) Positive opinions

According to the passengers' opinions, there are some positive opinion was got from them. It should be effective If the lane continues to other areas, the BPL service is good, and other vehicle interferences are higher. At the beginning was. But now it has decreased the progress, the traffic is reduced and users have used the BPL correctly with the police guidance.

2) Negative opinions

The negative opinions of the users are less discipline of users, busses are trying to overtake another vehicle, Other vehicles also use the bus lane that affects to speed of the bus.

3) Implementation tips from the passengers' opinion

Expectation of the users are very important. Such as: Should continue the bus lanes to other areas, expecting to continue the BPL, need to reduce waiting time at the bus halt, need to reduce private vehicles, continue the bus priority lane system for all day, need to put BPL for other roads, If the inside safety is good that would be better for the passengers, expecting the BPL to continue to other bus passengers, and Attributes of the conductors & the drivers should be improved.

4.2.5 Summary of the passengers' opinion on BPL

As the result of the passengers' opinion, many numbers of passengers know about the bus priority lane and the problem of the process. Some of the passengers did not get more experience with BPL. Because the frequency of their trip is very less.

On the positive side of the passengers' opinion, passengers have agreed that BPL service is good, BPL reduces traffic congestion, and BPL decreases the other vehicle interferences. Overall, of the positive opinion, passengers are agreed the BPL service is good for the travelling.

On the negative side, some of the passengers do not know about the BPL, this is the one of negative for BPL. Many passengers were mentioned that other vehicles used the BPL, so the speed of the busses are reduced through this activity, traffic creating through the buses overtake another bus, and the number of bus halts are reduced the bus speed.

4.3 Analysis of operators' opinion

The secondary data was used for this analysis which was conducted in 2017. There are two locations selected to getting data on operators' opinions about BPL. These are Panadura and Rawatawatta. Operators of route number 100 and 101 busses were giving their opinion.

4.3.1 Origin and destination of operators.

There are 74% of operators were coming from Colombo and rest of the operators were coming from Kalutara to Colombo district. All of the operators' destination is Colombo district. The figure shows the origin and destination of the operators.

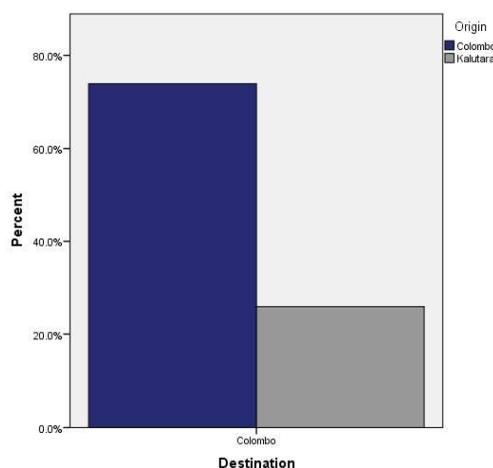


Figure 6. Origin & Destination of Operators

According to the analysis, 26% of trips created from Kalutara district to Colombo district. So, long distance buses were coming from Kalutara district, especially Panadura area. This distance around 25Km. Short distance trips (74%) created and finished within Colombo district.

4.3.2 Average time delay/ saving due to bus lane.

Operators are the most experienced people through the BPL lane. Because they are using the bus priority lane every day. As a result of operators' opinion survey, 80% of operators agreed that there is a time saving happening when using the BPL. And 20% of operators not agreed that there is a time saving happening. Most of the operation was told that BPL saving the travel time.

There are five categories divided to analyze the time delay and saving due to BPL. These are delay or saving happening within less than 2 minutes, 2 to 5 minutes, 5 to 10 minutes, 10 to 20 minutes, and more than 20 minutes.

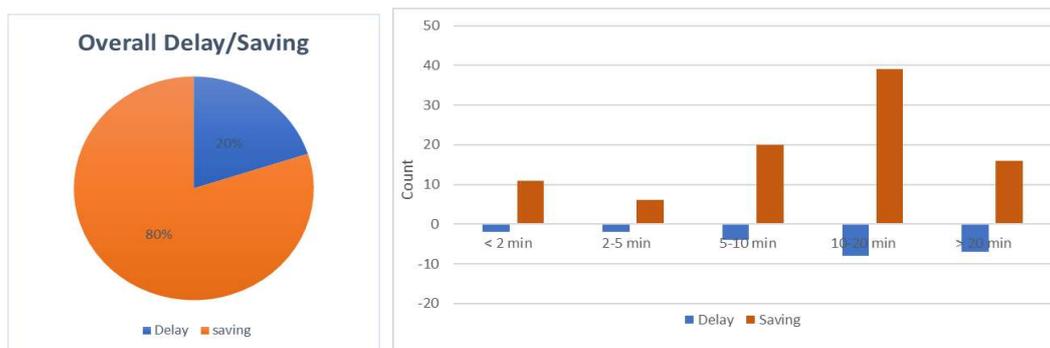


Figure 7. Average delay/saving.

When considering the category of delay or saving time, many operators were giving their opinion that 10 to 20 minutes of time saving when using the bus priority lane in peak hours. As well as mostly 10 to 20 minutes delay was happening when using the bus priority lane.

4.3.3 Problem with Police

Some problems are happening related to transportation traveling within Colombo city. Some of them are damaged when overtaking another vehicle, fraud in ticketing system, etc. The analysis said that 68% of operators said there are fewer problems with police in the ticketing system. The rest of them said that they have less problem with ticketing systems.

4.3.4 Competition between buses

Competition between busses is the main problem in this research area. This activity is caused for some problems, such as overtaking other buses, increasing bus speed, some damaged is occur &, etc. Some pregnant ladies can travel on a bus. when competitive another bus, it can be affecting the pregnant lady and her child. And heart patients can travel on a bus. This activity can affect this patient also.

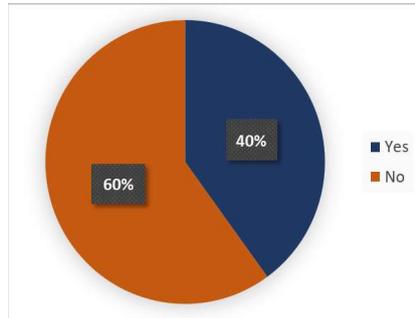


Figure 8. Bus competition

In the survey analysis, 60% of operators said that there is no competition between the busses. And the rest of the operators was told that there is a competition between the buses. Overall competition is not for traveling.

4.3.5 Effects on operators' income

The operators' satisfaction is very important to this sector. Because operators' happiness is very important to operate the busses. When the operators are satisfied with their income, then they can operate with curiosity. According to the result of the income statement, Consideration of operators' income is very important. The figure shows the operators income with average delay/saving due to BPL.

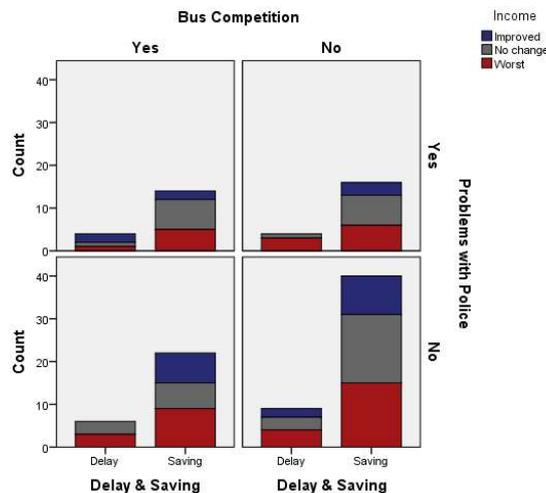


Figure 9. Income statement with time delay/ Saving due to BPL.

Operators' income is depending in many factors. Bus competition, time delay & Savings and problem with police can change the operators' income level. According to this analysis, operators' income has not improved when they have no competition between buses, no problems with police and time saving. Operators' income has not improved in the overall analysis.

4.3.6 Work Stress

Operators are the main consideration to operate the bus service. They should work with no stress. Then only they can operate the busses very carefully. Work stress is affecting the worker. When a worker gets the work stress, then full consideration of their work will disturb. Health problems and personal problems also affect the workers.

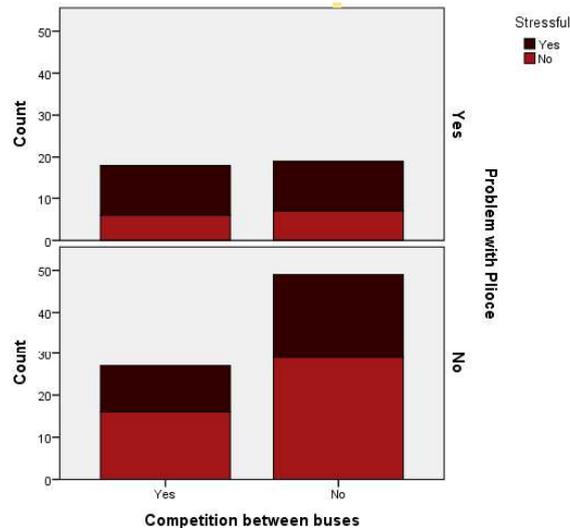


Figure 10. Relationship between police problem, competition between buses and stressful.

According to this analysis, bus operators have stress in every situation. But high number of operators said that they have no stress when they have no competition between buses and no problems with police. At the same time, they have more stress in this situation.

4.3.7 Operators' opinion about the benefits/problem of BPL

Operators' opinion is more important to implement the operational area and physical area of BPL. These opinions are divided into 3 categories, such as positive opinions, negative opinions, and implementation tips & requirements. The three categories of operators' opinions are described below.

1) Positive opinion

Operators was given some positive opinion about the BPL. When introduced by the BPL system, stress is reduced after introducing this system because traffic congestion was reduced, easy to travel using the BPL system, BPL is a good system for society, and there is less fuel and cost, traffic congestion was reduced.

2) Negative opinion

The negative opinions of operators are the traffic police control system was reduced, there are less & no change in income after introduced the BPL system, less profit and uncomfortable, there is no change in time, fluency of police is very less, sometimes 2 and

half hours take to go to Colombo, more time was taken when the buses are stopping in all bus halts, limited the system, because of more time taken, Still, other vehicles are coming into the BPL lane, the previous normal system is better than now. It is disturbing sometime and, there is no change in profit and time.

3) Implementation tips and requirements from the operators' opinion

According to the result of the survey, identified some requirements and expectations from operators. Such as: Increase the width of the bus priority lane because the bus priority lane width is small, needed a perfect road for the bus priority lane system and solve the out-station bus problem, expecting the bus priority lane system at all time, introduce the BPL system after the Maliban junction, introduce the separate rules for buses, bus drivers should follow the time distance between other buses, time distance of every bus should be schedule, reconsider the bus halt, provide the traffic police to guide the other vehicles,

4.3.8 Summary of the operators' opinion

The positive side of the operators' opinion about the bus priority lane, some of the opinion was mentioned by the operators, such as: time saving, reduction of traffic congestion, less fuel cost, less stress and easy to use. The negative side of their opinion, the less income, less profit, no change in travel time, uncomfortable and other vehicle influence within BPL were mentioned by operators as the opinion. As per the experience of operators on bus priority lane, they are facing some difficulties. From the opinions of operators, there are some implementations need for operators through BPL system in Galle road. These implementations are mentioned in the above opinion part.

4.4 Analysis of non-BPL users' opinion

4.4.1 Awareness of the BPL with trip purpose

The secondary data was used for this analysis as mention earlier. The opinion of non-BPL users will help to improve the bus priority lane.

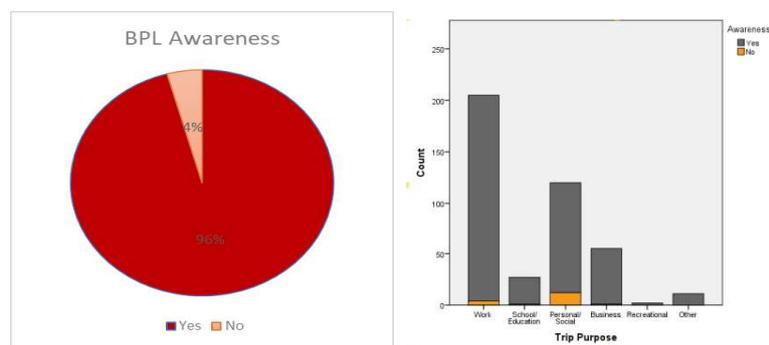


Figure 11. Trip purpose with BPL awareness of non-BPL users

According to an analysis of awareness about the BPL, 96 % of non-BPL users know the knowledge of BPL. Very a smaller number of non-BPL users did not get the knowledge of BPL. This is a plus point to implement the bus priority lane in this study area.

Higher number of Non-BPL users were using private vehicle for work purpose. And very a smaller number of Non-BPL users were using private vehicle for recreational purpose.

4.4.2 Average delay/ saving due to BPL

There are 75% of non-BPL users was agreed that BPL service is saving travel time. and rest of the non-BPL users were told that BPL is not saving time, it causes a time delay. There are five categories divided to analyze the time delay and saving due to BPL. These are delay or saving happening within less than 2 minutes, 2 to 5 minutes, 5 to 10 minutes, 10 to 20 minutes, and more than 20 minutes.

According to the analysis of time delay/ saving, there are more than 135 out of 420 non-BPL users who agreed that BPL saves 2 to 5 minutes of travel time. A very small number of non-BPL users was agreed that BPL saving more than 20 minutes of travel time. below graph shows the details of the average delay/ Saving due to BPL. Figure 12 shows the details of the average delay/ Saving due to BPL.

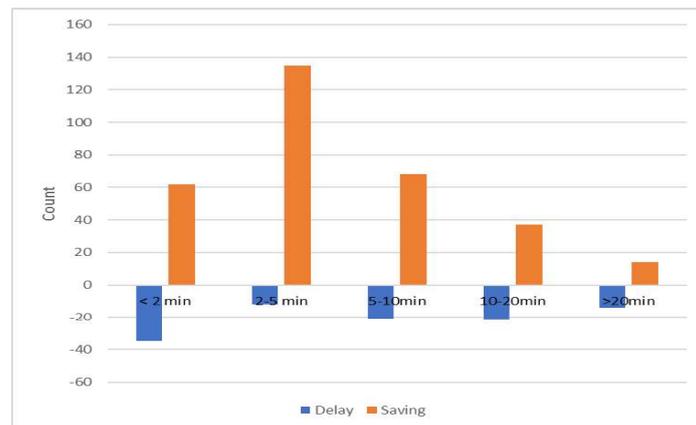


Figure 12. Average delay/ saving due to BPL

According to the analysis of time delay/ saving, there was more than 135 non-BPL users agreed that BPL saves 2 to 5 minutes of travel time. A very small number of non-BPL users was agreed that BPL saving more than 20 minutes of travel time.

4.4.3 Origin and Destination

The origin and destination figure shows in below.

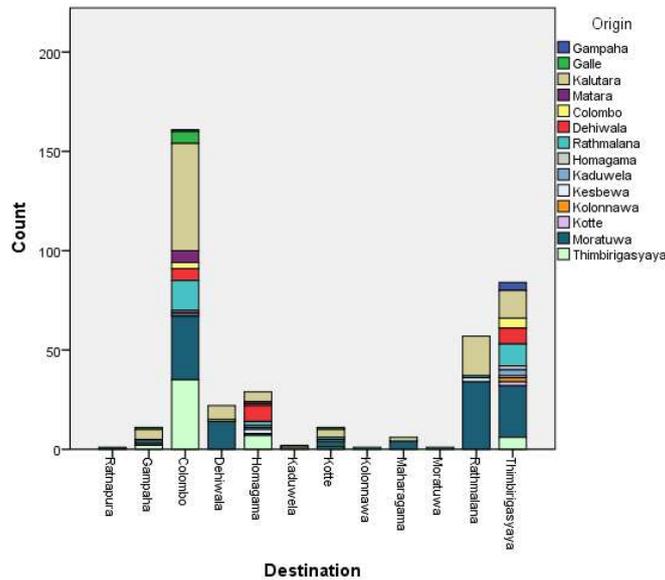


Figure 13. Origin and destination of non-BPL users

According to this analysis, many non-BPL users were going their trips within Colombo district. DS divisions of Colombo district considered for this analysis. And some of the non-BPL users coming to Colombo district from Galle, Gampaha, Kalutara and Matarata. Very small number of Non-BPL users were doing their trips to Gampaha and Ratnapura. Colombo (39%), Thimbirisayaya (20%) and Rathmalana (14%) are the most attraction DS divisions when compared with other areas. Moratuwa (30%), Kalutara (26%) and Thimbirisayaya (15%) are the most trip generated areas. The majority of non-BPL users generated their trips from Moratuwa.

4.4.4 Performance level

Some features asked non-BPL users to get their opinion about the bus priority lane under the performance level. Non-BPL users also rate their opinion on these categories. The categories are about comfort, Disruptive honning & overtaking, disruptive interference from bus, lane discipline, and safety.



Figure 14. Performance level

According to the data, most of the non-BPL users were degraded in each category. Most of Them are degraded their rate to all category of the features after introduced the BPL. Implementation of BPL is needed in this society.

4.4.5 Opinion of non-BPL users

There are more than 400 sizes of non-BPL users' opinions considered for this analysis. These opinions are divided into 3 categories, such as positive opinions, negative opinions, and implementation tips & requirements. The three categories of non-BPL users' opinions are described below.

1) Positive opinions

The positive opinions of non-BPL users are it is safe for vehicles, safety and travel time are saving to users when they use the bus priority lane, buses are not disturbing the other vehicles through introduced BPL, school children can go to their destination easily because BPL is saving time and it is good safety for these children, this service is reducing traffic congestion by introducing separate lane for only buses, reduced the traffic accidents than before introducing BPL, discipline of the Three-wheel and bike were improved, reduce accident and traffic, hires were highly reduced, good for only buses not others

2) Negative opinions

Negative opinions are buses are not used the BPL section Correctly and the bus does not protect rules, delay happening due to BPL, discipline is not followed by buses, some vehicles are not coming under the rules, three wheels are not obeying the rule, drivers are not considering the other vehicles in BPL, haven't any difference after introduced the BPL, difficult to ride and no space for other vehicles, Bus drivers do not obey basic rules & regulation, lane discipline must be improved, not safe for other vehicles and safety should be improved, there is no o support and no consideration for other vehicles, not Satisfied with this bus priority system and, takes much more time than previous situation in the traffic congestion of other lanes were jammed.

3) Expectation and requirements of Non-BPL users

Expectation and requirements of non-BPL users are, reduce the time limit, expand the BPL time limit. And need another priority lane for Motor - cycle and three wheelers, give Access to use BPL for three wheelers, BPL is relief Because Disruptive reduce the accident, sometimes private vehicles can't drive it when BPL is free, need to think about other road users when developing Systems, speed can be increased if the vehicles quality & quantity of the public vehicle is increased, need to allocate space for bikes riders, police people must interfere with actions, should be changed safety and, lane disciplines must be changed.

4.4.6 Summary of the non-BPL users' opinion.

According to the opinions of non-BPL users, many numbers of non-BPL users were said that BPL is a good system for society, good for school children, etc. and also, some of them were told that

not satisfy with this BPL system because not considering the other vehicle. Non-BPL users were facing many problems due to the BPL system.

4.5. Comparing the data between passengers, Operators and non-BPL users.

4.5.1. BPL Awareness

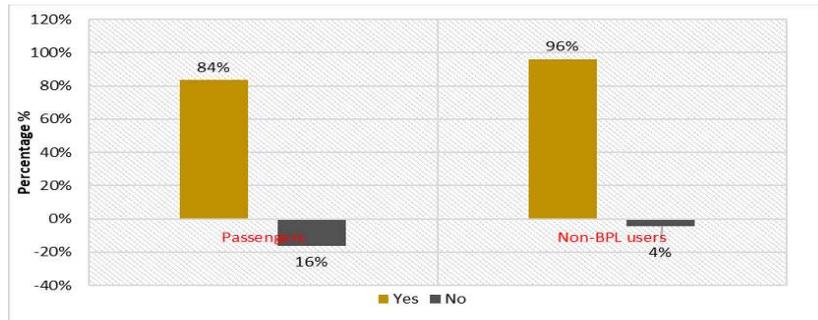


Figure 15. BPL awareness between Passengers and non-BPL users

When comparing the BPL awareness between Passengers and non-BPL users, 96% of non-BPL users have Awareness of BPL. Comparing with non-BPL users, passengers have less awareness about BPL. When consider the operators awareness, operators should get the BPL awareness. Without get BPL awareness, operators can't drive busses through BPL lane.

4.5.2. Origin and destination

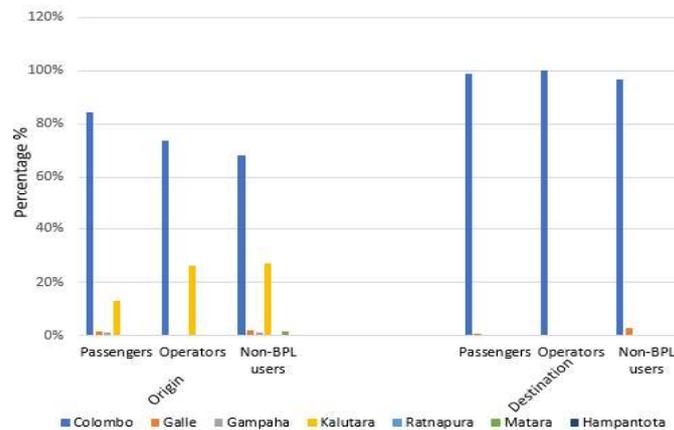


Figure 16. Origin and Destination of Operators, Passengers and non-BPL users.

According to the comparing analysis of origin and destination, trips were generated from Colombo, Galle, Gampaha, Kalutara, Ratnapura, Matara and Hambantota. And most trips attraction to Colombo and Kalutara district. More than 60% of trips generated from Colombo district and more than 90% of trips attract to Colombo district from three categories of users. These are some identified differences between users.

When compare the origin and destination analysis between passengers and non-BPL users, passengers attractive to Colombo, Thimbirisyaya and Dehiwala. Non-BPL users attractive to Colombo, Thimbirisyaya and Rathmalana. Both BPL and non-BPL users' origin and destination patterns are similar from Colombo and Thimbirisyaya. But more Passengers were targeting Dehiwala (10%) and more Non-BPL users were targeting Rathmalana (14%). Passengers and Non-BPL users generated their trips from Moratuwa, Thimbirisyaya and kalutara.

4.5.3. Trip purpose

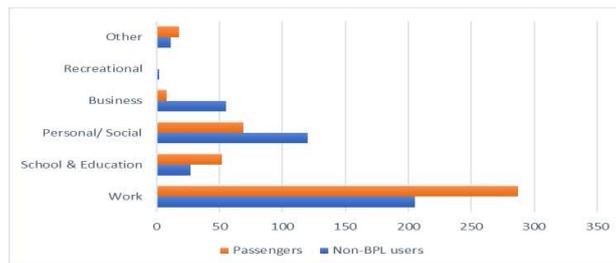


Figure 17. Trip purpose of Passengers and non- BPL users.

The result of the trip purpose analysis, most of the passengers and non-BPL users were used transportation modes to Work purpose. When compare with passengers' trip purpose, after the work purpose, Non-BPL users were mostly used private vehicles for business and personal/Social pupose.

4.5.4. Delay /saving due to BPL.

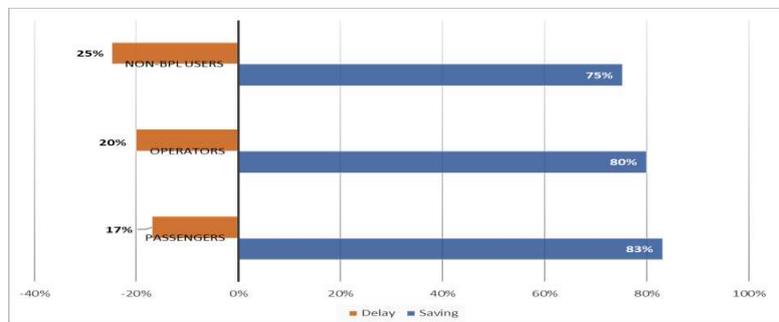


Figure 18. Delay/saving between operators, passengers and non- BPL users.

According to the analysis of the time delay/ saving of passengers, operators, and non-BPL users, the time saving side, 75% of non BPL users said that BPL was saving their travel time. As well as 80% of passengers and 83% of operators said that bus priority lane was saving their travel time when compare with before introduce the BPL.

5. CONCLUSION

Bus priority lane is a good way to reduce traffic congestion in the world. Many operational issues, physical issues, and other issues are causing through breaking rules by the users. The users'

corporation is very important to operate the bus priority lane. According to the BPL system rules, only busses are allowed to use the BPL in peak time, but three wheelers and bike users are using this system in peak time. This activity is disturbing the bus users. Bus priority lanes provide a faster transportation system to public transportation users. This is a good way to move the users from private vehicles to public transportation by providing fast service, comfortable, and punctuality. This study was able to identify the users' opinions through conducting the survey. This study was able to identify the factors that the BPL system has been improved, worsened or remained the same as previously. The study can be used to evaluate the effectiveness of BPL and generate the planning and solution to improve the public transportation system in Galle road, Sri Lanka. More than 84% of passengers & non-BPL users have the awareness about the BPL. Colombo DSD, Thimbirisayaya are the most attractive DS divisions. And most generated DS divisions of passengers and non-BPL users are Moratuwa, Kalutara and Thimbirisayaya. Most of the Passengers & non-BPL users were using transportation modes for work purposes. More than 75% of passengers, operators & non-BPL users agreed that BPL was saving their travel time.

It was expected that non-BPL users may perceive or experience less travel time due to removal of one lane from the non-BPL users. However, it was observed that not only BPL users and operators but also there is a travel time saving observed among non-BPL users mainly due to lane discipline arose physical.

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