

# Factors Affecting Service Quality in Public Bus Transportation in Sri Lanka

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**Abstract** - This research was conducted to find factors affecting service quality in public bus transportation and their effect on development of public bus transport sector. Study was carried out based on three research questions, main question being "What are the factors affecting the service quality in public transportation in?", followed by two subsidiary questions, "What are the existing transport facilities and how they can be improved through research findings?" and "What are the current facilities provided to handle customer complaints and how it can be developed?". Main objective was to find and analyse factors affecting service quality in public bus transport sector in Western Province, and further to achieve other objectives: To find relationship of factors affecting development of transportation and effect of customer complaints towards development of public transportation, and also to find areas on which further attention must be paid. Service quality in public transport sector could be varied upon different routes, where this study identifies it as short distance (within Colombo district) and long distance routes (out of Colombo district). As data collection methods, both primary and secondary data collections were used while analysis of research consists of a descriptive analysis, chi-square analysis and multinomial logistics regression analysis. Significant factors that have been selected through chi-square analysis were used to develop logistics regression model development and thus two models were developed. Factors used to measure service quality are vehicle safety, physical design of station, physical quality of vehicle, information regarding timetable, travel time/delay, frequency of departures, ticket system, price level, performance and reliability, crew's attitude, inquiries/complaints, appreciation of travel speed and time, connectivity, accessibility, information and environmental impact. Conclusively it could be identified that customer satisfaction towards public transportation plays a major role in identifying service quality. Thereby service quality can be improved by addressing unsatisfied or less satisfied matters effectively. Thus expected service quality by transport users could be reached, ultimately leading to eliminate unnecessary private vehicle usage on roads.

**Keywords:** Service Quality, Customer Satisfaction, Behavioural Intention

## I. INTRODUCTION

Public Transport is a shared passenger transport service which is available for use of general public for the purpose of travelling from an origin to a destination, and it is distinct from modes such as car-pooling, taxies, or hired vehicles which are not used by strangers without a private arrangement. Thus public transport modes may include buses, trains, rapid transits, trams, ferries and air carriers depending on countries' requirements.

Everywhere in the world, many countries' governments, transport operators, policy makers, legal authorities, health organizations, economists, and environmental organizations identify several benefits of using public transportation. As a result of these long and short terms benefits most countries are continuously investing more on developing public transport facilities.

Identifying the importance using public transportation with the prevailing travel and transport problems, this research has been conducted to find the "Factors Affecting Service Quality in Public Bus Transportation". Thus the outcome of the research could be used to develop a standard public transport system, where people would tend to travel using public transportation. Thereby it would lead to reduce the private vehicle usage on roads eliminating important problems such as congestions on roads, pollution, accidents, and so forth.

### A. Objectives of the Research

- To find and analyse the factors affecting the service quality in the public bus transport sector in Western Province.
- To find the relationship of the affecting factors to the development of the transportation
- The effect of customer complaints towards the development of public transportation, and yet to find the areas on which the further attention must be paid by respective authorities in policy making relating to this considered matter, which will ultimately enhance the social, cultural, economic and environmental developments of Sri Lanka.

### B. Research Problems

- What are the factors affecting the service quality in public transportation?

- What are the existing transport facilities and how it can be improved through research findings?
- What are the current facilities provided to handle customer complaints and how it can be developed?

### C. Significance of the Research

This study would be significant mainly in two different aspects namely, academically and practically. This is academically important as this area has not been much focused academically, in the Sri Lankan context, thus this effort of study would encourage Sri Lankan academics to further investigate and find the untouched area, especially relating to public transportation within the broad concept of transport management.

The practical significances could be categorized in several aspects such as, social, cultural, economic, legal and especially environmental aspects. Social and cultural significances are on the customers' perception, where the intentions of passengers on using public transportation could drive them to use public vehicles or alternative transport modes such as private vehicles.

The economic significant should be subjected to much more attention as the development of public transportation has a direct impact on macroeconomic level. Enhanced quality transport system and mobility it creates are linked to the level of output, employment, and the income of a country.

In legal aspect a clear and effective policy regarding the use of transport system and any violation of the procedures would encourage passengers to rely on the public transportation and make complaints against any violation without any hesitating and thus to improve the quality of public bus service.

The most significant practical approach that has been identified as a timely important is the environmental consideration, where the use of public transportation instead of using own private vehicles would be much environmental friendly as it reduces the use of vehicles on roads leading to reduce the vehicle emissions, congestion, accidents, and so forth.

Problems in these significance factors can only be addressed through an assessment of the satisfactory level of public transport users. Analysing the factors affecting service quality is one of the ways of assessing that and it would give an idea of passengers' intentions of using public transportation.

## II. METHODOLOGY

### A. Data Collection

Data collection methods used in this study was both secondary and primary data collections where a structured questionnaire survey was carried out as the primary data collection method, while data collected from Western Province Transport Authority (WPRPTA) and Sri Lanka Transport Board (SLTB) was used as secondary data sources in order to identify the customer complaints factors. The questionnaire survey was based on the identified service quality attributes where the factors are tested as per the customers' perspectives. Population selected for this research was Colombo district from which the sample was selected as per the random sampling method. Sample size was taken as 400 based on the factors considered.

Measurements used for factor evaluations included in the questionnaire were five scales and three scales which describes the strength of the opinion towards a particular factor. This scaling method is commonly known as the likert scale system which is commonly involved in researches that follows questionnaire surveys as shown in the Table 1.

Table 1. The format of five-level Likert item included

1	Strongly dissatisfied	Strongly discourage	Strongly disagree
2	Some what dissatisfied	Some what d discourage	Some what disagree
3	Neutral	Neutral	Neutral
4	Some what satisfied	Some what discourage	Somewhat agree
5	Strongly satisfied	Strongly encourage	Strongly agree

Data gathered through the questionnaire survey was measured using likert scaling method, where five level likert scaling was used to measure three different opinions of passengers. The service quality factors were measured as per the satisfaction level of the customers. By using the level of discourage, the factors that are more likely to discourage from complaining about vilonce of system procedures were measured. Factors developed to gain the opinion of using public transportation were measured with the agreement level with those factors. The format of three-level Likert items included in the research questionnaire is Frequently, Occasionally and Never which were used to rate the level of negative experiences that the passengers get when using public transportation.

Prior to make decisions based on the data, a pilot survey

was carried out in order to check the reliability of the data gathered [Santos (1999)], [Kimberlin and Winterstein(2008)]. Population selected for this research was Western Province from which the sample was selected as per the random sampling method. Sample size was taken as 400 based on the factors considered.

#### B. Data Analysis

Analysis of the data consists of descriptive analysis, chi-square analysis [Fisher and Yates (1963)], and logistic model development [Pearce and Ferrier (2000)].

Descriptive measures that are commonly used to describe a data set such as mean, mode, median, standard deviation, kurtosis, skewness, and minimum and maximum values were tested using gathered data.

Chi-square analysis was used to identify the significance level of the considered factors, (where  $p < 0.05$ ), which are used to develop the logistics model as per the table 1.

Table 2. Significant factors

Factors	Significant values
Occupation	0.000
Other occupation	0.003
Having unfavourable experience when using buses	0.022
Talk to the bus driver or conductor in an issue	0.022
Talk about it with family or friends regarding issues	0.044
Switch to other means of transportation	0.020
Information regarding timetable	0.005
Travel time/Delay	0.000
Connectivity between buses	0.010
Possibility of no response or solution for an issue	0.000
Takes too long to get a response	0.003
No possibility of switching to another mode	0.004
recommend others to use public buses	0.029

Multinomial Logistics regression model was developed using selected significant factors. Customer satisfaction was used as the dependent variable as it can be used to describe the service quality of the transport service. Independent variables of the model consist of all the selected significant factors.

### III.EXPERIMENTAL DESIGN

The design of this research primarily has its base of research objectives and research problems, on which the data collection is carried out. As the research objective is to identify the factors affecting the service quality in public bus transportation and to identify the relationship among independent and dependent variables, the required data was collected in terms of factors under service quality attribute from the public bus transport users. The research objectives and the problems further lead to define the type of the research among three different types which are named as Exploratory Research, Descriptive Research and Causal Research. From these three research types the best design applicable to this study could be identified as Causal Research design [Trochim and William (2006)].

As the objective of causal research is to test hypotheses about cause-and-effect relationships, in this research, customer satisfaction variable which is the (Dependent Variable) was tested as per the changes in other variables (Independent Variables), while satisfaction variable held constant. Figure 1 shows the conceptual design of the research.

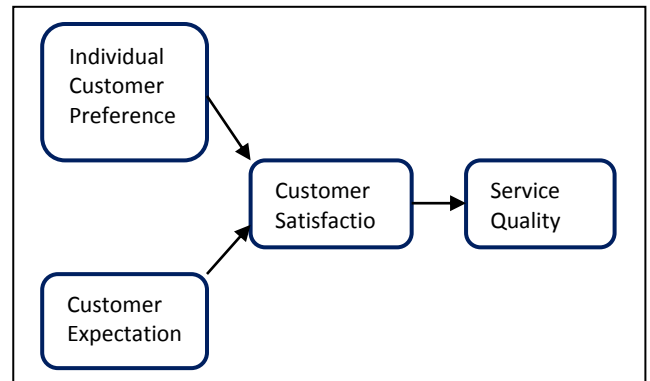


Figure 1. Conceptual framework of the research.

### IV.RESULTS

The selection of most appropriate model was carried out mainly in three effects types. Main effects, which consider all the independent variables individually, main effect with two way interactions, where it considers two way combinations along with main effects, and main effects with three way effects which includes three way interactions along with the main effects.

Model selection was done based on the Goodness of fit (G2), Degree of Freedom and Significant values. Values of the most appropriate model are shown in the Table 3, Table 4 and Table 5.

Table 3. Goodness of Fit

	Chi-Square	DF	Sig.
Pearson	1040.802	1432	1.000
Deviance	722.074	1432	1.000

Table 4. Model fitting information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	DF	Sig.
Intercept Only	1.056E3	-	-	-
Final	724.847	330.945	152	.000

Table 5. Pseudo R Square Test

Cox and Snell	0.563
Nagelkerke	0.606
McFadden	0.313

#### A. Parameter Estimates

Parameter estimates for this obtained model is expressed in four categories, where the dependent variable "Overall Passenger Satisfaction" is defined. As overall passenger satisfaction is rated in five likert scaling method which includes, "Strongly Dissatisfied=1, Somewhat Dissatisfied=2, Neutral=3, Somewhat Satisfied=4 and Strongly Satisfied=5", the parameters are evaluated under first four scaling in relation to "Strongly Satisfied" scale. Thus two models have been developed to describe the extremes of the customer satisfaction, which are, "Strongly Dissatisfied Customer satisfaction Relative to Strongly Satisfied Customer satisfaction" and "Neutral Customer satisfaction Relative to Strongly Satisfied Customer satisfaction".

## V. DISCUSSION AND CONCLUSION

#### A. Discussion of research Question

This research mainly focused on one main question and two other sub questions which were intended to address through the research findings.

1) *Research Question One:* "What are the factors affecting the service quality in public transportation?"

As per the logistics regression analysis it could be identified main factors that affect the customer

satisfaction which decides the service quality of public transportation.

Recommending non-public transport users to use it implies the level of satisfaction of the customers. The response time for a complain affects directly to the satisfaction level, where switching to another transport mode similarly affects the same.

Freedom or effectiveness of talking to the bus driver or conductor in unfavourable situations, travel time or delay and the frequency of experiencing unfavourable situations drive the passengers to decide the satisfaction level of using public transportation.

Service quality similarly affected with occupations of the passengers, time table information availability and the connectivity between different modes.

Talk about with friends or family in unfavourable situations is one of the reactions of passengers when experiencing unfavourable situations. It leads to decrease the satisfaction level and ultimately the service quality.

Possibility of no response or solution for complaint, No possibility to switch to another mode are the factors which has a negative impact on customer satisfaction which links to have a poor service quality.

Table 6 summarises the above explained customer satisfaction factors which ultimately decides the service quality.

Table 6. Service Quality Factors

Recommend others to use public transport	Occupation
Takes too long to get a response for a complain	Time table information
Switch to another mode of transportation	Connectivity
Talk to the bus driver or conductor in unfavourable situations	Talk about with friends or family in unfavourable situations
Travel time or delay	Possibility of no response or solution for complaint
Experiencing unfavourable situations	No possibility to switch to another mode

In public bus transportation customer is the key component to whom the operators provide the service. The higher customer satisfaction leads to attract more customers and similarly retain the existing customers. It implies that, customers are satisfied when they are

provided with a higher quality service from which people could see no much difference in private vehicles and public vehicle usages.

As per the results, research survey was successful in answering the main research question. Since higher customer satisfaction is gained from a higher service quality, factors which were identified as customer satisfaction factors could be similarly used to define the service quality factors.

2) *Research Question Two:* "What are the existing transport facilities and how it can be improved through research findings?"

In order to find solutions for this questions discussion were carried out with the chairman of WPRPTA and operation manager of SLTB. According to the information given by the chairman of the WPRPTA, some of the existing facilities in private bus sector are, private bus transport operators are compelled to give tickets to passengers, More buses are provided to ensure the adequacy of buses, some short distance routes have been provided with intercity air-conditioned buses in order to ensure comfortability of passengers, touch smart travel card facility is provided mainly in order to avoid ticket balance discrepancies and "Sisuseriya" school bus service is provided during morning and evening school hours for the ease of school children.

In SLTB transport operations some of the facilities given to passengers are mainly, issuing season tickets and school bus services.

Through the discussions and analysis, it is evident that, though these transport facilities are provided by both operators, most of the services are not effective. In order to overcome this, priority should be given in enforcing a proper and effective transport policy, where it could be used to develop standard public bus transportation. Apart from that, previously stated factors that affect negatively on service quality should be paid more attention to make those factors effective.

3) *Research Question Three:* "What are the current facilities provided to handle customer complaints and how it can be developed?"

The discussions with both WPRPTA and SLTB revealed that, customers have been provided with some facilities such as 24 hours customer complaint channel for complaining about violence of transport system procedures.

As per the WPRPTA complaint handling procedure, a daily complaint recording system is used to examine the complaint. For certain complaints such as, operators 'misbehaviours and ticket issuing problems, they obtain the conductors 'license they are given a three days training depending upon the issue. For complaints such as route changes, and even not completing the particular route distance, depending on the frequency of such incidents for a particular bus, the bus's route permit is obtained by the authority. After a penalty charge the permit is released.

Though these systems are implemented, in order to get an action against violence of rules, transport authorities require the relevant parties to the complaint to be presented to the WPRPTA, where they decide the accused.

Due to such process though many complaints are being recorded, most frequently the complaint handlings are not effective. To avoid this situation, initial step that both authorities could focus is development of an effective and clear transport policy. Thus a standard policy could make a disciplined public bus transport service.

#### *B. Theoretical Contributions and Implications*

Though the public bus transportation is the mostly used travel method in Sri Lanka, studies regarding public bus transportation have not been much focused, whereas other countries pay much more attention on carrying out researches on these aspects.

Identifying the importance of such studies, this research was carried out in order to reveal the service quality of public bus transport sector. As scientific studies and researches would lead to identify the strong and weak area of a particular subject, it's important conduct researches, as it gives a great contribution to the practical aspect of the study area. Since the service quality is one of the major aspects that decide the customer attraction towards public transport, this study gives a greater contribution by developing a new theoretical approach to Sri Lankan academics. Thus this effort of study would encourage Sri Lankan academics to further investigate and find the untouched area, especially relating to public transportation within the broad concept of transport management.

#### *C. Industrial Contributions and Implications*

Public transportation as an industry, which provides a service to the customers, it is important to understand the development of service quality. An improved standard service quality would leads to attract more

customers where it brings more benefits to the transport operators and ultimately to the country.

Through this study it has been identified the factors that have influence on service quality, and it could be used to improve the service quality in public bus transportation in our country. A high quality transport service would encourage people to use public transportation to full fill their travel needs, which eliminates the use of private vehicles.

This study is similarly important to the relevant authorities, that the findings could be used to develop and enforce new transport policy by securing the standard of the public bus transportation.

Elimination of private vehicle usage would leads to save additional expenses such as fuel cost, which ultimately leads to increase the country's GDP. Thus carrying out a research on service quality and identifying the affective factors that give the opportunity to improve the service quality, could be defined as a timely important step.

#### D. Recommendations

- More buses should be used during peak hours to facilitate passengers
- Proper and standards transport policies must be adopted and enforce to eliminate weaknesses in public transportation hence to standardize the system.
- Promote and use existing touch travel card system more efficiently to eliminate bus fare issues.
- Display time tables at bus halts for the convenience of passengers.
- Provide more comfortable buses.
- Improve connectivity between modes.
- Strict regulations must be imposed to avoid travel time delays.
- Proper transport policies must be imposed to maintain the standard of the PT system.
- Adopting new technological approaches and infrastructure developments such as introducing metro system should be done.
- More qualified crew must be employed.

#### E. Limitations

- Though the public transportation is a wide scope which includes both rail and buses in our country, due to difficulties of studying such a large scope the research had to limited only to public bus transportation.

- Due to the improper procedures of handling complaints, it was unable to gather statistics and standard procedures.
- The population is limited only to the Western Province, as considering the whole country is not possible.

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#### REFERENCES

- Bland, J. M., & Altman, D. G. (1997). Statistics notes. *occasional notes*, 572.
- Fisher , R. A., & Yates, F. (1963). *Chi-Square Test* . Retrieved from Biology 110 laboratory Independent Research Project: <http://www2.lv.psu.edu/~jxm57/irp/chisquar.html>
- H., K., & Joewono, T. B. (2007). User perception of private paratransit operation in Indonesia. *Journal of Public Transportation*, 99-118.
- Johnson, M. D., Gustafsson, A., Andreassen, T. W., Lervik, L., & Cha, J. (2001). The evolution and future of national customer satisfaction index models. *Journal of Economic Psychology*, 217-245.
- Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments. *Research*, 2277-2278.
- Pearce, J., & Ferrier, S. (2000). Evaluating the predictive performance of habitat models. *Ecological Modelling*, 225-245.

Santos , J. R. (1999). *Cronbach's Alpha: A Tool for Assessing the Reliability of Scales*. Retrieved from journal of extension: <http://www.joe.org/joe/1999april/tt3.php>

Trochim, & William , K. M. (2006). *Types of Research Designs*. Retrieved from USC Libraries: <http://libguides.usc.edu/content.php?pid=83009&sid=81807>