A SAMPLING METHOD TO ESTIMATE THE REVENUE OF PRIVATE BUS SERVICE

(A Case Study for a Selected Urban Cross Town Route in Colombo District)

by

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DECLARATION

The work described in this thesis was carried out by me under the supervision of Dr.B.M.S.G. Banneheka and a report on this has not been submitted in whole or in part to any university or any other institution for another Degree/Diploma.

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I/~~We~~ certify that the above statements made by the candidate true and that thesis is suitable for submission to the University for the purpose of evaluation.

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Dedicated to

my dearest parents, husband and teachers

for their obsessive concern and dedication on my studies

ABSTRACT

Public transportation is one of the important service sectors in Sri Lanka. Buses are the principle mode of public transportation. But the quality of the bus service is very low due to many reasons. One major problem is that there are no proper and quality fare policies which give similar benefits for both passengers and the bus owners.

Different fare structures have been introduced by the government time to time. The policy introduced in 2002 by National Transport Commission (NTC) is used to calculate the fares at present. It takes into account 12 factors which affect the expenditure of buses (operational costs) and 10 route types. But the revenue earned from a bus is not considered when preparing fare policies due to the difficulties of collecting revenue data as the owners are reluctant to give actual data. NTC has done some surveys to collect the data to estimate the revenue. But their method has many weaknesses.

The main objective of this study is to propose a new sampling procedure to collect the data from passengers to estimate the revenue of a private bus.

In the new sampling procedure, data are collected from the passengers that arrive to the halts. In the survey done by NTC, the data were collected from the passengers by traveling in buses. New sampling procedure provides estimates not only for the revenue but also for the total number of passengers in the route, number of passengers travel in each route number, etc.

In the sampling procedure, a questionnaire is used to collect data from passengers about the number of sections they travel, and a schedule is used to record the number of busses that arrive to the halt and the number of passengers that get in to those buses. The revenue of a bus per turn is estimated by considering the starting time of the bus, the number of passengers that loads in to the buses and the number of buses reaches the halts. A comparison was done by using the estimated revenue of the simulation and the calculated revenue of the collected data. The revenues give only 10% of relative error.

The validity of the proposed procedure was checked by comparing our estimate with the data collected from the bus owners. The private buses of the route 120 (Kesbewa, Pettah) in Colombo district were taken as the target population of the study due to limited time period and the resources.

A Matlab program was developed to estimate the revenue. Inputs of the program are the starting time of the bus, the matrix of the number of sections that passengers travel and the average number of passengers get in to the buses from each halt. For the validation of the program, the inputs were estimated from the data collected from the ticket machines.

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CHAPTER 1
INTRODUCTION

1.1 Background of the Study

Public transport is a major service sector which influences the economy of Sri Lanka, as its performance affects the economic activities in various ways. Therefore, an efficient public transport system is considered as a mostly required condition for a faster economic growth and social progress. However, the quality of the public transport service in Sri Lanka is not in satisfactory level. Therefore, it is the time to investigate, the reasons for pessimism and continued failure in developing the transport sector in the country. Road transportation is the key transport method in the Island compared to other transport services. Buses are the principal mode of road transportation and, the other modes are trains and private vehicles. There are two main sectors of bus transport service in Sri Lanka. Those are,

- Central Transport Board Bus Sector (State Bus Sector)
- Private Bus Sector

Sources indicate that around 70% of service is provided by private bus sector. As well 50% of entire private buses are available in Colombo district. Bus services are often crowded compared to other modes since the fares of both sectors are cheaper.

However, the public transport service, especially the bus transport service, suffers many deficiencies due to lack of effective and consistent policies to guide the sector to maintain it as a viable economic venture. Introduced fare policies have resulted in anomalies in the fare structure that has led to imbalances and inefficiencies in the service. Since these fare policies were developed by considering only the expenditure on bus service, the quality of the service has not been improved. Consequently, however the fare increases gradually, the passengers do not receive a satisfactory level of service.

Fare policies are introduced, implemented, and modified by the National Transport Commission (NTC). The policy makers have considered twelve cost factors and ten route

types when introducing policy. The most recent fare policy is the one introduced in year 2001. The bus fare is increased annually according to the fare policy.

Revenue of a bus is one of the important factors that has not been taken into account when developing fare policies. The main reason for ignoring this factor is, collecting information on the revenue is very difficult since the bus owners are reluctant to reveal their actual revenue.

NTC was done a survey to collect the data to estimate the revenue from passengers. But it contain many weaknesses. Thus, the aim of this research is to find the solutions for the following problems,

(i) What is the approximate revenue of a bus per turn for a selected route in Colombo district?

(ii) What is the suitable method of collecting data from passengers?

1.2 The Objective

The main objective of this study is to introduce a new procedure to collect the data from the passengers to estimate the revenue of buses.

It is expected to achieve the following minor objectives according to the main objective of the study,

- To check the reliability of the new procedure by using a simulation
- To check the reliability of the simulation by collecting data from ticket machine
- To identify the factors affect on the revenue

1.3 Significance of the Study

Even if appropriate fare policies were implemented for the bus fare, passengers do not gain the ultimate benefit of those fare policies. Since fare policies depend only on the bus operating cost, there are additional missing factors to be considered on the revenue which lead to facilitate the improvement of the benefits for passengers.

Revenue of a bus is one of the major factors ignored, when constructing the fare policies. Many factors affect the revenue such as the number of passengers traveled, number of bus turns traveled per day, the time of the first turn, etc. Nowadays, bus fare increments done under the fare policies are a very vital issue faced by 68% of total passengers in Sri Lanka.

If a simple and proper sampling procedure is available then the revenues are able to estimate for any route. As a result, the revenue can be included for the fare policies as a factor. Therefore, this study will contribute to examine the status of the revenue of buses and provide assistance to improve the fare policies.

1.4 Scope and the Limitation of the Study

New procedure of estimating revenue can be applied to find the revenue for any route in the country. Data should be collected to classify the sections and the time and to test the reliability of the procedure. Reliability of the procedure is tested by using the data collected from 120 – (Kesbewa, Pettah). Thus the validation is limited to find the revenue of the urban cross town route type because of the limitations of time and resources. Therefore, the sampling frame is the buses belong to this route type. As well, the findings will be valid only for the cross town routes in Colombo district.

1.5 The Outline of the Dissertation

Chapter two provides Literature Review consists of background information about the fares and revenues of buses, available methods of collecting data to estimate the revenue which were published in books, articles, newspapers, magazines, etc.

Chapter three provides Pilot Survey consists of description of the study area, the way of collecting data, identification of the factors which considered when preparing sampling procedure and classification of the factors