

Effects on Passengers due to Long Dwelling Time at Bus Halt: A Case Study from Sri Lanka

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1. Introduction

Dwell time was measured as the time a public transit vehicle spends at its scheduled bus stop for passenger boarding without moving, which is one of the main determinants of service quality of public transportation [1]. Long dwell time causes many problems for passengers, public transport operators and environment. A bus route (Route No 255), between Mount Lavinia and Kottawa which is one of the bus routes with the highest demand in Moratuwa with a frequency of 300 buses per day was selected as the case. Katubedda junction being a major transfer point between two roads was selected as a case to study dwell time. The objectives of this research were to identify: (a) the present practice of dwell time, (b) passenger perceptions about longer dwell time and (c) the rationale of users' mode choice.

2. Research Methodology

Both quantitative and qualitative data for research were gathered through an array of surveys such as:(i) structured interviews with bus passengers to collect socio-demographic data of passengers along with their opinion on dwelling time, (ii) opinion survey with bus drivers towards dwelling time and (iii) inventory data like bus capacity, frequency and waiting time to identify average load factor. The targeted population was bus users who touch Katubedda junction during their trip. Due to limited financial and time budget, the survey was conducted only during peak times as a sample with randomly selected passengers on randomly selected buses and 30 responses were collected at the bus halt.

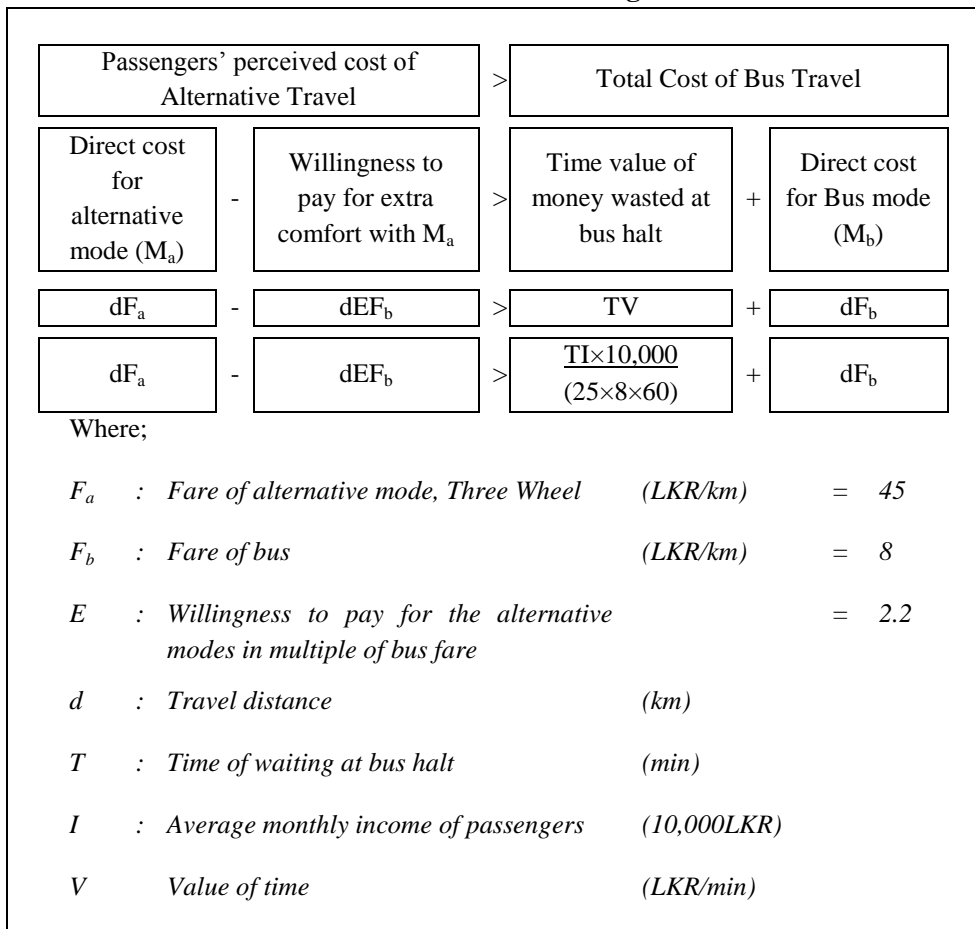
3. Data Analysis

Using some of the data collected, the value of time of passenger in Sri Lankan LKR ($V_t=1.94$ Rs/min), average dwell time per bus at bus halt in minutes ($T_d = 8$ min), average load factor of the bus upon arrival at bus halt ($L_f =43$ passengers) and frequency, no of bus trips per day ($F=304$), it was found that the total value of money wasted ($V_t T_d L_f F$) at this bus halt alone per day is about 200,000 LKR.

Based on survey data, 82% of bus users were dissatisfied with longer dwell time whereas 18% of the people who arrive later than the bus favoured the longer dwell time. This study further identified that among 18% of respondents, majority were students of University of Moratuwa whose travel distance is small: approximately 1.4km from the halt.

A decision-making model is developed as given in Box-1 comparing bus mode against an alternative mode which attempt to compare the willingness to wait for a bus based on travel distance and monthly income.

Box-1: Condition for Users to Wait for Bus against Alternative Mode



Using the present scenarios from bus and three-wheel modes of transport and users' preference expressed, the above model was converted into graphical representation as given in Figure1. Area below distance-curve represents the willingness to wait for bus as against the upper area favours moving to alternative mode. For an

example, a passenger, who draws monthly salary of 100,000 LKR with trip length of 1km or 2km, would not wait more than 2min or 4.5min respectively.

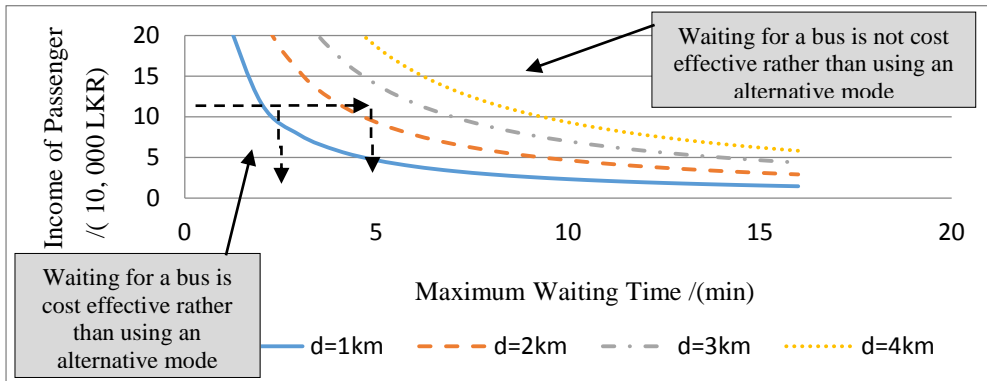


Figure1: Variation of Willingness to Wait for Bus with Monthly Income and Travel Distance

4. Conclusion

The study developed a relationship among passenger waiting time, monthly income and trip length, which would help operational planners to make the best dwell time by considering both determinants.

The study also has found that passenger willingness to wait for bus depends on their income level and their trip length. It is also noted that passengers having earnings below LKR 25,000 per month wait for bus regardless of trip length, which clearly indicates that they have become “captive riders”.

The study could be further extended to studying arrival time of people to bus halts as well as buses to include actual passenger waiting.

Reference:

- [1] Kenneth J. Dueker, Thomas J. Kimpel, James G. Strathman, 2014, Determinants of Bus Dwell Time, Journal of Public Transportation, Vol. 7, No. 1.

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