Electronic Card System to Reduce Queue Length for Tickets in Kollupitiya Railway Station

Kandamby D A, Karunarathna S, Navodya S Y, Madhavika K, Geevinda Y S, Jayasuriya M D, Wijayarathna R P, Fahim R M and Dilini K P

Department of Transport and Logistics Management, Faculty of Engineering,
University of Moratuwa, Sri Lanka

Corresponding author e-mail address: kandambyda.19@uom.lk

The public transportation sector influences the economy of a country directly and indirectly. Railway transportation is widely used in Sri Lanka, which is used daily by 18% of the total population. This paper is based on a case study of the queue length for tickets at the Kollupitiya railway station. The purpose of this paper is to develop and provide effective solutions to prevent long queues at ticket counters in railway stations in Sri Lanka by providing reliable and affordable service to the customers. The analysis is based on an online survey of 94 commuters which was done over six consecutive days in April 2020, which included four working days and two days of the weekend. All commuters were using the Kollupitiya railway station during evening peak hours and 96% were passengers between the ages of 18 and 30 years. Problems faced by these commuters were identified through a descriptive analysis with results showing that people spend around 9.6 minutes in the queue at the ticket counter. Usage of a season ticket is the only prevailing solution and was used by 44.7% of young passengers, but was not a satisfactory remedy since 45.8% of passengers were not regular users. Generalized cost theory and flow rate theory were used to mathematically derive solutions to determine optimum waiting time at ticket counters. Factors including travel time, travel cost, waiting time, and the number of people in the queue at the time of arrival were considered in the analysis. Time is taken as a proxy for the level of service of rail transportation and the solutions were derived to reduce the waiting time in the queue. Accordingly, three cost-effective solutions were identified to mitigate the formation of long queues. Among them, the implementation of an electronic card system was found to be the most optimal solution as it reduced waiting time as well as the cost of operating ticket counters. Since the rail transportation service acts as a monopoly in Sri Lanka, the whole system should be implemented, operated, and managed totally by the government. A cost-benefit analysis was done using details given in a proposed project by the Ministry of Finance Sri Lanka in 2019 as its reference. The analysis indicated that the government has the ability to recoup the money invested within a payback period of 0.88 years. Hence, there is a need to introduce an efficient and effective ticketing system to ensure the sustainability of the rail transportation in Sri Lanka. If successful, this system can be extended to apply to the bus transport system in Sri Lanka.

Keywords: *Generalized cost, Flow rate, Waiting time, Ticket counter at railway station*