

PERCEPTION OF SAFETY AND VULNERABILITY TO DISEASE OF BUS PASSENGERS IN KANDY, SRI LANKA

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ABSTRACT - The public transport sector in Sri Lanka lacks up to date guidelines and an effective communication mechanism to enhance passenger health safeguards, reduce vulnerability to disease and ensure overall safety and security in travel. This study investigates perception of bus passengers on (a) safety, (b) health and hygiene facilities made available when choosing to travel by bus. A total of 96 passenger responses were collected between 10th to 12th April 2021 at bus terminals in Kandy, Sri Lanka, including personal profiles as well as safety perceptions, including potential exposure to COVID-19. Quantitative methods analyzed the sample responses. With respect to health and hygiene, it was observed that 68% of the respondents felt unsafe from diseases when travelling on a bus, but only 29% reported feeling unsafe inside a terminal. The analysis further reveals that the Sri Lankan public transport has failed to meet passenger expectations of measures taken against the COVID-19 pandemic. Furthermore, more than 80% of the respondents agreed to pay a 10% premium fare for bus services having improved security, health, and hygiene features. It was also found that 90% of the bus passengers in the Kandy district have accessibility to a mobile phone for use of IT-based interventions and improved communications. These results would be useful in understanding the potential of implementing a technology solution when perceiving it as an immediate requirement.

Keywords: Promote Health & Hygiene; Public Transport; Intelligent Transport System; User Safety

1. INTRODUCTION

The demand for bus transport is derived from a composite of many influential factors, including fares, car ownership, income levels, and quality of service. Accordingly, the attraction to buses is influenced by customer satisfaction and their preferences, including reliability, convenience, health and hygiene, safety, comfort, accessibility, and affordability. In Sri Lanka, government and private sector provide competitive bus transport services. However, in spite of a competitive market, bus transport which through carrying 52% share of the total trips without non-Motorised Transport been considered is reportedly the least appealing mode among all other mobility alternatives being plagued with sexual harassment, and intense overcrowding and even physical distress [1]. When COVID-19 hit, the public's distrust in health and hygiene standards in bus transport resulted in an estimated average 50% loss of passengers. With COVID-19 being still a continuing threat, attempts should be made to make bus transport safer so that this does not impact the overall management of transport infrastructure leading to traffic congestion if a large number of passengers leave buses. Balcombe et al. [2] examine the influence of development in technology to increase the quality of bus systems. According to Salonen [3], the most convenient way to understand the influence of system implementation and its service performance is to assess user satisfaction.

It is important to set the context in defining the role of travel safety, health and hygiene perceptions in bus transport, thereby increasing the public's trust and usage in the long run and making the system resilient to future safety and health challenges. Hence, this study intends to achieve following two Research Objectives (ROs): (RO1) Explore user satisfaction on perceived safety, health and hygiene in buses in the Sri Lankan transport network, (RO2) To test the effectiveness of deploying a centralized end-to-end technology solution as a means of positive reinforcement. Overall, this study tries to understand the influence of system implementation that will be added to the existing Bus Management System (BMS) operational in Kandy from 2018.

2. METHODOLOGY

A survey was conducted among bus passengers in Kandy, a UNESCO heritage city and economic hub of central Sri Lanka, to obtain their perception of the existing service quality. The surveys were carried out by interviewing randomly selected passengers waiting at the bus terminals. The survey gathered general questions pertaining to gender, occupation, mobile phone availability etc. Three hypothesis were developed in line with the latest end-to-end technology solutions that will be added to the existing BMS operational in Kandy from 2018 to improve the required service quality and safety. The first and second hypotheses are denoted as: (H1) The willingness to accept a price increment to ensure passenger safety is positively related to the unpleasant experiences when travelling in a bus; (H2) The willingness to accept a price increment to ensure passenger safety is positively determined by the vulnerability to non-disease matters when staying at a terminal. Additionally, technological solutions for measuring any aspect of health and hygiene offered to bus passengers are assumed to play an intermediate role between service quality and perceived health and hygiene. It has been noted that satisfactory service quality may predispose travellers not to raise negative perceptions on health and hygiene, low service quality triggers passengers' negative perceptions. Hence, the third hypothesis can be denoted as: (H3) The willingness to accept a price increment to ensure passenger health and hygiene is positively determined by the perception of vulnerability to diseases when travelling in a bus.

3. RESULTS AND DISCUSSION

3.1 Perception of the problem

Most respondents felt unsafe from diseases (68%) than non-disease service quality features in bus transport (55%). Out of the respondents who were not feeling safe from diseases when travelling in buses, most (79%) agreed that they feel unsafe from non-disease service features. These include harassment, pickpocketing, terrorist threats and abusive environments. However, this might be not the case in vice versa. Thus, it was observed that there is still a widespread agreement regarding the high risk of exposure to non-disease matters when travelling on a bus. On the contrary, most respondents felt unsafe from non-disease matters (58%) than diseases (29%) when using a bus terminal. Overall, the prime concern for passengers when travelling on a bus is identified as feeling unsafe from diseases (health and hygiene concerns), whereas non-disease matters (safety concerns) became prominent when in a bus terminal.

3.2 Reactions for support interventions

Subjective perceptions on improved safety measures were statistically observed to understand the acceptance of the first and second hypotheses. It was observed that most of the respondents are willing to pay 10% extra ticket price for an improved safety system (mean= 3.83) irrespective of the perceived unpleasant experience when travelling on a bus. A similar perception was observed regarding the willingness to pay 10% extra ticket price for an improved safety system (mean= 3.84) irrespective of the vulnerability to non-disease matters when staying at a terminal. Thus, it can be assumed that both perceived unpleasant experience and vulnerability to non-disease matters does not significantly differ from the widespread acceptance of an improved safety system. However, a one-way ANOVA test is conducted for both situations to conclude that this independence holds for the entire population. Similarly, one-way ANOVA test concluded that the vulnerability to diseases does not significantly differ from the widespread acceptance of improved the health and hygiene system. The significance level (or p-value) for the test is higher than 0.05 in all instances ($0.387 > 0.05$, $0.561 > 0.05$, $0.520 > 0.05$); therefore, we can accept the null hypothesis concluding that there is no significant difference between the groups who were exposed to unpleasant experiences and those who had not been. This notion applies also for either being vulnerable to non-disease matters or not.

As hypothesized, service quality dimensions are positively related to the perceived safety, with both unpleasant experiences and perception of vulnerability to non-disease matters contributing significantly. As hypothesized thirdly, service quality dimensions appear to be positively related to perceived health and

hygiene, with the vulnerability to diseases a significant contributor. A one-sample t-test was performed to determine the widespread acceptance among the whole passenger sample.

Table 1. One-sample t-test results

	t	DF	Sig. (2-tailed)	Mean difference	90% Confidence Interval of the Difference	
					Lower	Upper
Test statistics for “willingness to pay 10% extra ticket price for an improved safety system”	-1.551	95	.124	-.16667	-.3452	.0118
Test statistics for “willingness to pay 10% extra ticket price for an improved health and hygiene system”	.645	95	.520	.06250	-.0984	.2234

The test value is deployed as 4, which represents the minimum Likert Scale value of responses that agreed on prevalence of such measures. According to Table 1, with a 95% confidence level, it can be concluded that passengers are willing to pay an additional 10% for both improved safety measures and improved health and hygiene measures in the bus systems ($0.124 > 0.05$, $0.520 > 0.05$).

4. CONCLUSION

The research focused on passengers' subjective perceptions (a) safety, (b) health and hygiene provided when using bus transport. The survey was designed to check the user perception on the proposed technology solution which will implement a mechanism to communicate health guidelines to bus crews and passengers and enforce their adherence. This solution will be added to the existing BMS operational in Kandy from 2018. Considering the overall results, it was observed that the users are willing to accept this end-to-end technology solution that integrates passengers' mobile devices, an array of internet of things (IoT) modules/sensors on buses and bus stops, a centralized helpline and a network of trained local volunteers which improves the perception of mitigating health and hygiene among bus passengers. Following the three hypotheses, results can guide policymakers and practitioners into aspects of safety, health and hygienic standards related to how individuals perceive their willingness to ensure service quality. In the development of future bus systems, there is a demand to embrace a long-term perspective, including continuous quality improvement requirements. Future studies should include cities from other parts of the country. They may also preferably include other contexts than urban areas to better understand different determinants of perceived safety and health and hygiene measures depending on various scenarios and prerequisites for travel.

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