Factors Influencing a Shift towards Carpooling in Western Province, Sri Lanka

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1. Introduction

The current fast-paced development of the modern world has caused a massive need for mobility. With a 7.3% increase in Sri Lanka's GDP in 2013 (Economic and Social Statistics of Sri Lanka 2014, Central Bank of Sri Lanka), the number of vehicles bought also increased by approximately 12% that year. According to statistics published by the Daily Mirror newspaper which cites the National Transport Commission and Central Bank, the total amount of cars which enter Colombo every day is 170,000. Out of the total 500,000 vehicles that enter Colombo daily, 87% are private vehicles and 6% are public vehicles. These public vehicles, carry 52% of the total passengers who enter Colombo. Only 44% of the passengers who enter the Colombo City are carried in private vehicles. 31% of the vehicles are cars and the average occupancy of these vehicles is around 1.8 people. This has led to a large number of low-occupancy vehicles in the Western Province of Sri Lanka. The objective of this research is to identify the factors that could possibly influence people to shift towards carpooling in the Western Province of Sri Lanka.

2. Literature Review

Carpooling can be defined as a set of people riding in one vehicle owned by them when travelling together regularly from one place to the other where they take only one of their own vehicles to the ride.Dewanand Ahmad define it as the sharing of rides in a private vehicle among two or more individuals. It involves the use of one person's private or company vehicle to carry one or more fellow passengers. They state that, in New Delhi, the amount spent on petrol could be reduced by 30% if carpooling was carried out. A Swiss survey (Ciari, F. and Zurich, 2012) carried out on carpooling identified safety to be a concern but practical aspects such as being able to go back home as a passenger if pools are arranged on a one-way basis appeared a more important concern: this research makes a similar observation.

3. Methodology

Primary data were gathered from a random sample in the Western Province of Sri Lanka. Data gathering was carried out by administering a survey questionnaire (emails, online documents and interviews) containing respondents' details, journey details and the preferences towards carpooling. Part A contained questions on age, education, income and household details. Part B questioned on distance to work, mode of travelling, time taken to travel to work and Part C consisted of the respondent's concerns on the safety, security, environment and social concerns and also the expectations with respect to reliability, comfort and incentives. 649 questionnaires were collected. Descriptive analysis was carried out to identify respondents' views on carpooling.

4. Results and Discussion

59% of the respondents had a positive opinion on carpooling. 49% were willing to embrace carpooling. This shows that people are positively inclined towards carpooling yet are not willing to embrace it, since sometimes it does not result in the outcomes expected from the carpooling service providers. These service providers are not commercial service providers but drivers who travel for work daily. Respondents are concerned about the driving style of the driver and whether the riders smoke or not. The ethnicity and appearance of riders are rather unimportant concerns and gender is a neutral factor when the collective results are considered (male and female). When only the female population is concerned, gender is a very important concern for them. Respondents are well aware that carpooling will reduce congestion levels, reduce pollution, save time and increase parking space. The main barrier the respondents have when considering to join carpooling is the safety risk. These safety risks could be harassments, thefts and invasion of privacy. Another barrier is the risk of not being picked up. Reliability of the service is a very important concern for the respondents.

Out of the proposed incentives, rather than expecting separate lanes in highways and getting other incentives, respondents are expecting more practical incentives such as ride-back assurance, reserved parking spaces and possible fuel incentives. When joining carpooling, important factors for consideration are the proper availability of space, reliability of the service, picking up from the residence and dropping off at the residence. When respondents were provided with the statement "*If proper passenger preferences are provided, people will shift towards carpooling rather than using their own vehicles for routine activities*", 51% of the respondents "*strongly agreed*" with it while 41% "*agreed*" with it. Only 1% disagreed.

Factor analysis was carried out in order to explain correlations among multiple outcomes. The important purpose of this was to describe the covariance

relationships among variables, which was unobservable. Initially, Cronbach's alpha test was performed. Cronbach's alpha, α, which is the most common measure of scale reliability turned out to be 0.844. Hence, it can be said that the internal consistency of the questionnaire is within required levels. KMO test statistic was 0.62. Therefore, it can be concluded that sample size was adequate for a satisfactory factor analysis. Using factor analysis, 36 of the variables questioned in the questionnaire were divided into 12 communalities: Utility, Service, Altruism, Convenience, Egoism, Skepticism, Attitude, Risk, Cost, Environmentalism, Community and Reliability. Reliability analysis was carried out for each of the above factors and the factors which yielded reliability value above 0.7 were identified. The two factors which had reliability value above 0.7 were Utility and Service. These were used to test the hypotheses using Kruskal Wallis test where the following hypotheses tested:

H_o: Reliable factor is independent of the ith variable

and

H_1: Reliable factor is dependent of the ith variable

where reliable factor was Utility or Service and the ith variable was age, gender, education, sector of employment, monthly income, number of members in the household, distance to work from the residence, time taken to travel for work, method of transport, mode of transport or occupancy of the vehicle. When considering the Utility factor, all the ith variables (11 variables) were significant. When Service factor is considered, except for gender all the other i^{th} (10 variables) were significant.

5. Conclusions

The study enables the conclusion that, when promoting carpooling and giving incentives to passengers, more consideration should be given to age groups above 35 years in which we could possibly find a high usage of private vehicles. Carpooling should be promoted among people who obtain higher salaries (above 50,000) since they are likely to be the main user of private vehicles to travel for work. Low salary earners mostly use public transportation. The proper route planning should be done in a way that it covers passengers travelling small distances to work (0-10KMs) as well as those travelling over 40 km. It is observed that people are partial to travelling by carpooling services rather than using their own vehicles or public transport to go to work. Also people are partial to joining carpooling to travel longer distances (above 50KM). Based on the opinion on carpooling and willingness to join carpooling, the government does not need to impose any harsh or stringent strategies to make people embrace it while giving a few of the proposed incentives. Initially the policy makers should concentrate on

creating a policy framework where they initially promote the benefits of carpooling and give the required incentives step by step as mentioned. Also government should support the private sector in creating a system which connects drivers who are willing to carpool and passengers who are willing to join.

Acknowledgment

References

1) (2014). Economic and Social Statistics of Sri Lanka. Colombo: Statistics Department, Central Bank of Sri Lanka

2) http://indi.ca/2015/10/colombo-vehicle-statistics-2015/

3) Dewan, K.K. and Ahmad, I., 2007. Carpooling: A Step To Reduce Congestion. *Engineering Letters*, *14*(1).

4) Ciari, F. and Zurich, I.V.T.E.T.H., 2012, May. Why do people carpool: Results from a Swiss survey. In *12th Swiss Transport Research Conference, Ascona*.

Keywords: *Single Occupancy Vehicles, High Occupancy Vehicles, Carpooling*