Identification of Attributes Influencing a Functional Park and Ride Systems for Colombo

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Abstract

Colombo, being the commercial capital and largest city of Sri Lanka by population, is plagued with traffic congestion in most of the corridors. Improving public transportation has been identified as the foremost approach to solving the congestion considering private vehicles have a higher share of the vehicle composition and carry fewer amount of passengers. Authorities have come up with different solutions like providing flyovers, constructing bypass roads, introducing bus lanes, increasing taxes on private vehicles, and widening existing roads, yet an intact result has not been delivered to Colombo city. 'Park and Ride' has been identified as one of the functionalities to make public transport more attractive because it aims to influence travellers' attitudes and behaviour into shifting from private vehicle use to mix mode of transport. A questionnaire survey was carried out to understand the attributes that influence the choice of passengers to use the Park and Ride system. The set of attributes listed in the questionnaire was obtained from previous studies conducted in different regions under different conditions. Selected attributes were categorized in to 6 major categories as; 'parking facilities' which asks respondents to rank a list of characteristics related to the car park in a park and ride system, 'facilities and services provided at the park and ride station' which asks respondents to rank a list of characteristics related to the park and ride station, 'characteristics and facilities provided in public transportation mode', which asks respondents to rank a list of characteristics related to the mode of public transportation (i.e. train, bus LRT), 'travel time characteristics' where respondents find a list of different time components related to a park and ride system (i.e. time spent on public transportation, time spent walking to the destination), 'availability of public transport mode', which asks respondents preference regarding the availability of different combinations of public transportation modes (i.e. availability of bus only, availability of LRT and bus only, availability of bus, rail and LRT) and 'general characteristics of park and ride', where respondents find a list of attributes which does not lies under any of the previous categories. 5-10 attributes were listed under each category, and respondents were asked to rank the given list within the category based on their preference. Each attribute was given a score referring to the survey results. The number of respondents who have ranked a certain attribute as '1' is counted, and it was multiplied by a relatively higher number (multiplying factor) based on the number of attributes given under that category. The same procedure was followed to allocate scores for the rest of the ranks (2,3,4.) given for that certain attribute, and the multiplying factor was reduced when the rank reduces. Sum of the scores for ranking as '1', ranking as '2' and the rest is taken as the score for that attribute, and a score was given to all the attributes by following the above method. Further, as the last stage of this survey, respondents were asked to rank the given major categories based on their perspective. The same mathematical analysis method used for ranking the attributes within the category was followed to allocate a score for the categories also. A final score was obtained based on the 'scores given for attributes within the categories and the 'scores given for the categories itself. This leads to the identification of

the most prioritized attributes regardless of major category. Using the above set of prioritized attributes, a stated preference (SP) survey can be conducted with a sample size of around 400 to identify the user perception of the attributes. The initial survey was conducted to identify the most important characteristics from the long list of characteristics obtained from the literature, and the highest-ranked attributes of that initial survey can be used for the SP survey. 380 responses were obtained for the aforementioned initial survey, and the results of the questionnaire revealed that 'certain seating facility in the public transportation mode', 'availability of the washrooms at the station', 'secure parking at the station', 'time spent waiting in park and ride station' and 'displaying Information on services (bus route/time, etc.) in the station' were the highest ranked attributes. It also exposed that respondents have less concern about 'having free parking at the station' and 'having a low cost or public transportation. Moreover, the results showed that the respondents prefer to have more options as their public transportation mode instead of having a single mode. This ranking of attributes generates a clear view of approaching the planning and design stages of public transport projects by providing scientific evidence so that ad-hoc decisions will be avoided. Therefore, the findings of the study would provide useful insights into the feasibility assessment of public transport projects, especially in the Colombo region.

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