



## Use of Hybrid Conjoint Model to Elicit User Preference Towards Colombo Light Rail Transit

T. M. Rengarasu, and M.S.C. Gunasekara

*Faculty of Engineering, University of Ruhuna, Sri Lanka.*

### Abstract

This study is aimed at evaluating the preferences of users toward the proposed Colombo Light Rail Transit (LRT) utilising two-level conjoint, linear regression hybrid analysis. Seventeen attributes identified from the literature were ranked by 40 transport experts. 'Travel time', 'accident safe', 'comfort', 'park and ride', and 'e-services' are the top 5 five attributes. The five attributes were then subdivided into levels. The attribute 'comfort' had two levels while all others had three. By combining attributes at different levels 162 distinct LRT setups can be created. Using a partial factorial design utilising an orthogonal matrix 20 profiles were selected. Users ranked the 20 profiles on a 0 to 100 scale according to their preferences. Certain demographic data were also collected. A total of 223 data was collected. As the first level model, an attribute-only conjoint model was developed with R software using 16 cards. The rest of the 4 cards were used to check the accuracy of the models. The resulting residuals were aggregated for respondent level and regressed with user attributes 'gender', 'vehicle ownership', 'prior knowledge', and 'expert in transport' to form the second model. An  $R^2$  of 0.58, a Kendall's Tau of 0.80, and an F value of 544.8 ( $P < 0.001$ ) were reported by the model. The highest part-worth utility of 17.3 was achieved by the level 'emergency evacuation system', followed by 'seat booking' and 'reclining seats' with 16.7 and 15.1 respectively. Attributes 'e-services' (31.5%), 'accident safe' (21.5%), and 'comfort' (20.5%) were found to be the three most important attributes in that order. The second model developed showed an  $R^2$  of 0.37 with an F value of 31.6 ( $P < 0.001$ ). The attraction to any given LRT setup increases for females respondent and decreases for the respondents who own a vehicle. 4 holdout cards were used to validate the model and it showed an  $R^2$  of 0.80.

Keywords: *Colombo LRT, Conjoint Analysis, Gender, User Preferences.*

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Corresponding Author: [rengarasu@cee.ruh.ac.lk](mailto:rengarasu@cee.ruh.ac.lk)