Abstract

Ahmed O. Idris

Modal Shift Forecasting Models for Transit Service Planning.

This research aims at developing a better understanding of commuters’ preferences and mode switching behaviour towards local transit for work trips. The proposed methodological approach incorporates three main stages. The first introduces a conceptual framework for modal shift maximized transit route design model that extends the use of demand models beyond forecasting transit ridership to the operational extent of transit route design. The second deals with designing and implementing a socio-psychometric COmmuting Survey for MOde Shift (COSMOS). Finally, the third stage focuses on developing econometric choice models of mode switching behaviour towards public transit. Advanced mode shift models are developed using state-of-the-art methodology of combining Revealed Preference (RP) and Stated Preference (SP) information. The results enriched our understanding of mode switching behaviour and revealed some interesting findings. Some socio-psychological variables have shown to have strong influence on mode shift and improved the models in terms of fitness and statistical significance. In an indication of the superiority of the car among other travel options, strong car use habit formation was realized for car drivers, making it hard to persuade them to switch to public transit. Further, unlike conventional choice models, the developed mode shift models showed that travel cost and in-vehicle travel time are of lower importance compared to other transit Level of Service (LOS) attributes such as waiting time, service reliability, number of transfers, transit technology, and crowding level. The results also showed that passengers are more likely to shift to rail-based modes (e.g. LRT and subway) than rubber-tyred modes (e.g. BRT). On the other hand, the availability of park-and-ride facilities as well as both schedule and real-time information provision did not appear to be significant for mode switching to public transit for work trips. This research provides evidence that mode shift is a complex process which involves socio-psychological variables beside common socio-demographic and modal attributes. The developed mode switching models present a new methodologically sound tool for evaluating the impacts of alternative transit service designs on travel behaviour. Such tool is more desirable for transit service planning than the traditional ones and can aid in precisely estimating transit ridership.