Abstract

Extensive research in mode choice behavior analysis is matured with traditional discrete choice models: Multinomial logit (MNL), Mixed Logit (ML), and so on. These models have several shortcomings, most notably MNL model is constrained with Independence from Irrelevant alternatives (IIA) that may not properly reflect the behavior relationship among alternatives. This motivated researchers to develop various alternative formulations. The mixed logit model handle this by random parameter substitution. However, the traditional discrete choice models are limited to discrete variables, that is, capturing the perception of travelers and other psychological factors that are not directly observable. This paper formulates and provides the significance of the Integrated Choice and Latent Variable (ICLV) over the discrete choice model by including perception variables: satisfaction, safety, and discomfort. The comparative behavioral analysis is conducted with commuter's mode choice Stated Preference (SP) data collected in Dalian, a city in North-East China between 1 and 24 June 2021 using an online platform. Due to the capability of the mixed logit model to capture individual heterogeneity and Irrelevant from alternatives, data fits the ML model ($\rho^2 = 0.342$) than the MNL model ($\rho^2 = 0.132$) as shown by the increased value of Rho Squared. Similarly, the Inclusion of intrinsic variables in the traditional model significantly increased the explanatory power of the ICLV model compared to ML and MNL. Model results indicate ML model is more robust than MNL and ICLV model is more significant than the ML model due to its ability to incorporate psychological indicators.