Recent developments and future topics in choice modelling for travel behaviour research

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This special issue contains 5 papers presented at the 2015 Conference of the International Association for Travel Behaviour research (IATBR), which took place in Windsor, UK. It also contains a resource paper from one of the conference workshops.

The IATBR conference takes place every three years and represent an important occasion to disseminate the latest developments in the field of travel behaviour research among academics and practitioners. The work presented at the conference aims to advance academic research as well as provide valuable support to policy-makers in the transport sector all over the world. The papers in this special issue focus on different themes in choice modelling that are relevant to travel behaviour research. In particular, these are the ordering of attributes value across choice alternatives; the role of familiarity and awareness in choice behaviour; the specification of indicators as continuous or ordered; the way people process information in stated choice experiments, and the modelling of behaviour in the case of mass evacuation.

The first paper in this collection is inspired by research in marketing and psychology which suggests that not only the numerical differences in values between attributes should be considered but also the ordering of values, as different decision makers could apply different decision rules and ordering could also play a role. In his paper, Mabit estimates models in which the marginal value of an attribute depends on its ordering relative to the same attribute for other alternatives. He finds that this not only improves model fit, but also that these ordering effects cannot be captured by standard choice models.

The second paper, authored by Balbotin et al., highlights how most of the literature assumes that decision makers are aware of as well as familiar with all the different choice alternatives. This is not necessarily the case in real life, and these aspects can have an effect on how people make decisions. Their study focuses on voting intentions for road pricing reform in Sydney, Australia, and includes awareness and familiarity as part of the endogenous choice set of the model. Somewhat surprisingly, they find that awareness of what road pricing is and familiarity with the debate have little effect on the level of support for the reform, differently from awareness of the investments planned for the revenues raised from road pricing. Nevertheless, the authors conclude that attempts to increase awareness and familiarity to influence support for a specific option are desirable.

The use of hybrid choice models in the travel behaviour literature has seen a rapid increase in the last decade, but more recent work has also raised a number of critical concerns. Bahamonde-Birke and Ortúzar focus on the implications of the common treatment of indicators as a continuous instead of an ordered variable. While the first approach has computational advantages, it neglects the real nature of the variable, leading to potential bias. Performing analyses with both simulated and real data, the authors conclude that while a better model fit can be obtained by modelling the indicators

as ordered, the predictions of choices do not differ greatly between the two approaches unless high variability of the latent variable is present.

Ho and Hensher raise another important issue affecting many choice modelling applications. While acknowledging that generally analysts assume that respondents adopt a specific processing strategy when performing stated choice experiments, they speculate that different possible strategies could be considered, and use the irrelevance of state-wise dominated alternative (ISDA) axiom to identify the strategy that is more likely to be used. The application is centred on best-worst responses to stated choice questions regarding a road pricing reform. The authors find that utility maximisation seems to be more adequate than regret minimisation for modelling exploded best-worst data. They also find that independently of the order of presentation, respondents are more likely to process the information and select the worst alternative first.

The fifth paper deals with evacuation modelling, a theme that has received increasing attention in the field. The decision of whether to evacuate or not during a hurricane can be influenced by multiple factors, and this paper explores the role of ego-centric social networks. A multinomial multilevel model of joint evacuation is used to investigate the hypothesis. The authors Sadri, Ukkusuri and Gladwin find a significant role of network partners in the decision to evacuate, together with other social network, socio-demographic and geographical factors. A better modelling approach to explain evacuation decisions can support the design of emergency evacuation strategies and hopefully contribute to limit the damage of hurricanes and other extreme events.

The special issue concludes with a resource paper from the conference workshop entitled “Innovation adoption modelling in transportation: new models and data”, in which the organisers Amanda Stathopoulos, Cinzia Cirillo, Eran Ben-Elia, Jan Dirk Schmoecker, Joe Li describe the format and contents of the workshop as well as the conclusions reached by the participants. Concerns over excessive reliance on stated preference data for innovation adoption were raised. Moreover, limitations of current modelling frameworks and a lack of adequate tools to account for temporal dynamics of market diffusion of innovations were highlighted. Some suggestions about applying different modelling approaches are made, and integration of tools from other disciplines is encouraged.

We think that the papers in this special issue can provide an overview of state-of-the-art research in choice modelling applied to travel behaviour research. We thank all authors as well as the many reviewers who helped improve the quality of the submissions.