Automation of information collection in transport. Application to the household survey in the framework of the four-stage model

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Abstract

The traditional transport planning model, known as the four-stage model (generation-attraction, distribution, modal split, and trip assignment to the network) involve performing household surveys of a random and representative sample of the population inside the Study Area.

The traditional process involves lengthy procedures that resulted in low survey volume yields and/or errors due to the human factor. These activities include the completion of the forms, their classified storage by activity, their distribution to pollsters and subsequent receipt by the supervisor, the validation of the results, and the classified storage in the office. In addition, given that each household survey is structured in three levels using a tree structure (a household survey, a survey for each household member, and finally one survey per trip for each household member) which results in a lot of information being generated.

To ensure the randomness of the surveys and to improve the traditional process, the following methodology was developed. First, the blocks to be surveyed were selected within each zone of the study area (the probability of block selection is proportional to the number of households it contains). In a second stage, a fixed number of households were selected within each selected block using Sobol's sequence. Secondly a desktop application based on Java which simplifies the survey process was developed. This application is used to complete the household, person, and trip surveys in real time, saving all the information in a cloud database [1][2]. Additionally, a series of internal validators were implemented to ensure that the work is fluid and error-free.

References

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