

# ETWW DEMAND FORECASTING

## HOW A BRIDGE CONNECTING MATHEMATICAL MODELS AND HUMAN BEHAVIOURS FOR MUNICIPAL WASTE MANAGEMENT SHOULD BE BUILT

### Current objective of research project

Successful development of municipal waste-management strategies, planning of municipal waste collection and land demand for facilities depend on accurate predictions of municipal waste generated. Present prediction models of municipal waste management (MWM) are mainly related to mathematical models such as a Time series model and a Grey fuzzy dynamic model. Economic, demographic and management-orientated data based on designated regional sampling (i.e., number and size of observed areas), a modelled waste stream and the hypothesised independent variables are put into these forecasting models to achieve demand forecasting of MWM.

On the other hand, human behaviour plays an important role in the municipal waste generation (MWG), and understanding the influence of human behaviour on MWG can be a key to improving the accuracy of the demand forecasting of municipal waste. Although different attitudes and actions to waste minimisation, waste reuse and waste recycling have been widely researched, it is not yet clear exactly what those behaviours might actually be.

Barr, al. (2001) divide the human behaviours of MWM into three types, including environment values, situational variables and psychological variables and prove that the amount of municipal waste generation is variable in terms of the responding behaviour with respect to waste reduction, reuse and recycling.

However, there is a research gap between mathematical models and human behaviours in the prediction of MWG. Behaviour analysts may believe that research on MWM with mathematical models is out of their comprehension, or worse, irrelevant to their research interests, while users of mathematics models also think the influence of human behaviours is minor and difficult to analyse through mathematical models.

Failures of communication between behaviour analysts and users of mathematical models lead to the inaccurate prediction of MWG. Therefore, the current aim of this project is to develop an

approach to combine the effect of human behaviour with the analysis of mathematical models to achieve better prediction accuracy than those of the conventional mathematical models.

### SUPERVISORS

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### REFERENCES

Barr, S., Gilg, A. W., Ford, N. J. (2001). "A conceptual framework for understanding and analysing attitudes towards household-waste management." *Environment and Planning A* 33 (11): 2025-2048.

