



Master thesis *(in English)*

Smart Waste Collection Systems *(Working Title)*

Date: September 2021

Background

In the context of “smart cities” and “internet of things” information and communication technologies have become indispensable in the planning and design of modern municipal solid waste management. Cities around the world are on the run to become smarter. Optimizing waste collection is an important step towards a circular economy to provide a clean and safe waste collection and to enable a high level of material recovery and thus ecologically and economically viable recycling.

Research questions

The main research question is

- Which technical applications are used in waste collection by means of technical innovations and digitization?”

Further the following questions should be addressed:

- What are the specific goals, strength and weaknesses of each application?
- What kind of data is and how is it measured?
 - volume, filling level, odor, temperature, weight, materials, aerosol emissions etc.
 - acoustical, optical or chemical measurements etc.
- Where are the smart waste collection systems already in use?
 - How is the technical and logistical conversion working?
 - What are social, economic and environmental effects?

Method

In this master thesis, technologies suitable for waste collection will be screened and evaluated with regard to their applicability and limitation to identify valuable or problematic substances in the waste fractions or transmit other information.

- Description of smart waste collections systems (literature review)
- Evaluation of technology providers (interviews and literature review)
- Assessment of case studies (interviews and literature review)
- Identify an optimized waste collection system by considering effects on health, environment and costs

Links/Literature

- Master thesis:
 - Oliver Eismair („Stand der Technik bei der kommunalen Abfallsammlung in Österreich“)
- Technology provider or user
 - Recircula Solutions, AIT (biosensor-technologies), Sloc, Saubermacher, Daka, ARA; Reclay
 - Further different cities and regions
- Literature
 - Chaudhari, S.S., Bhole, V.Y., 2018. Solid waste collection as a service using IoT-solution for smart cities, 2018 International Conference on Smart City and Emerging Technology (ICSCET). IEEE, pp. 1-5.
 - Pardini, K., Rodrigues, J.J., Kozlov, S.A., Kumar, N., Furtado, V., 2019. IoT-based solid waste management solutions: a survey. Journal of Sensor and Actuator Networks 8, 5.

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