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Smart innovation

Smart trash – Research report

# Introduction

## Background

This report was written during the project module of the minor smart innovation, by Mike Schatorje, Loek Ehren, Herm Lecluse and Simone Francesconi. An application is going to be developed with the aim of integrating the Internet of Things into the garbage collection system in Venlo.

### Problem description

The problem that this project aims to solve is:

The centralized garbage collection system in Venlo is currently being managed rather inefficiently. Collection of garbage is done on a manual schedule basis, which leads to densely populated areas overflowing with garbage, while less densely populated areas have their garbage containers empty while they are still half full.

### Core and sub questions

The core questions of the research are:

* How can the garbage collection system in Venlo be improved with the Internet of Things?
* How could the solution improve similar products?

The sub questions for core question one are:

* Does Venlo need improvement?
  + Does the local government need improvement?
  + Does the population of Venlo need improvement?
* What kind of technologies are currently being used in Venlo?
* What kind of IoT technology suits the application best?
  + What kind of technologies exist?
  + What kind of technologies are useful for successfully developing the application?
* How can data of all devices be efficiently collected and analyzed?
* What kind of connections to other devices could be made?

The sub questions for the second core question are:

* How do other cities that use similar technologies currently operate?
* How does the investment analysis of the application compare to similar products?
  + How many containers need to be equipped with new technology?
  + What is the return on investment of the application?
  + What is the internal rate of return of the application?
* How can the application compete with other similar products?

# Research design

The following methods are going to be used to answer all the core and sub questions that exist in this project:

Does the local government need improvement?  
Interviews

Does the population of Venlo need improvement?  
survey

What kind of technologies are currently being used in Venlo?  
interview

What kind of technologies exist?  
Literature research

What kind of technologies are useful for successfully developing the application?  
Literature and practical research

How can data of all devices be efficiently collected and analyzed?  
Literature research

What kind of connections to other devices could be made?  
Practical and literature research

How do other cities that use similar technologies currently operate?  
Literature research

How many containers need to be equipped with new technology  
interviews

What is the return on investment of the application?  
Literature and practical research

What is the internal rate of return of the application?  
Literature and practical research

How can the application compete with other similar products?  
Literature research