



# Digitalization of waste management processes in smart cities or regions

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## Background

Rapid urbanization caused important economic, social and demographic transformations. Therefore, smart cities are emerging all around Europe, claiming to be the future of urban areas strategies. Due to a lack of agreed definition, this study identifies smart city or region's characteristics and emphasizes the importance of digitalization in waste management processes. A case study was used to understand organizations' main challenges and key success factors and create a guideline for waste management actors willing to shift towards smart processes.

## Objective

The aim of this research is to draw recommendations for any waste organization willing to develop a smart city or region initiative. The findings depict the motivations and smart objectives of the actors and insist on the importance of collaboration along with digital tools and processes, to achieve their goals. The benefits and limits of digital transformation are also discussed.

## Theory

- Newness of the concepts = diverse definitions = confusion
- Characteristics of a smart city or region
- Introduction of new technologies
- Focus on digitalization of waste management processes
- Impacts of digitalization

Depict a growing interest of academics on using digital tools to optimize the processes and to create new opportunities for urban areas.

## Research Question

*What are the positive and negative impacts of digitalization in waste management processes, for cities or regions willing to become smart(er)?*

## Methods

### Qualitative research

- waste management is deeply embedded in its context = need to gather specific data
- Newness of the concept = must collect information from field experience
- No agreed definition = creates confusion so need to interview experts to understand the key elements

### Interviews: 10 Participants

Participant	Position	Type of organization	Country
A	Waste Management Director	Territorial community	France
B	Waste Strategy Responsible	Municipality	France
C	Environmental Expert	Municipality	Finland
D	CEO	Public owned waste management company	The Netherlands
E	Senior Advisor	Public owned waste management company	The Netherlands
F	Program Manager Circular Economy	Public owned waste management company	The Netherlands
G	Environmental Manager	Public owned waste management company	Denmark
H	CEO	Software publisher and integrator	France
I	Marketing Director	Software publisher	France
J	Entrepreneur & Founder	Vocal interface company	France

## Results

### Tools and processes

#### Motivations

#### Smart objectives

### Collaboration

#### Benefits of digitalization

#### Limits of digitalization

#### Benefits of digitalization

- Better traceability (of waste)
- Better legibility (of the organization)
- Empower the population
- Inclusion
- Speed of action & rapid adaptability
- Financial benefits

#### Limits of digitalization

- Complexity of processes
- Inclusion
- Population's reluctance (privacy / safety)
- Employees' reluctance
- Hard to combine digital tools with field knowledge and experience
- Danger of following new trends
- High costs
- Risk of biased information

## Recommendations

**P1:** Integrate the notion of waste management at the start of projects' development to optimize and profit from those new digital tools.

**P2:** Stress the importance of trainings and tailor them to the targeted audience.

**P3:** To encourage change in mentalities, organizations should focus on their user's feedback and include reward systems.

**P4:** Digitalization as a tool to positively influence social interactions.

**P5:** Focus on "quick-wins" instead of trying to implement global strategies at once.

**P6:** Test as much as possible before expanding to larger scales.

## Conclusion

Research showed a growing interest about digitalization in urban areas and contrasted its positive and negative impacts. If organizations could successfully anticipate all those elements, it could become a starting point of the construction of more connected / intelligent urban areas.

However, new technologies shouldn't take over human intelligence. It is crucial to combine both (human and digital) to achieve greater optimization and integration.