Challenges in resource recovery value chains

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Resource Recovery from Sanitation for Food Security and Soil Health, E-Conference, February 19-21, 2020, Day 2: Setting up a Value Chain

Challenges in resource recovery value chains

My perspective

Operations Research and Logistics group

Academic discipline focused on data science / advanced analytical approaches to help make better decisions

Logistics: the processes involved in matching supply and demand of products and services

Logistics is all about making sure we have the right products and services at the right place, in at the right time, in the right quantity, and at the right quality

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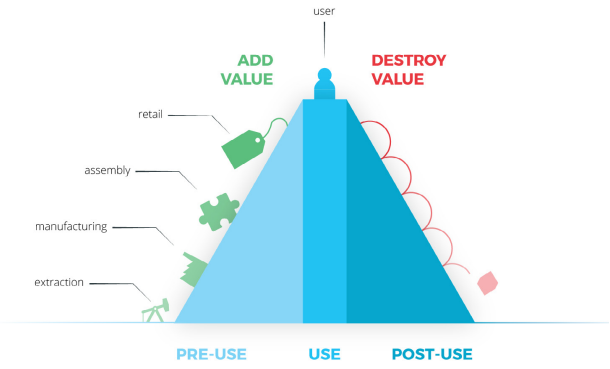
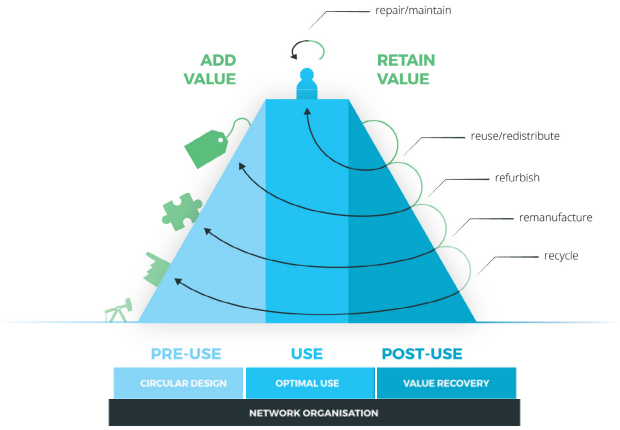
Resource recovery value chains – Background

From a linear economy...



...to a circular economy:



(Achterberg et al., 2016)

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Resource recovery value chains – Experiences

LogiCE

Main project goal:
Accelerate the transition to a circular economy by leveraging knowledge on logistics and CE in collaboration between science, industry, and (local) government

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Funded by: NWO TKI DINALOG Dutch Institute for Advanced Logistics

Key challenges and considerations

- LogiCE project approach
  - Literature study
  - Case studies
    - Student projects
    - Co-creation sessions
    - Expert workshops
  - Focus on exploration of the role of logistics in a circular economy

(Akkerman et al., 2019)

(main outcomes soon also available in English in Beames et al., 2020)

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Key challenges and considerations

1. The level of centralization

Case: Organic waste in urban environments

Collection of biomass from households and companies to make biogas, heat, CO_2, and water in the Metropolitan Region of Amsterdam

Challenge: Where to locate such a biogas installation?

Approach: Two-stage multi-objective GIS-based optimization model for identification and selection of location.

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Key challenges and considerations

1. The level of centralization

Case: Organic waste in urban environments

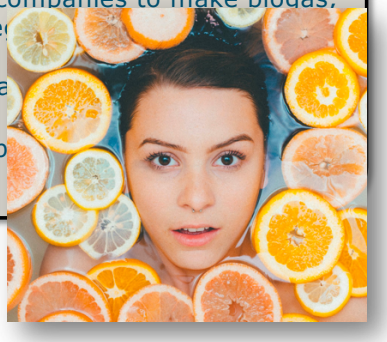
...d companies to make biogas, ...e...

Case: Orange peels

Collection of orange peels from hotels, cafes, and restaurants in urban environments. Biorefining of these orange peels to produce a mix of products (for cosmetics to food and feed)

Challenge: How to efficiently organize a collection network?

Approach: Scenario analysis w/ several transport methods, collection systems, and collection frequencies.



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Key challenges and considerations

1. The level of centralization

2. The level of collaboration

Case: Organic waste in rural areas

VICOE (vital circular organic economy) focuses on organic waste streams in a municipality with many horticultural companies. Different uses possible (e.g. vermicomposting) after collecting the waste streams

Challenge: Some degree of centralization and collaboration required among growers to achieve feasible processing options

Approach: Technology assessment, logistics scenario analysis

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Key challenges and considerations

Case: Plants as a service

Refurbished orchids – orchids can be raised to bloom multiple times.

Challenge: How to organize the logistics of getting the flowers back?

Approach: Workshops with stakeholders with scenario development

3. The level of servitization

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LogiCE

Key challenges and considerations

1. The level of centralization

What are the scale effects that need to be taken into account for the relevant technology?
Scale relates to quantity, but definitely also to quality: how to get a stable supply mix?
Balancing supply and demand – Does variability in supply ruin a more stable demand?

2. The level of collaboration

How are 'supplier' and 'customer' stakeholders involved (vertical collaboration)?
How to link to different valorization and transportation activities (horizontal collaboration)?
How to provide the right incentives in collaborative initiatives? (also for data sharing)

3. The level of servitization

What part of the value chain can be offered as a service? Public toilets?
Does servitization offer benefits in this specific case? Can we quantify those?
How does servitization and ownership influence system behaviour/incentives?

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References & Acknowledgements

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