The role of recycling companies in the circular economy

Opportunities and challenges towards a materials management transformation

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Ascending the waste hierarchy

Stages

Prevention
Preparation for re-use
Recycling
Other recovery
Disposal

Includes

Using less material in design and manufacture.
Keeping products for longer: re-use.
Using less hazardous material.
Checking, cleaning, repairing, refurbishing, repair, whole items or spare parts.
Turning waste into a new substance or product including composting if it meets quality protocols.
Including anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling operations.
Landfill and incineration without energy recovery.
The inner loops of the circular economy
15.5 tonnes of waste was examined through composition analysis, and the re-use potential of nearly 17 000 products was assessed (Hultén et al., 2018)
Material Management Systems

Integrated system design with new forms of collaboration, information sharing, contracting, and revenue-risk sharing.

Pure resource (ownership transfer): Materials, Components, Products
Resource/service-system: MSS, CSS, PSS
Transition in ownership

Source: Blomsma et al., 2022
Preliminary research findings

• Pilot study on the recycling industry in Sweden
  – semi-structured interviews with major recycling companies in Sweden
    (10 interviewees from 3 recycling companies >80% market share)
  – plan to expand the study on minor players in Sweden, as well as recycling
    companies in the EU – active in multiple Member States

Source: Dalhammar et al., 2021
Major barriers
- Recycling industry not seen as an “industry”
- Recycling industry not always represented well in political processes
- Swedish authorities makes it hard to recycle, through 1) legal interpretations; 2) lack of leadership; 3) lack of guidelines, harmonised practices, and appropriate end-of-waste processes

Trends
- Going from selling large quantities with limited profit margins, to managing more materials streams with lower volumes but higher added value
- More cooperation with other actors; assigning resources to actors who can extract the highest value
- Want to compete more with the mining industry

Opportunities
- Exchange of information/data from various actors in product/material chains
- from ‘fixing problems’ to ‘future resource management’
- Public leadership
- Masterplan at EU and national levels
- Re-use properties of materials in products, a process that is on the borderline between re-use and recycling
- Recyclers as ‘interface’ between diverse actors

New business operations
- Re-use of products and components in new applications
- Work together with OEMs on “Design for re-use and recycling”
- Circular consulting

“Recycling industry in transition”
Conclusion

• Recycling companies must be ready to face decreasing market volume in certain waste streams and respond by increasing market value by high value-retaining operations such as repair and reuse.

• Recycling companies must identify potential competitors and potential partners to facilitate joint collection and management of resources (EOL products). If not, they would have to develop internal capabilities and business models of reuse vs. recycling.
  – especially for products e.g. WEEE, building materials, packaging
Thank you!

Questions?

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