Sharing is caring – for the environment?

Results of life cycle assessments for peer-to-peer sharing

4. IWSE
Lund, June 15 2017

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RESEARCH BACKGROUND AND RESEARCH QUESTIONS
Peer-to-peer (p2p) sharing is perceived as environmentally sound.

Environmental benefits occur due to a reduction of demand for new products:
  - an extension of product life times
  - an intensified use of products

But there is little knowledge and empirical insight into the actual impacts of sharing practices on the natural environment.
Research questions

1. What are the environmental benefits of consumption behaviour with p2p sharing activities compared to an equivalent consumption behaviour without active sharing?

2. What are the environmental benefits associated with the change in user behaviour that is caused by the availability of p2p sharing platforms?
METHODOLOGY
Life Cycle Assessment (LCA)

Method: Life Cycle Assessment is a compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle.

Tool: Mass flow modelling software

Environmental impact categories, examples:
- Climate Change / Global Warming Potential (CO₂ equivalents)
- Terrestrial / Aquatic Eutrophication (PO₄ equivalents)
- ...
Life Cycle Assessment (LCA)

Input data for the model:

- Literature and databases
- Behavioural data gathered from user surveys
- Sharing platform insights (contributed by the business partners)

Results refer to:

- the consumption impacts of
  - one representative German consumer
  - during one calendar year
LCA for Kleiderkreisel (KK)

- Consumption mode: trading of second-hand clothing

- Clothing type modelled: cotton T-shirts (200 g) from global average production

- The average KK user consumes a total of 2.3 kg or 11.5 T-shirts per year

- Results: Comparison of environmental impacts caused by different consumption patterns
LCA model overview for KK

System boundaries:
- Resources: cotton agriculture, yarn, fabric, T-shirt production
- International transportation

Transaction:
- Buying new T-shirts
- Trading used T-shirts
- Kleiderkreisel

Consumption requirement:

Use phase:
- Laundry

Textile recycling:
- End of life (waste treatment)

Energy

Annual consumption behaviour
Scenarios KK

- RQ 1: What are the environmental benefits of consumption behaviour with p2p sharing activities compared to an equivalent consumption behaviour without active sharing?

- Three consumption/disposal patterns are compared:
  1. The **KK only user** buys all T-shirts via KK and resells as much as possible via KK, avoiding container collection.
  2. The **average KK user** behaves according to the user survey, with 18.5% of T-Shirt consumption via KK.
  3. The **single-mode consumer** buys only new T-shirts and leaves all used T-shirts to container collection.
Scenarios KK

- consumption/disposal patterns:

**T-shirt consumption**

- KK-only user: 2.3 kg/person/year
- Average KK user: 1.9 kg/person/year
- Single-mode consumer: 2.3 kg/person/year

**T-shirt disposal**

- Municipal waste: 1.1 kg/person/year
- Container collection: 1.2 kg/person/year
- Used T-shirt swapping: 0.3 kg/person/year
- Used T-shirt resale offline: 0.1 kg/person/year
- Used T-shirt resale online: 0.1 kg/person/year

Legend:
- New T-shirt consumption
- Used T-shirt consumption online
- Used T-shirt swapping
- Used T-shirt resale offline
- Used T-shirt resale online
RESULTS
P2P sharing can reduce GWP impacts

• Global Warming Potential (GWP) in kg CO₂ equivalents
• Emissions originate from e.g. electricity and energy carrier use

The comparison shows that the average KK user exhibits only about half (49%) of the single-mode consumer impacts.

GWP reductions are mainly due to reduced new production.
P2P sharing can reduce aquatic (EP) impacts

- Aquatic Eutrophication Potential (EP) in kg PO$_2$ equivalents
- Emissions originate from e.g. fertiliser use in agriculture, detergents (laundry)

→ The average KK user shows only 60 % of the single-mode consumer impacts
→ Aquatic EP reductions are mainly due to reduced new production
RQ 2: What are the environmental benefits associated with the change in user behaviour that is caused by the availability of p2p sharing platforms?

Changes in behaviour caused by the availability of KK:

- 0.2 kg additional consumption
- 0.1 kg less demand of new T-shirts

→ Overall effect still positive!
→ The KK user has reduced GWP impacts by 11 % and aquatic EP impacts by 6 % compared to a situation without KK.
Conclusions

• KK use shows overall positive effects in the calculated scenario comparisons, even if:
  • no change in the amount of consumed T-shirts is assumed, and
  • rebound effects according to user survey data are considered.
• Overall: p2p sharing has positive effects due to lower demand for new clothes and less textile waste (longer lifetime of textiles)
• „shared clothes result in shared environmental burdens“
Thank you very much!

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