



Project on the Energy  
and Environmental Impacts  
of the Digital Economy

# UNCOVERING THE STRUCTURE & DYNAMICS OF THE SHARING ECONOMY: EVIDENCE FROM A FOOD SHARING PLATFORM

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Based on: Makov, T., *et al.* Social and environmental analysis of food waste abatement via the peer-to-peer sharing economy. *Nature Communications* **11**, 1156 (2020). <https://doi.org/10.1038/s41467-020-14899-5>



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# Food Waste: U.S.

30%-40% of U.S food  
wasted annually



Source: ERS USDA, 2017

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while

**1 in 9**  
Americans report  
food insecurity...



Passing on **edible yet unwanted food** to **secondary consumers** could yield environmental and social benefits

**Don't let  
good food go bad**

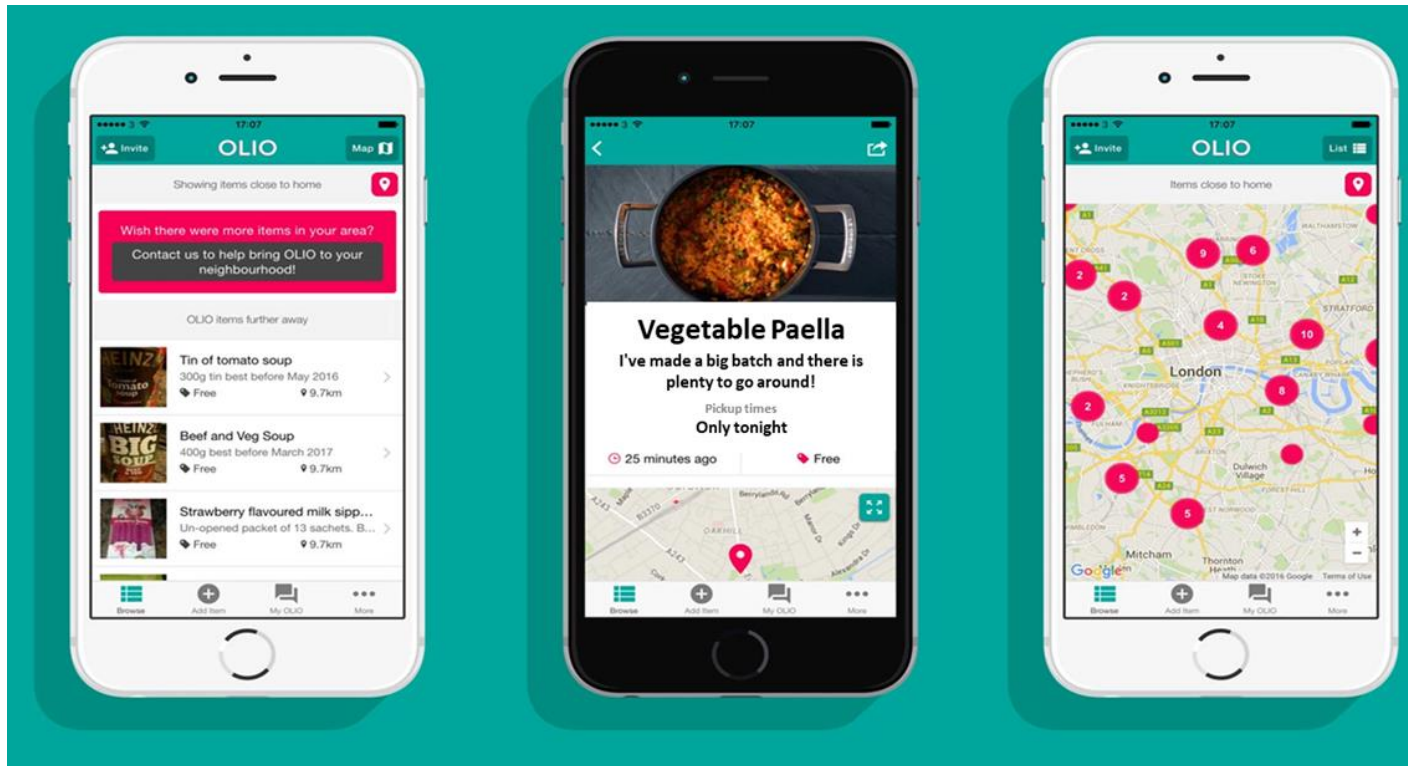


Rette mit!  
**foodsharing.de**



Saure Gurken

# OLIO - Tinder for food: App shares leftovers for a healthier planet



Free, location based, Peer-to-Peer

# Methods

## **Data:**

- All platform activity April 2017- October 2019

## **Mixed methods approach, combining:**

- Natural language processing (NLP)
- GIS
- Geospatial Network analysis
- Monte Carlo simulations
- Transport modeling
- Life cycle assessment (LCA)

(1)

**Do people want 2<sup>nd</sup> hand food?**

*What gets listed?*

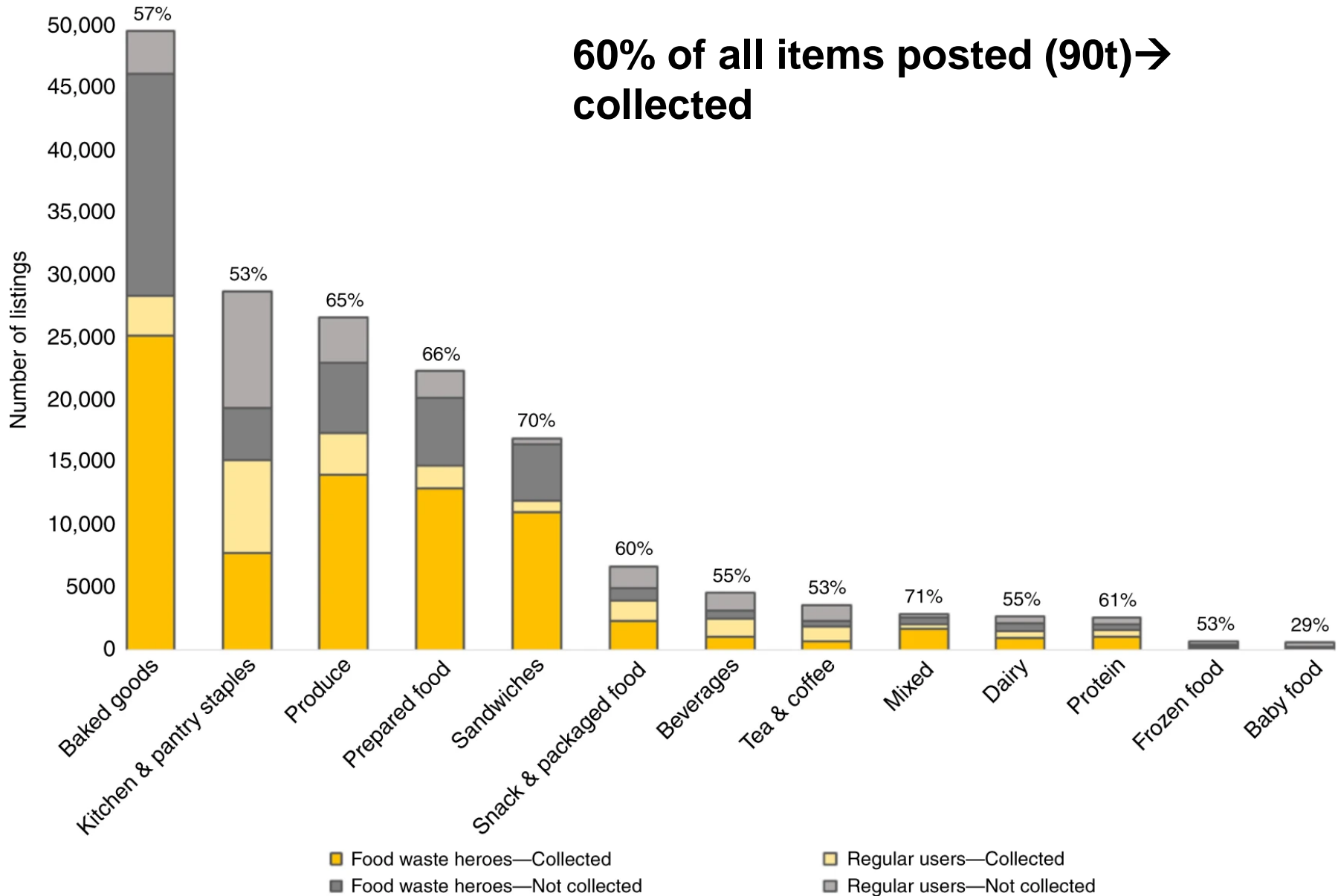
*What gets shared?*

*How much gets shared?*



# Results

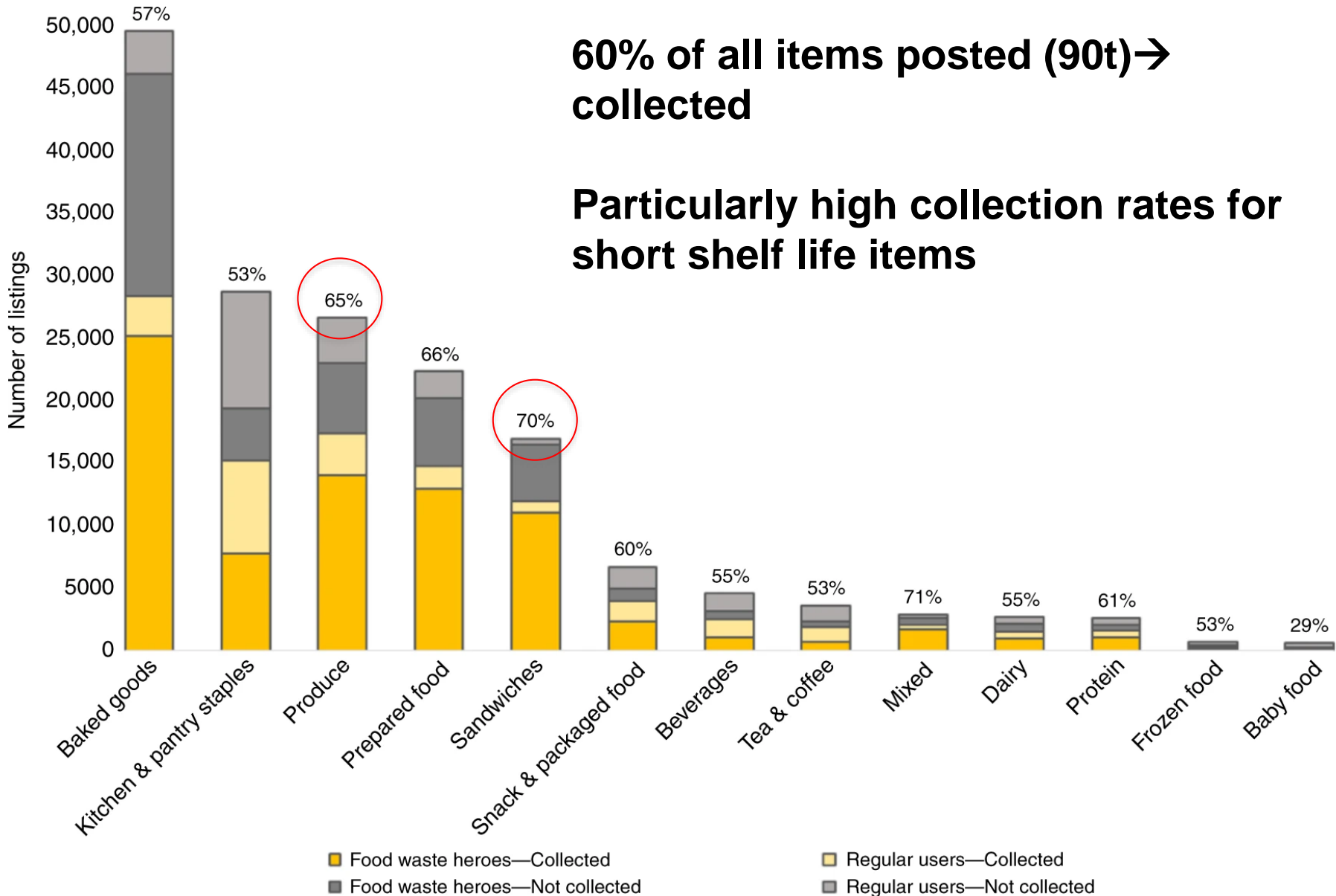
**60% of all items posted (90t) → collected**



# Results

**60% of all items posted (90t) → collected**

**Particularly high collection rates for short shelf life items**



(2)

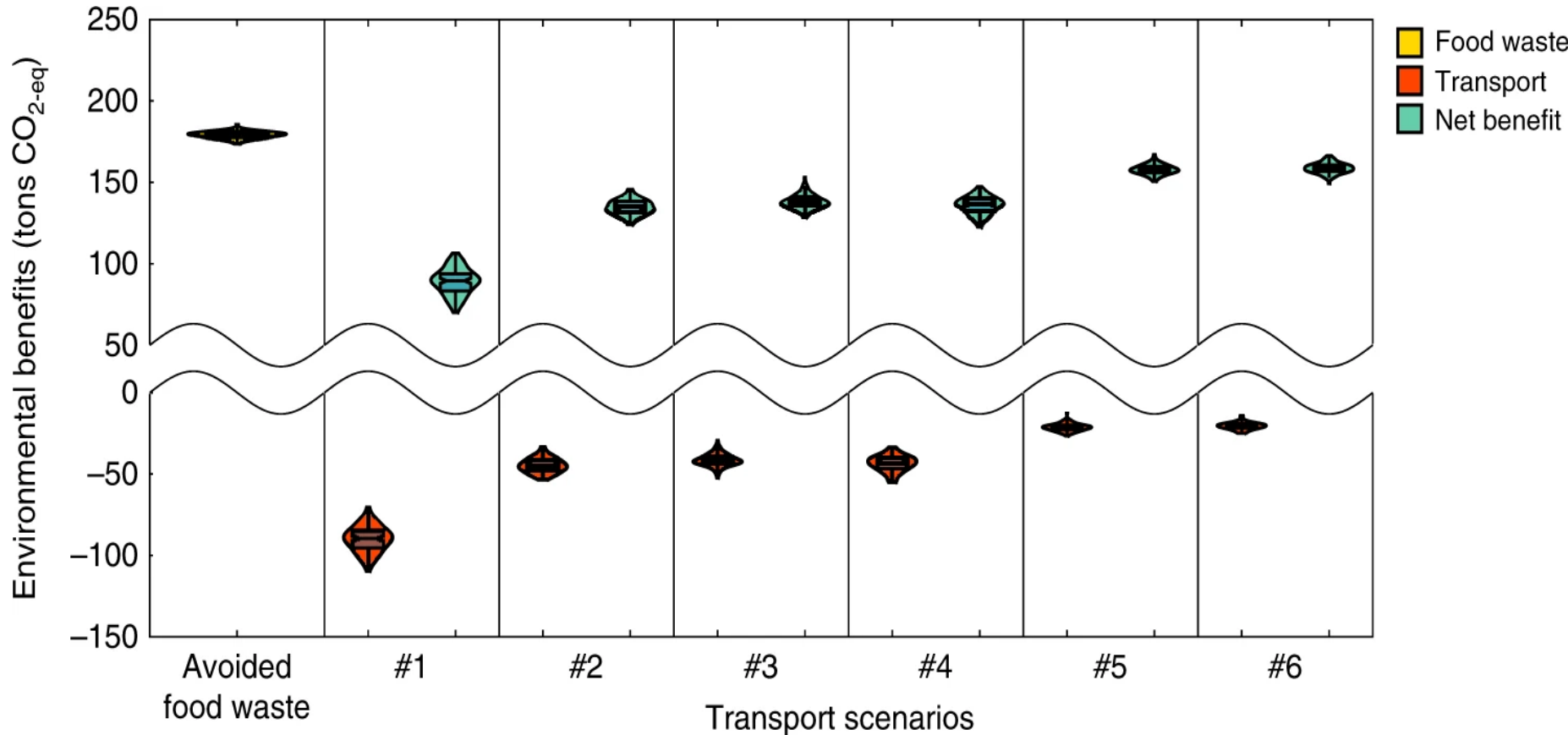
**Do the environmental  
benefits of avoided food  
waste outweigh added  
transport?**

**Focus: Greater London**

# Results

## Net benefit even under worse case scenario

(#1- driving back and forth in private vehicle only to collect food)



(3)

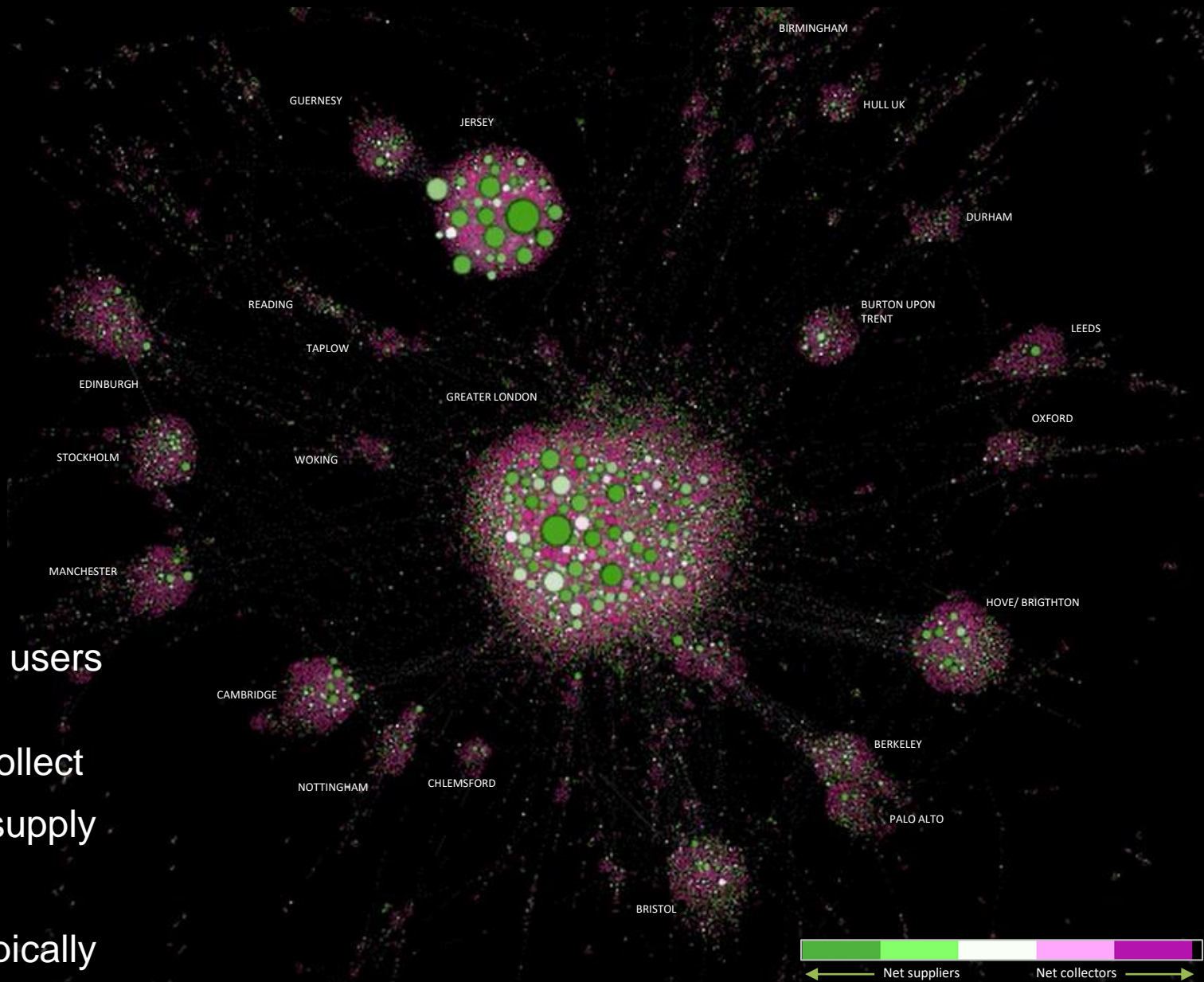
**What is the nature of the network?**

***Collaborative consumption or  
redistribution?***

***Food insecurity?***

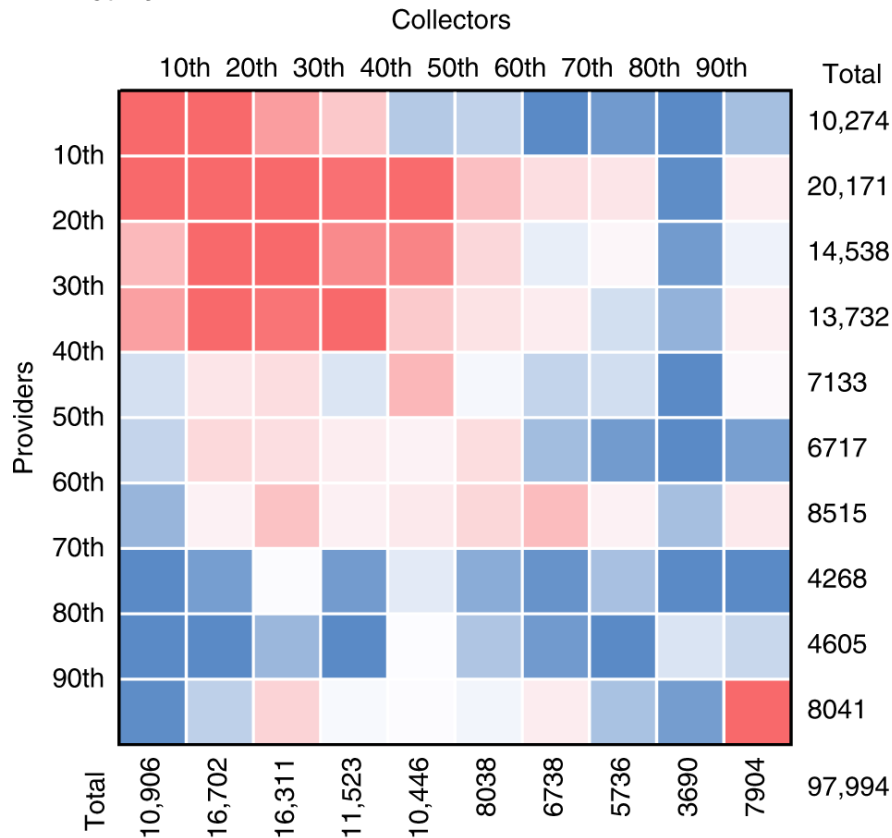
20,000 unique users  
("nodes")

- 61%- only collect
- 27% - only supply
- 13% - both
- User role typically constant

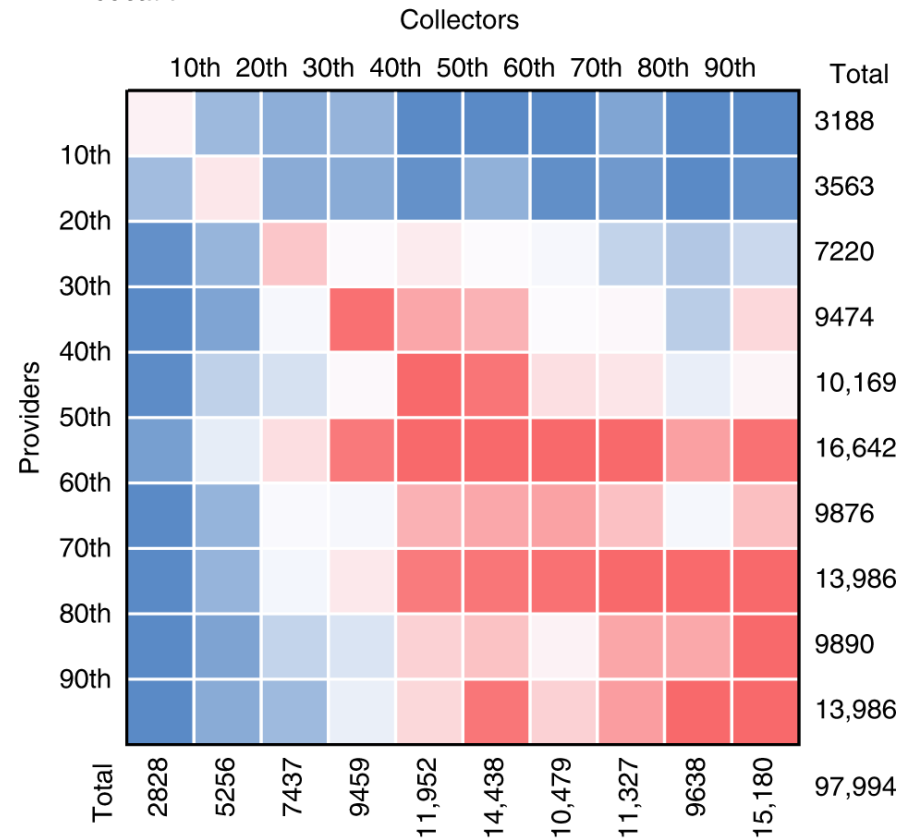


# Results: Food flow by users Income and education

**a** Income



**b** Education



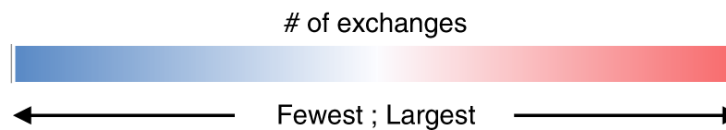
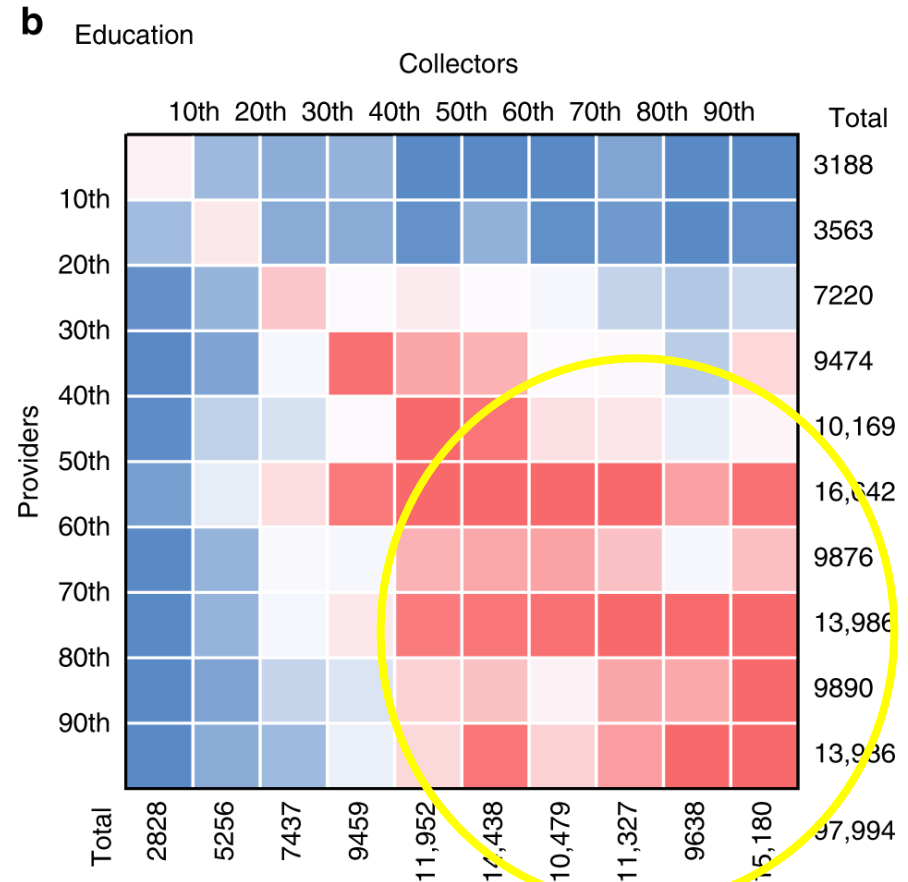
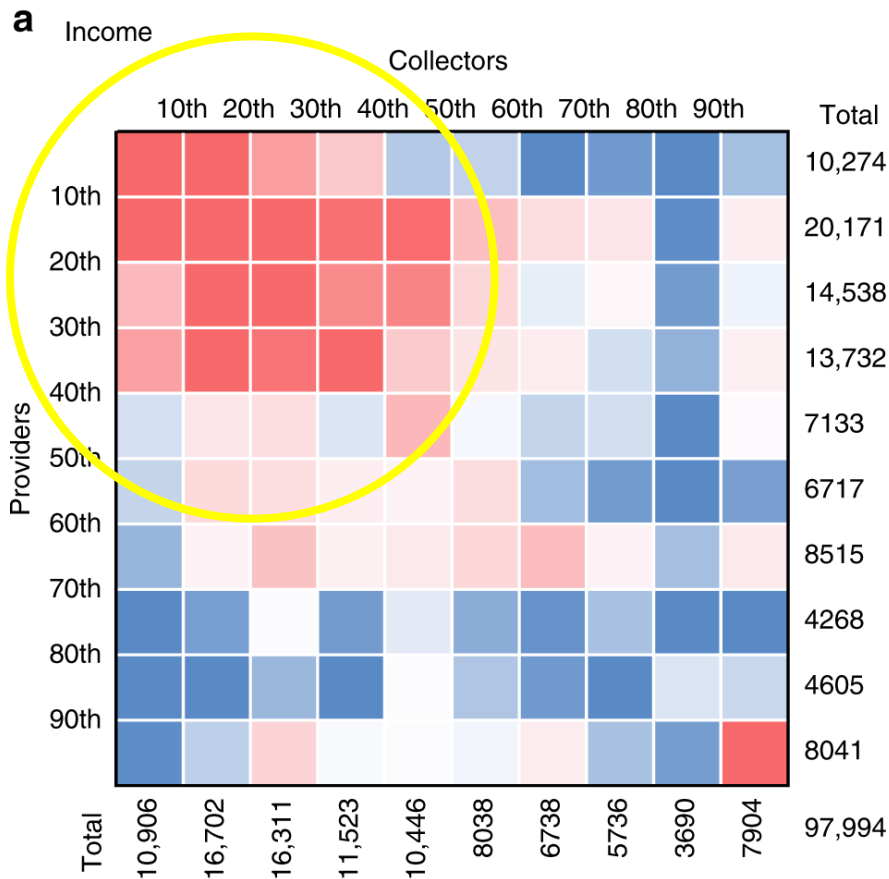
# of exchanges



Fewest ; Largest

# Results: Food flow by users Income and education

Most exchanges among users associated with low income yet high education





# In sum

- There is demand for 2<sup>nd</sup> hand food...
- Especially promising for perishables which pose challenges for conventional redistribution channels!
- Net environmental benefits
- Not a charity - Cultural prerequisite might be prerequisite for successful participation.
- The '*voluntary poor*'?

**Future directions** - Sharing economy rebound effects

*Behavioral and system wide responses to increased efficiency which can negate some of the expected environmental benefits*

# The impacts of Online retail



# For example:

- Return rate as high as 40% <sup>1</sup>
- Expected to increase with wider adoption of *“Try before you buy”*<sup>2</sup>

## Environmental impacts

- Reverse logistics (i.e. shipping and managing returns)
- 25-50% returned in non-sellable condition → never make it back to stock!!!<sup>1,3</sup>

