

Exploring consumers' omnichannel behaviour and the impact on last mile sustainability: a case-study

Heleen Buldeo Rai, Vrije Universiteit Brussel, research group MOBI
Presentation at METRANS I-NUF 2019, Long Beach



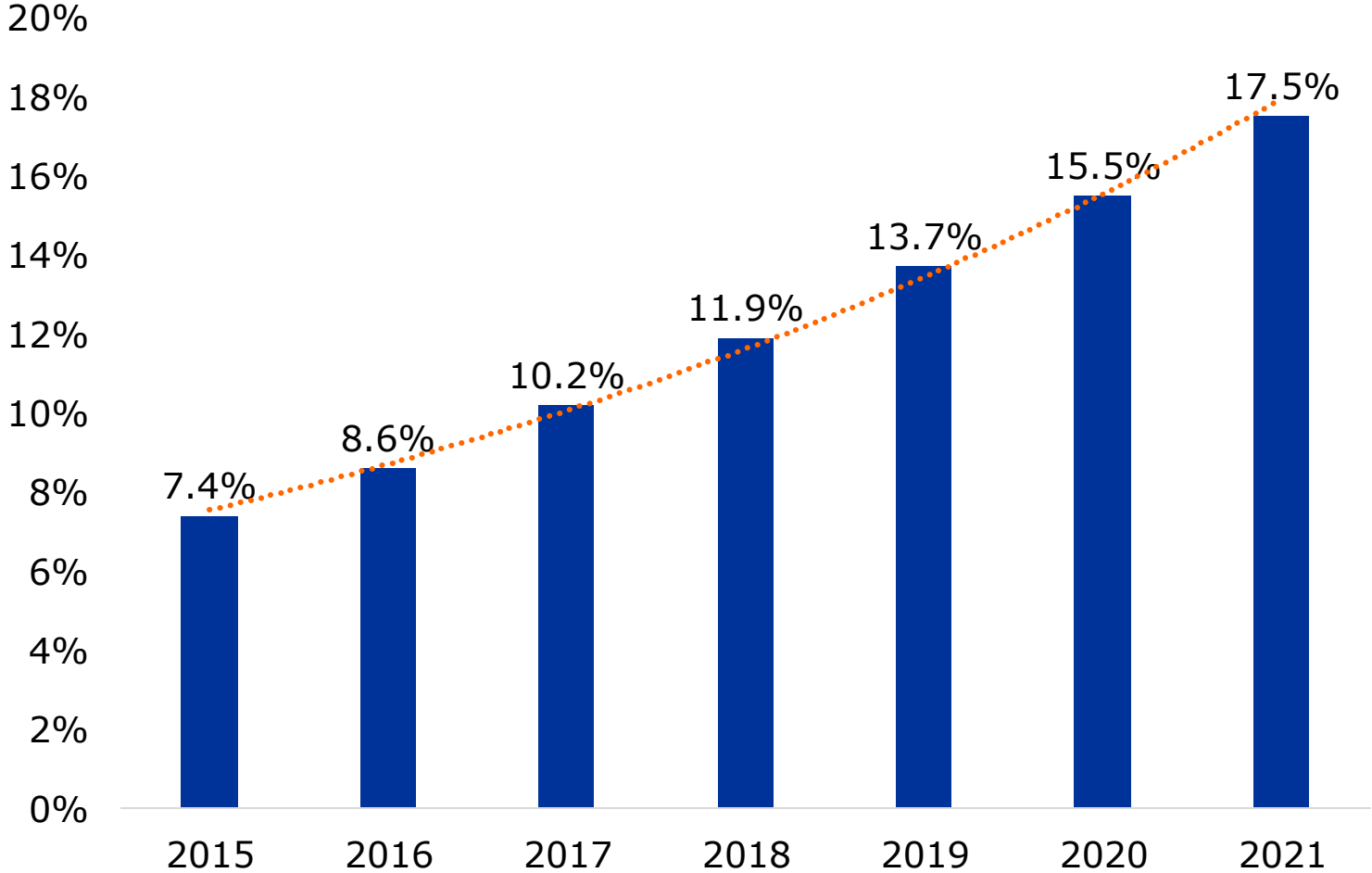


UBER KITTENS



The rise of online retail

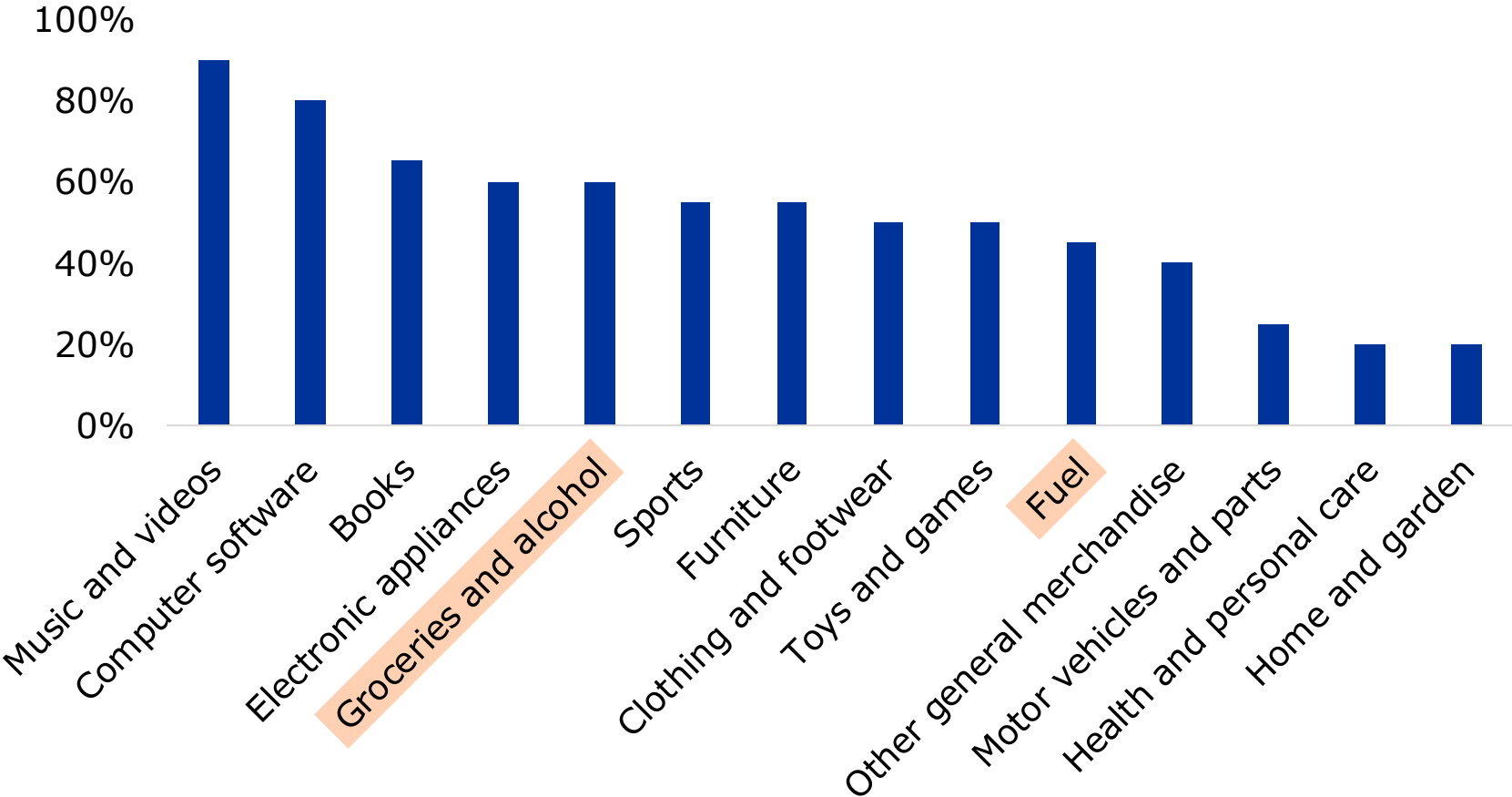
Share of total global e-retail sales



Reference: Statista, 2019

The rise of online retail

Estimated 2036 online share of retail sales by category (G7 average)



Reference: Reeve, 2016

The rise of online retail



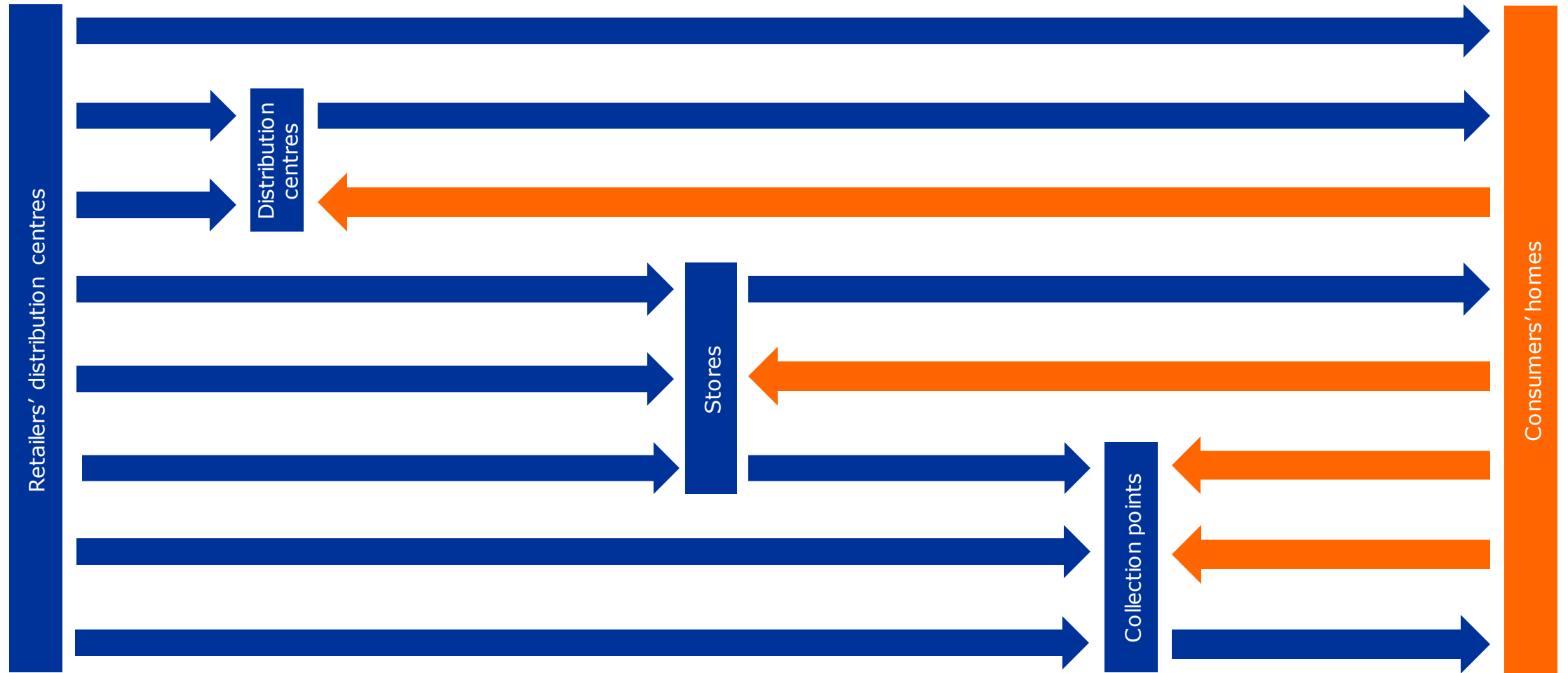
15,6%	8,3%	12,4%
7,3%	17,8%	8,8%
Belgium	UK	Europe

Reference: Ecommerce Europe, 2018; Statista, 2018

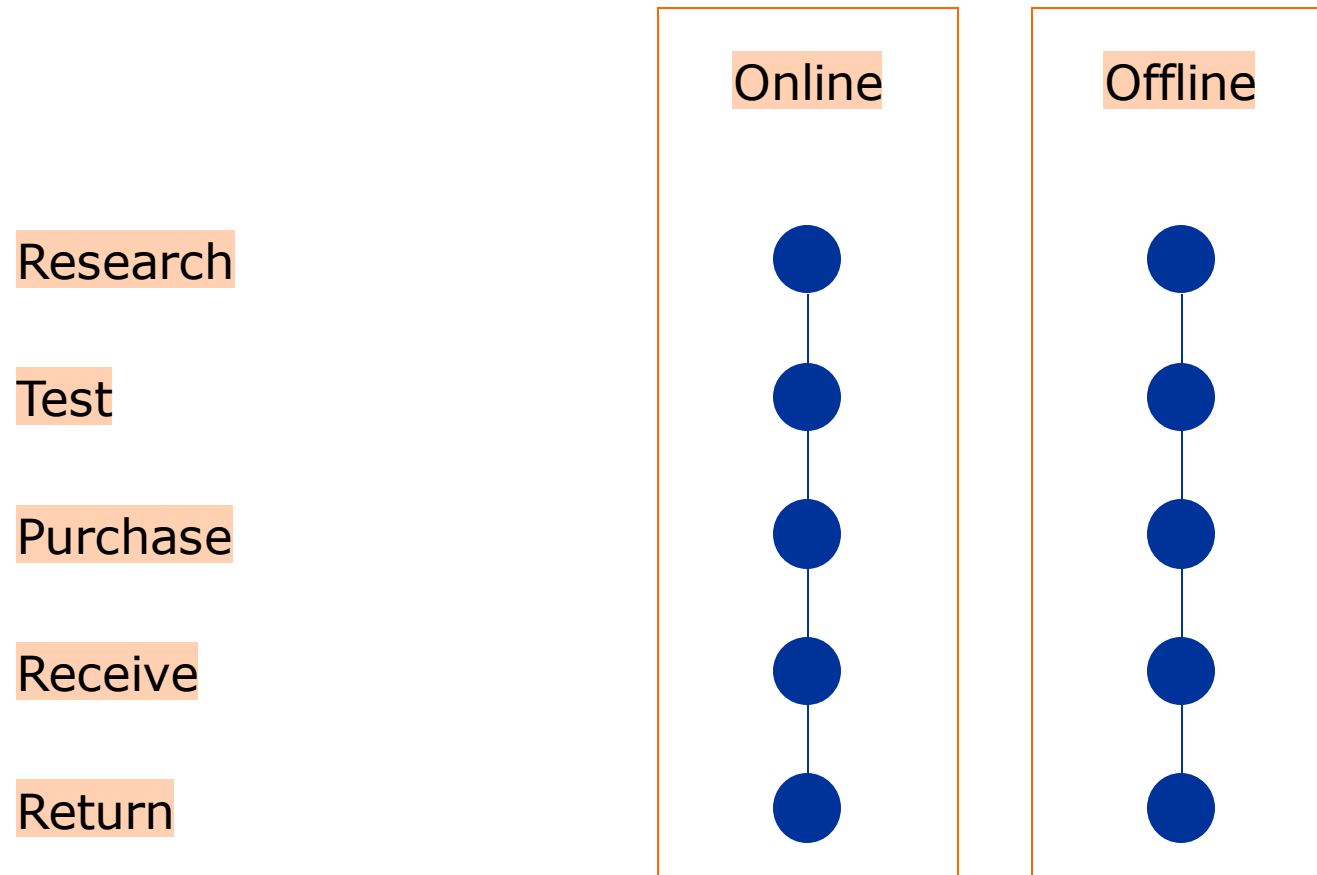
Which retail model is more sustainable?

“Transportation is generally believed to have the greatest impact on sustainability. In this regard, last mile delivery has emerged as the most important of the transportation activities, since there is generally very little difference between the two alternatives for most of the other transportation activities.”

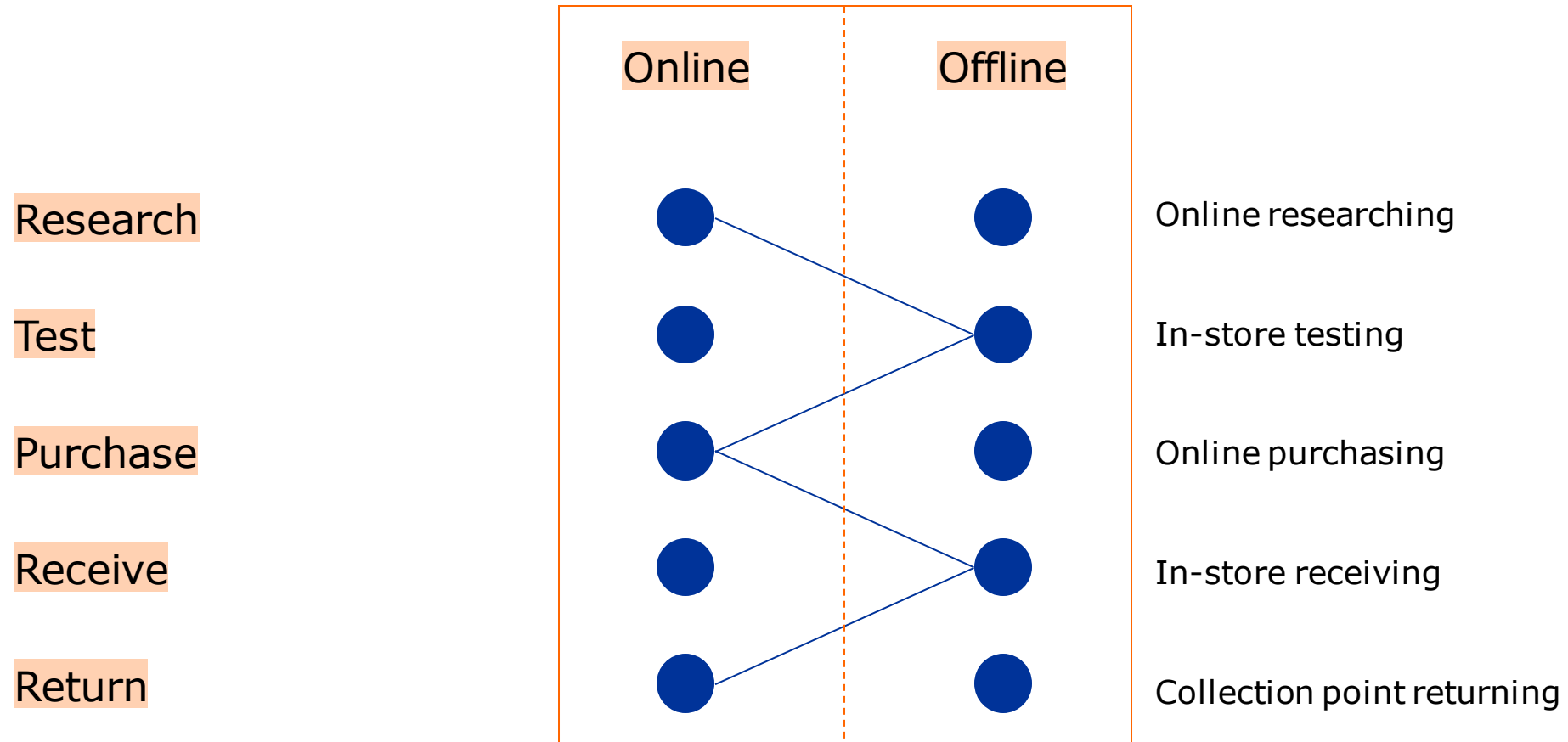
Retail's last mile



Changes in consumer behaviour: "traditional"



Changes in consumer behaviour: "omnichannel"



Which retail model is more sustainable?



Case-study context

Omnichannel footwear retailer

- › Leading the omnichannel development in Belgium.
- › Homogeneous product category as well as “considered purchase”, “experience good”.
- › 70+ stores in Flanders (Belgium north), web-shop since 2012.
- › Free, next-day delivery to any address of choice, collection point or store.
- › 15% of purchases online, 2200 daily parcels.
- › 20% of purchases returned.

Data-collection and analysis

Retail logistics

- › Semi-structured interviews and data-exchange with retail management.
- › Data-exchange with retailer's logistics service provider for the last mile.
- › Data covers retailer's logistics operations and omnichannel performance.

- › Analysis of logistics trips with agent-based transport simulation model TRABAM (Mommens, 2019).

- › Calculation of CO₂ emissions with Excel, based on international reports with key external cost figures.

Consumer travel

- › E-mail survey to 80.000 customers who made a purchase in the last months.
- › 707 complete responses, fair representation of customer population.
- › Questions cover nature and travel associated with purchase, reception, return, research and test activities (if applicable) and socio-demographics.

- › Analysis of purchase behaviour and consumer trips with SPSS and Google Maps.

System boundaries



Retailer's integrated
distribution centre



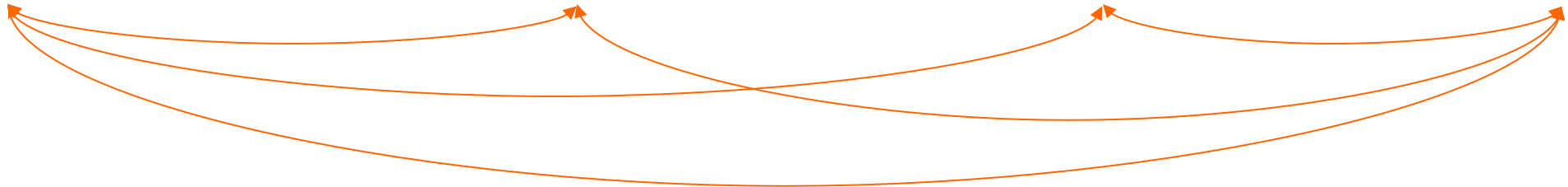
Retailer's
store



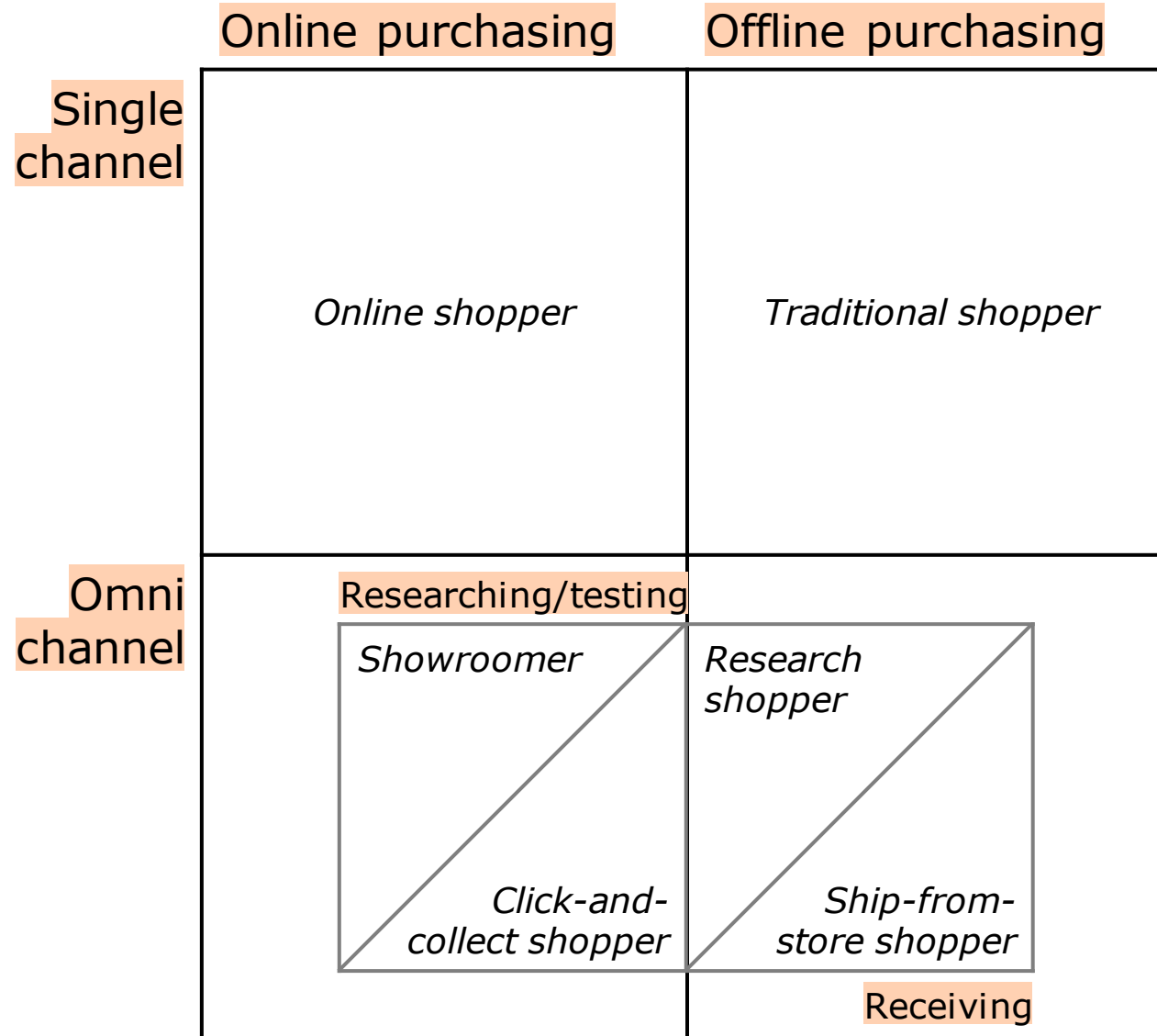
Logistics service
provider's collection point



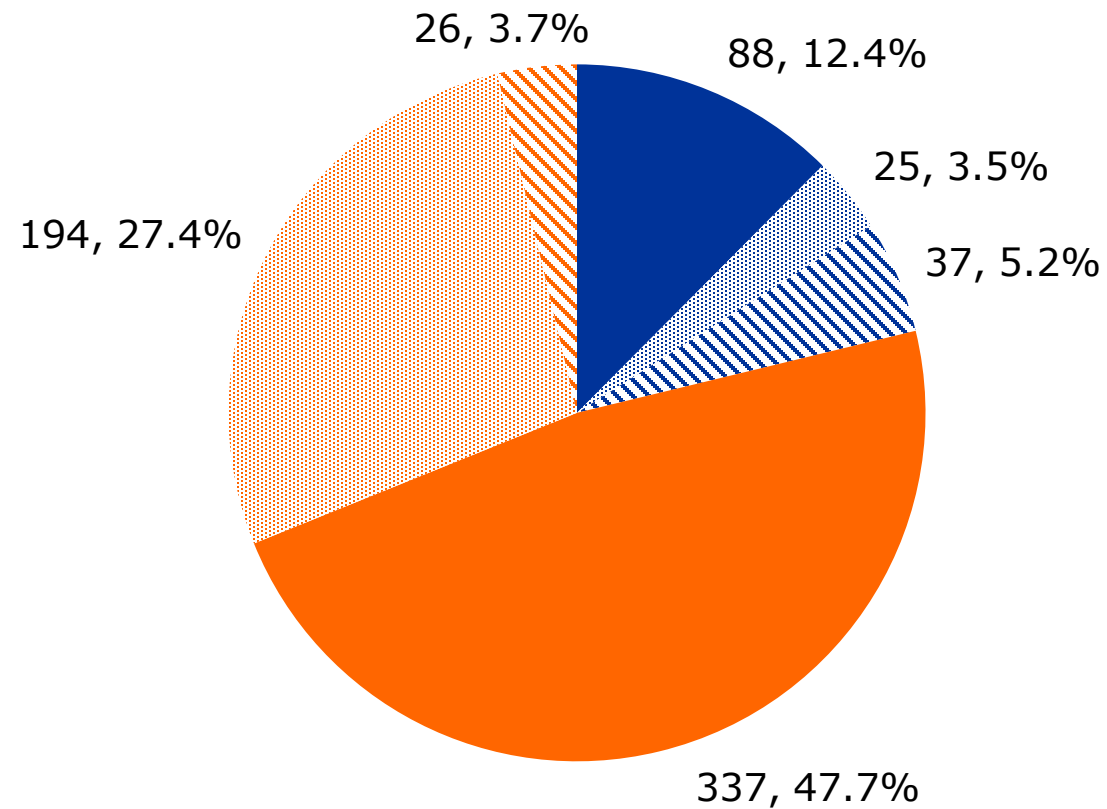
Consumer's
home



Omnichannel consumer types

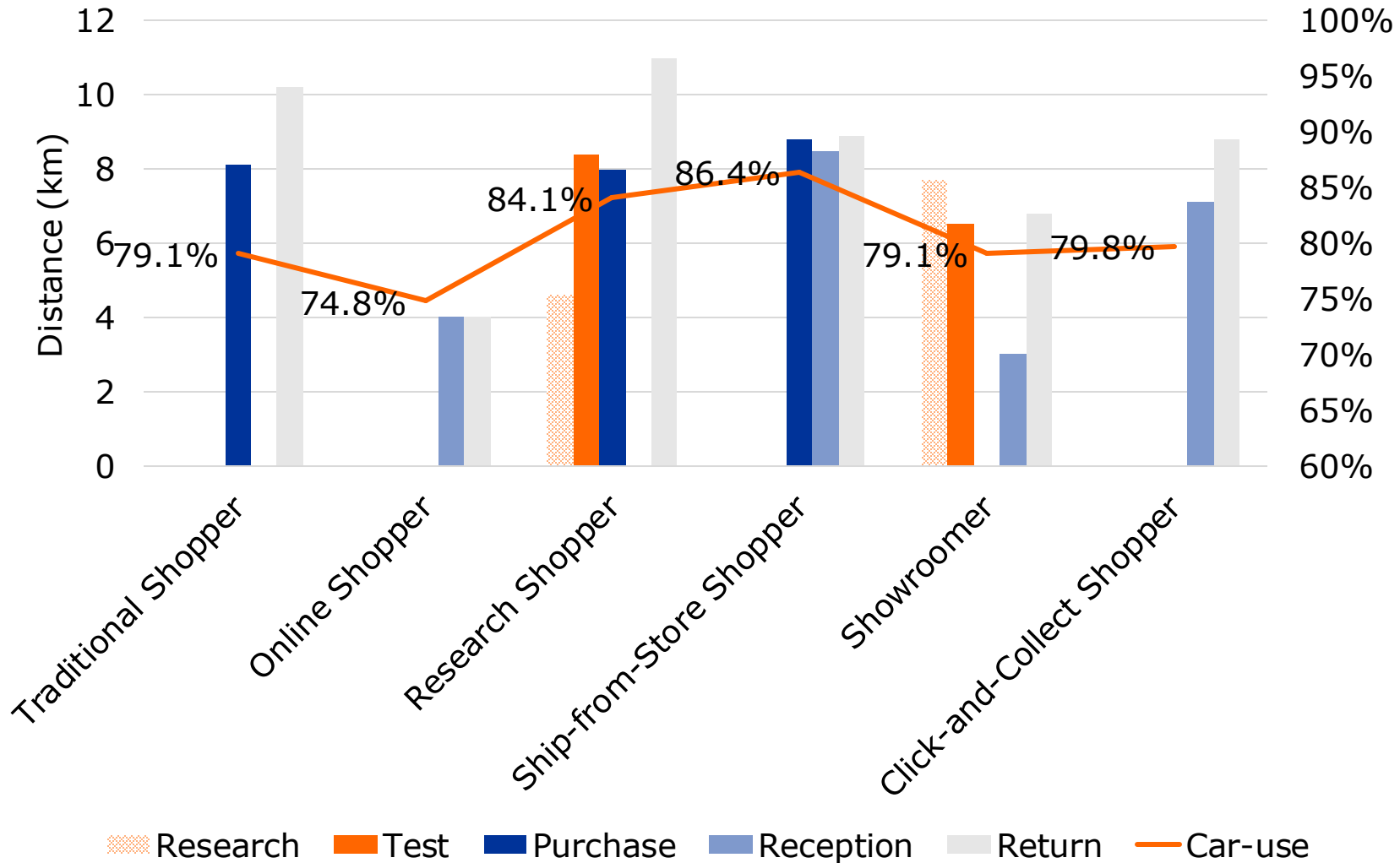


Omnichannel consumer types



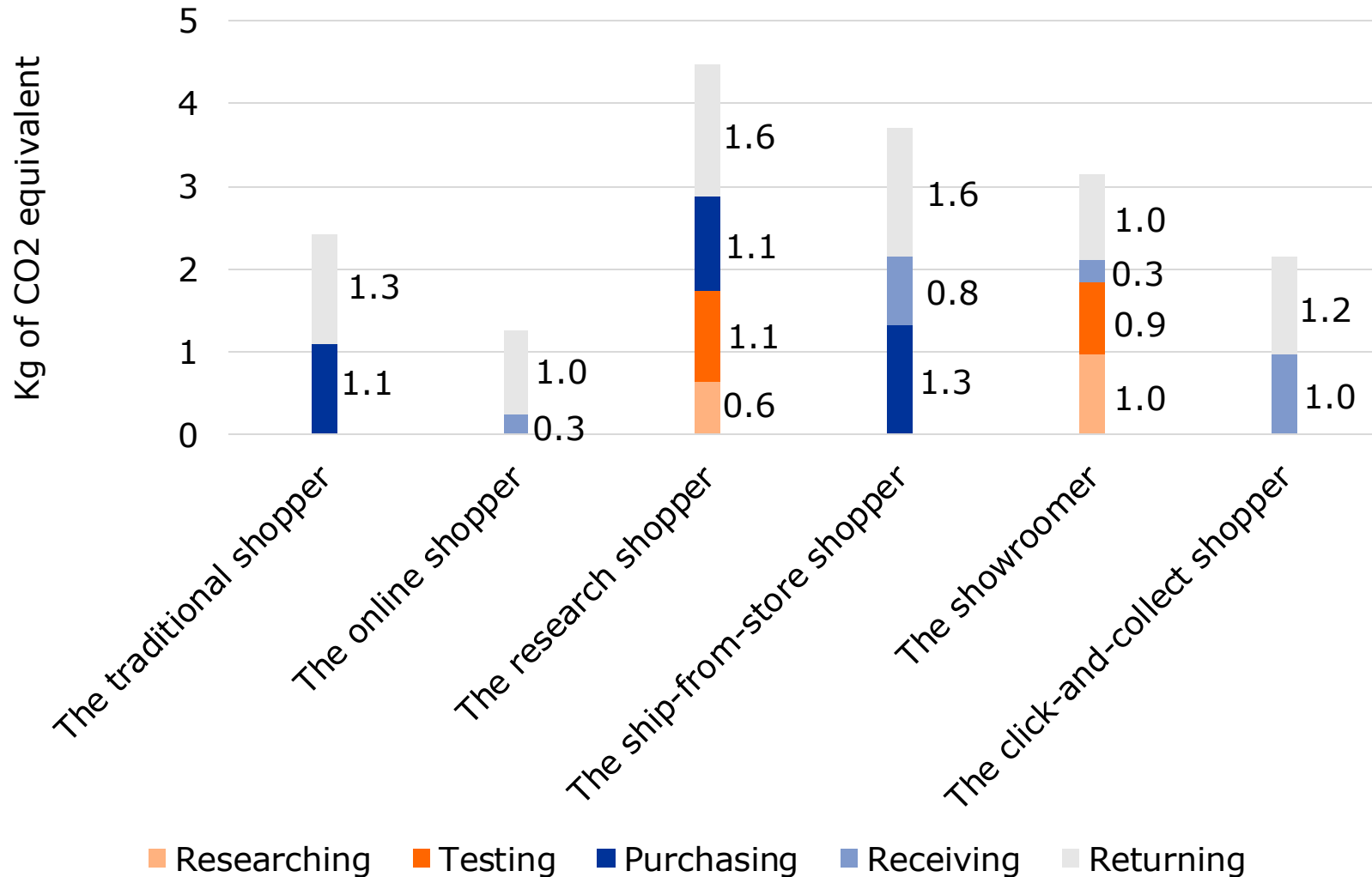
- Online shopper
- Showroomer
- Click-and-collect shopper
- Traditional shopper
- Research shopper
- Ship-from-store shopper

Omnichannel travel behaviour

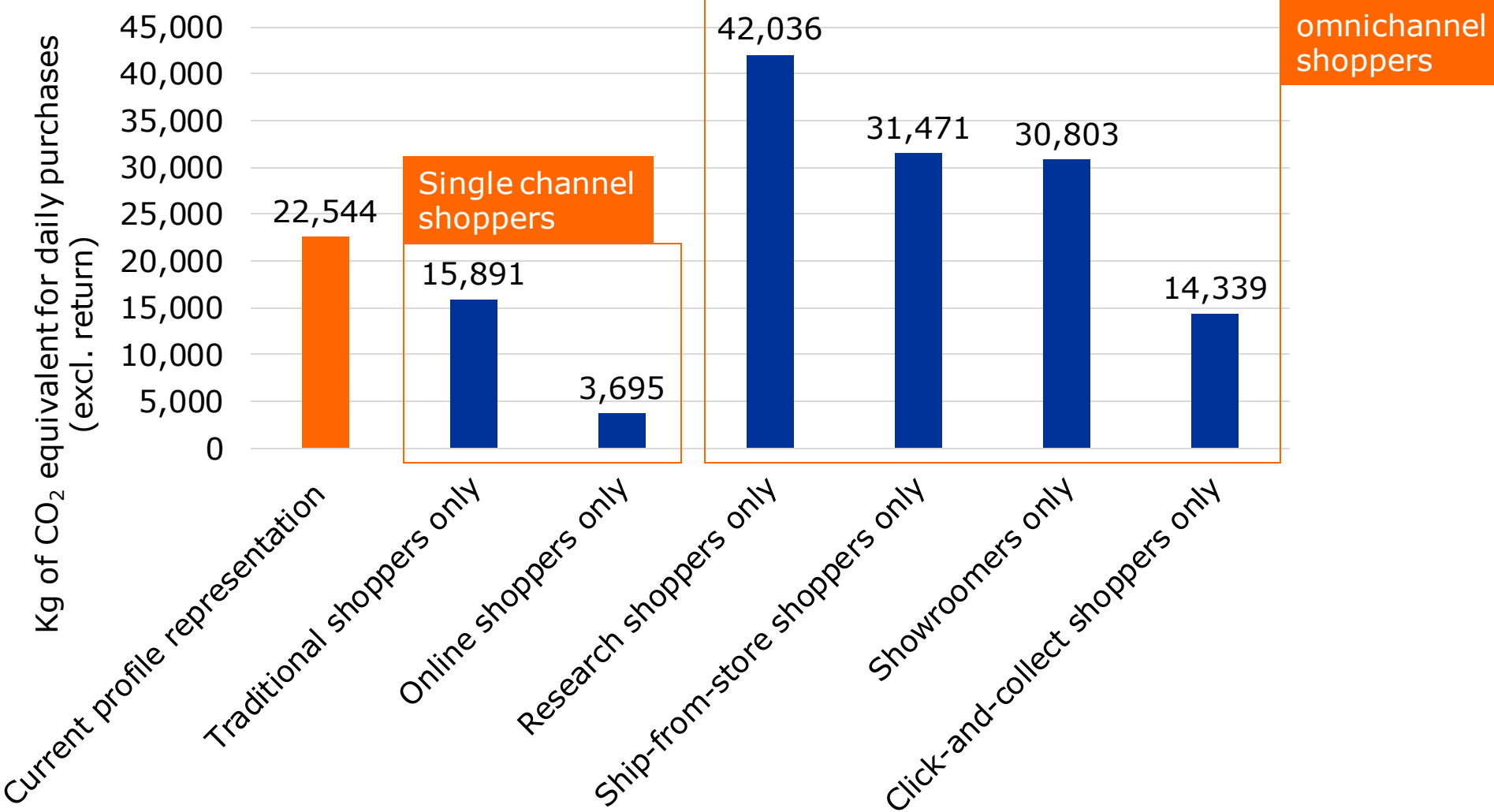


The impact on last mile sustainability

22.554 kg



The impact on last mile sustainability



Conclusion

- > Opportunities for retailers, consumers and logistics service providers to reduce the environmental impact.
- > Beyond the limitations of the case-study: crucial to consider consumer behaviour in studying and pursuing sustainable retail supply chains.
- > Differences among the different profiles in terms of return behaviour?




sustainability



Article

How Does Consumers' Omnichannel Shopping Behaviour Translate into Travel and Transport Impacts? Case-Study of a Footwear Retailer in Belgium

Heleen Buldeo Rai *, Koen Mommens, Sara Verlinde and Cathy Macharis 

Vrije Universiteit Brussel, MOBI — Mobility, Logistics and Automotive Technology Research Centre, Pleinlaan 2, 1050 Brussels, Belgium; koen.mommens@vub.be (K.M.); sara.verlinde@vub.be (S.V.); cathy.macharis@vub.be (C.M.)

* Correspondence: heleen.buldeo.raai@vub.be

Let's stay in touch!



Dr. Heleen Buldeo Rai

+32 2 614 83 08
Heleen.Buldeo.Rai@vub.be
Building PL5 (4.36)



Dr. Sara Verlinde

+32 2 614 83 43
Sara.Verlinde@vub.be
Building PL5 (4.36)



Dr. Koen Mommens

+32 2 614 83 26
Koen.Mommens@vub.be
Building PL5 (4.33)



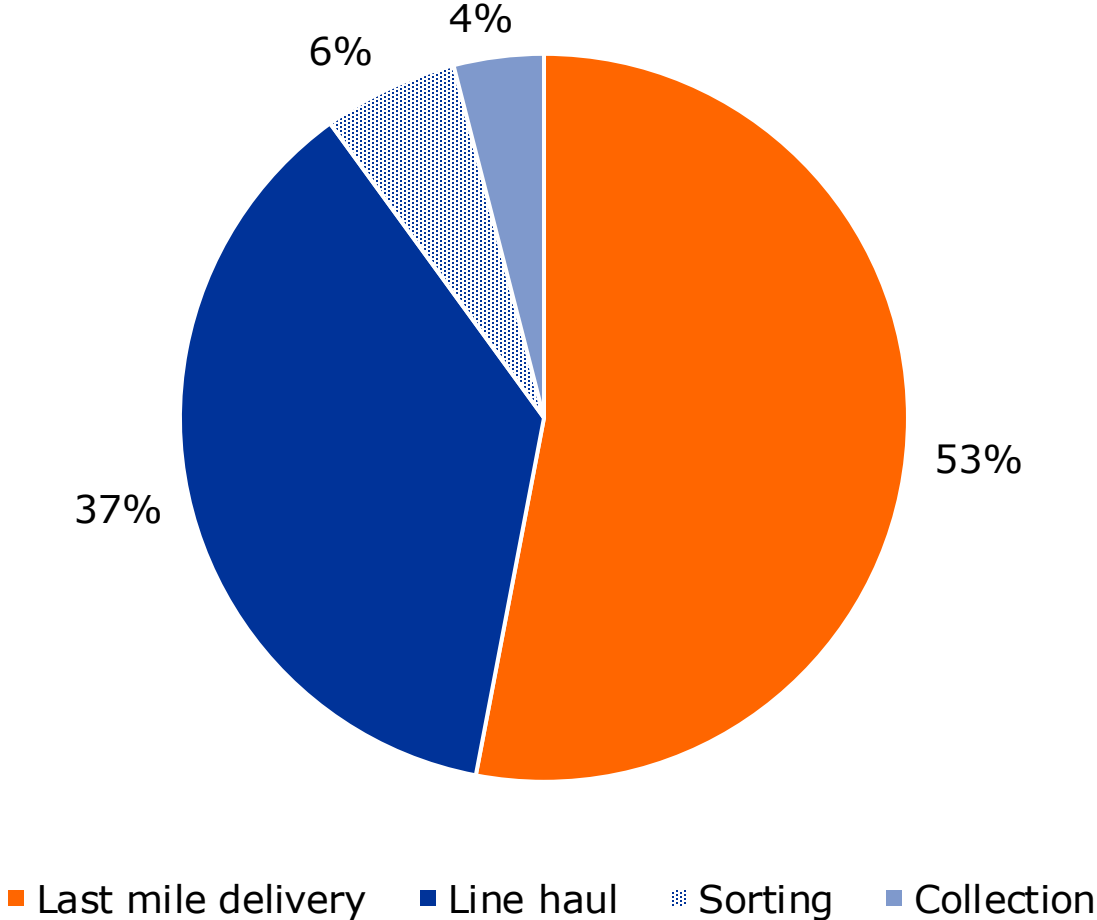
Prof. dr. Cathy Macharis

+32 2 614 83 03
Cathy.Macharis@vub.be
Building PL5 (4.37)



The importance of the last mile (1/3): costs

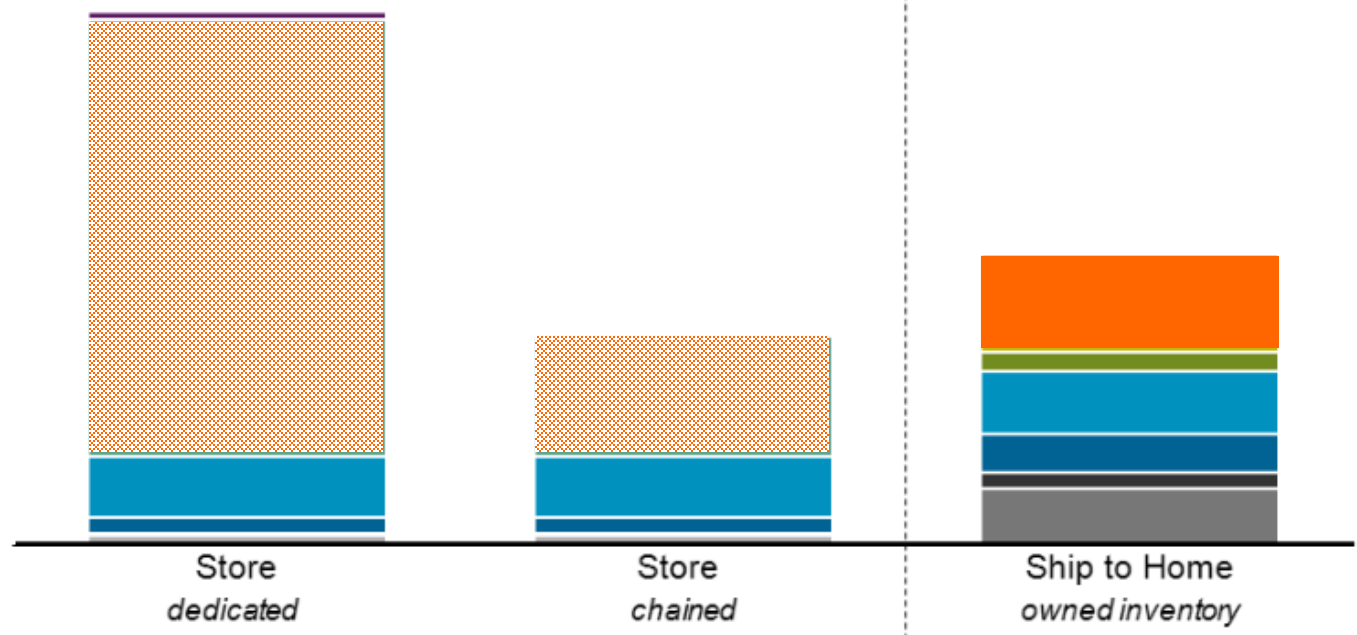
Share of delivery costs, by part of journey



Reference: Honeywell, 2016

The importance of the last mile (2/3): environmental impact

Emissions per single-item general merchandise basket (kg CO2e)



- Mobile**
 - Returns transit
 - Grocery delivery
 - 3rd party shipping – last mile
 - 3rd party shipping – long haul
 - 3rd party shipping – first mile
 - Customer trips to store
 - Transit within WMT system
- Packaging**
 - All secondary packaging (includes internal transport, store bags, and 3rd party shipping packaging)
- Stationary**
 - Data center emissions
 - DC emissions
 - Store emissions

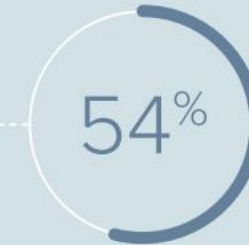
The importance of the last mile (3/3): importance to consumers



of consumers bought goods from one online merchant over another because the delivery options were more convenient for their needs

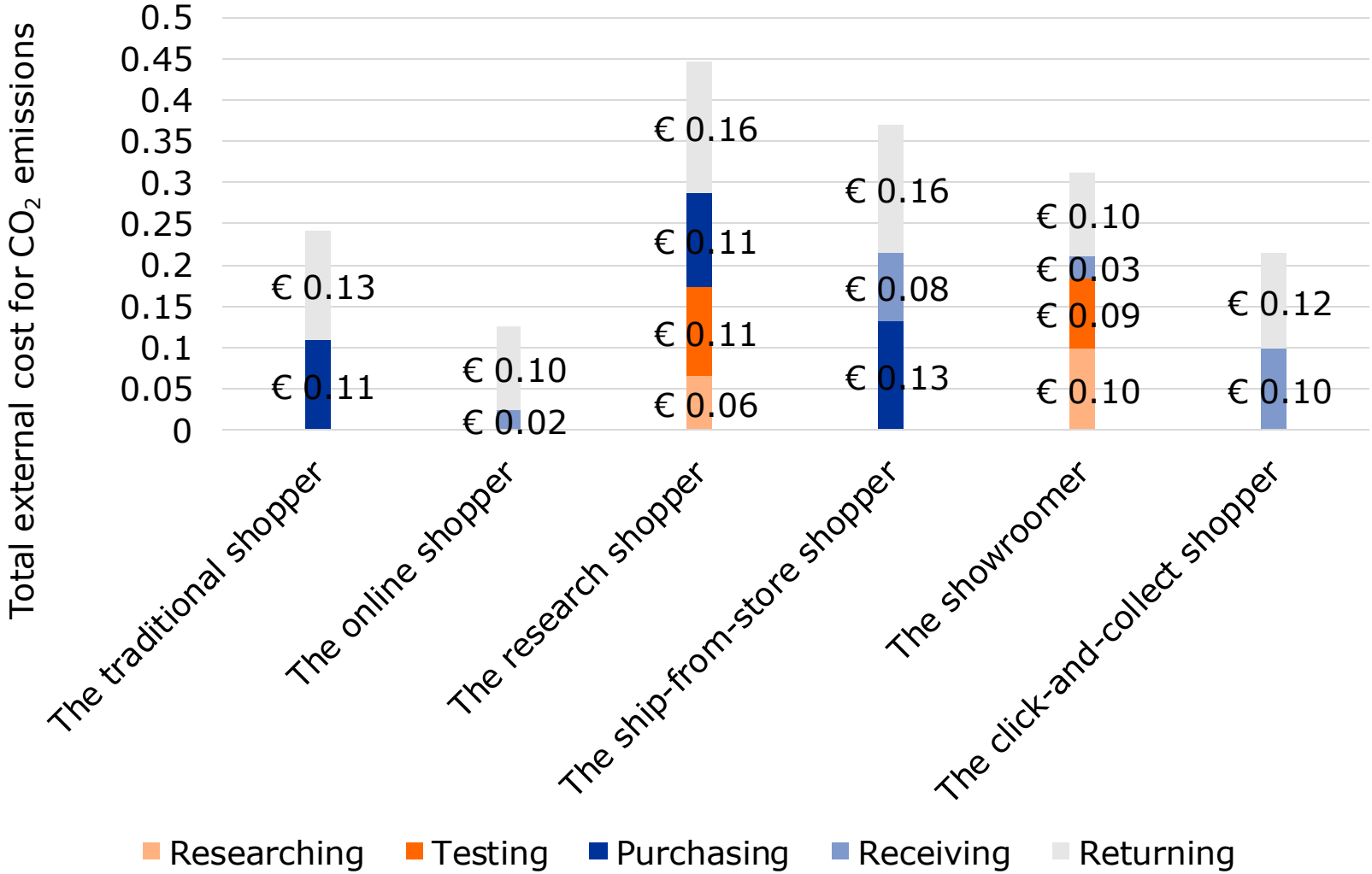


purchased more items to take advantage of a minimum spend 'free delivery' option

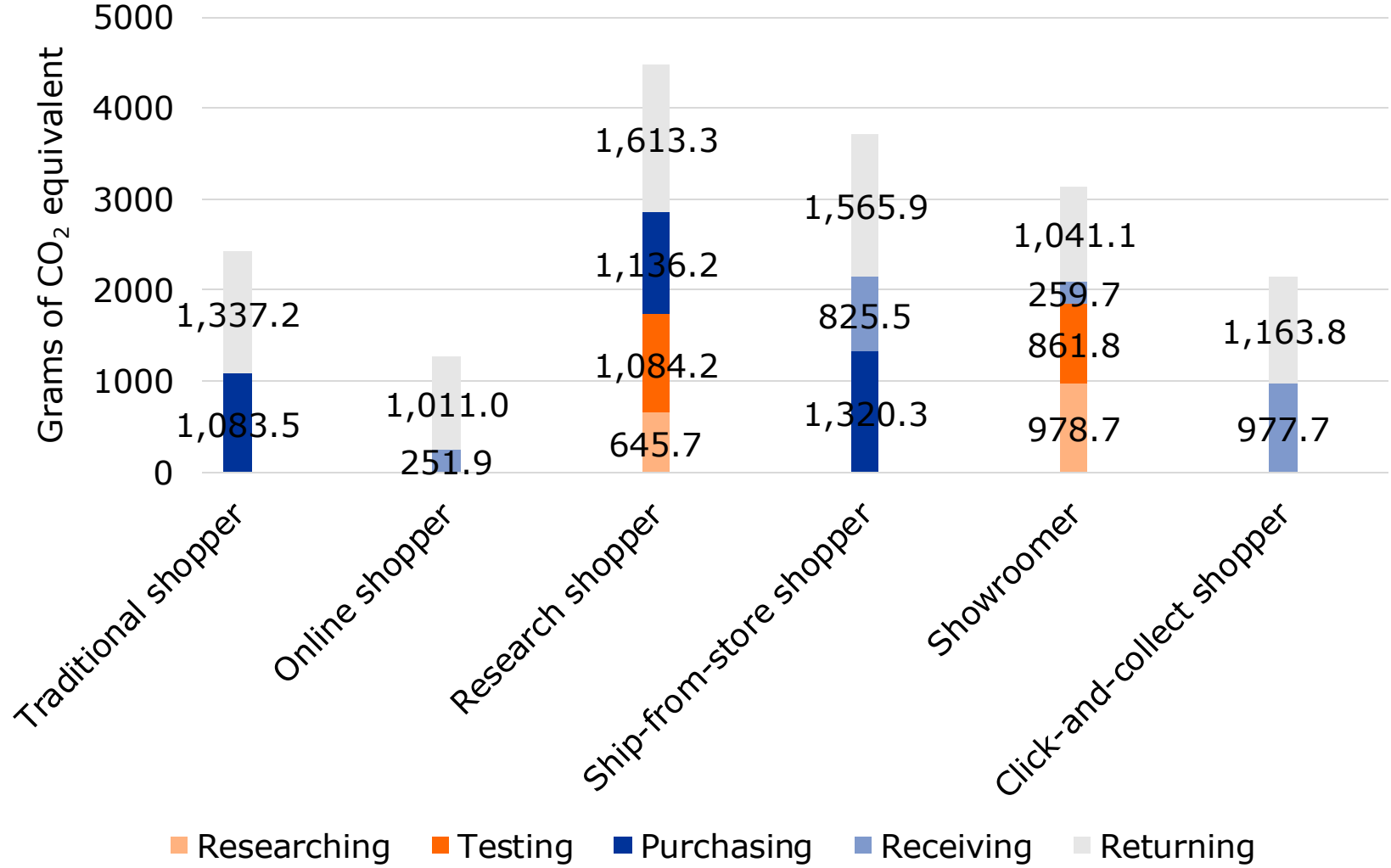


of consumers say delivery defines who they always shop with

The impact on last mile sustainability



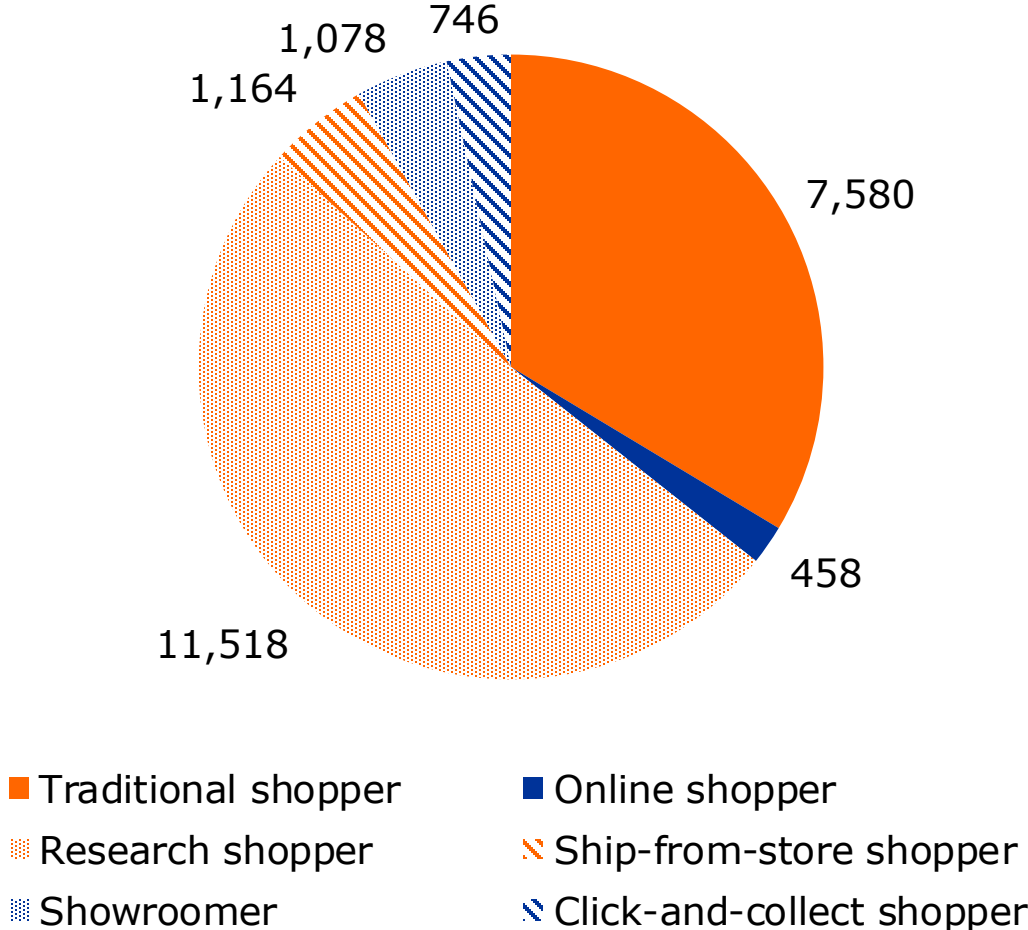
The impact on last mile sustainability



The impact on last mile sustainability

22.554 kg

Kg of CO₂ equivalent for daily purchases (excl. return)



Opportunities

Retailers

Adapt store infrastructure and store locations to facilitate sustainable transport modes.

Stimulate stores as “one-stop-shops” for all pre-purchase and purchase activities.

Enhance online channels to facilitate pre-purchase activities online.

Provide and stimulate longer delivery terms to foster consolidation.

Encourage reception and return in collection points.

Collaborate with the most efficient logistics partner for last mile deliveries.

Consumers

Use sustainable transport modes for all shopping activities, especially for shorter trips.

Chain activities to shopping trips.

Combine shopping activities in one trip.

Avoid short delivery terms.

Select collection point delivery.

Avoid product returns.

Logistics Service Providers

Increase use of sustainable vehicle types.

Increase delivery efficiency.

Increase collection point density and flexibility.

Create programmes to avoid delivery failure.