why online shopping can be, but not necessarily is, more sustainable than physical shopping

SafeShops.be webinar on January 21st, 2021

Heleen Buldeo Rai, postdoctoral researcher at the Logistics City chair, Université Gustave Eiffel
unprecedented parcel volumes

2017
150,000 parcels per day

2020
1,300,000 parcels per day

references: Gijsbrechts, 2017; bpost, 2021; BIPT, 2021
"the quickening"

reference: OECD, 2020
the more sustainable way to shop

physical shopping

online shopping

reference: Wygonik & Goodchild, 2012
substitution as basic hypothesis

![Box plot showing gCO₂ per purchase for online and store purchases.](image)

reference: Buldeo Rai & Dablanc, in progress
modelling shopping patterns...

personal mobility

shopping in high-emission modes
shopping remote
one activity per trip

shopping in low-emission modes
shopping local
more activities per trip

in favour of online shopping
in favour of physical shopping
modelling shopping patterns...

goods mobility

- Many parcels per round
- Optimal packaging
- Delivery in low-emission modes
- Shopping in high-emission modes
- One activity per trip
- Shopping remote

- Excessive packaging
- Few parcels per round
- Shopping in high-emission modes
- More activities per trip
- Shopping local

In favour of online shopping

In favour of physical shopping
modelling shopping patterns...

personal + goods mobility

- delivery in low-emission modes
  - many parcels per round
  - optimal packaging
  - one activity per trip
  - shopping remote
- shopping in high-emission modes

- failed delivery
- return delivery
- shopping in low-emission modes

- delivery in high-emission modes
  - excessive packaging
  - few parcels per round
  - more activities per trip
  - shopping local

in favour of online shopping  in favour of physical shopping
challenged by consumer behaviour

1 omnichannel purchases

reference: Buldeo Rai et al., 2019
challenged by consumer behaviour

2 fragmented purchases

reference: 6t, 2018
challenged by consumer behaviour

3 increased purchases

*Indicates sales compared to average in October 1-28 2020 (four weeks).
At least 10 retailers at most granular level.

reference: Criteo, 2020
challenged by consumer behaviour

4 alternative activities

reference: European Commission, 2017
an offer you can hardly refuse


FREE Same-Day Delivery

Holiday gifts, just in time.

See the latest dates to order your holiday gifts with free shipping. Find specific delivery dates based on your selections and location in checkout. In most metros, get in-stock items by 2-hour delivery for $5 or Apple Pickup.
the virtual transforms the physical

online business models

mobility lifestyles

distribution structure and facilities

physical store offer and locations

Transport system (networks)

Accessibility

Activities (travel behaviour)

Land use (locations)

Technological innovations
Infrastructure investment
Mobility policy

Regional demand
Land availability
Area attractiveness
Spatial policy

Socio-demographic, economic and cultural factors

direct
slow
fast

reference: Bertolini, 2012
good practices in e-commerce

at check-out

• provide (a) delivery option(s) with a lower environmental impact
• differentiate delivery options in price according to environmental impact
• inform and raise awareness about the environmental impact of delivery
• explore the potential of crowdsourced delivery and collection
good practices in e-commerce

in the distribution centre
- optimise packaging and reduce waste
- collaborate to optimise vehicle load rates
- clarify origin destination(s)
- consider alternative origin and destination locations to optimise delivery routes
good practices in e-commerce

- integrate low or zero emission vehicle types or modes
- optimise delivery information and communication
- explore the potential of autonomous delivery
Upon arrival:

- Consider failed deliveries to optimise delivery information and communication.
- Consider collection trips to optimise the delivery options.
- Consider returns to optimise retail processes and packaging.

Good practices in e-commerce.
visit https://www.ecommercemobilities.com/
& let’s stay in touch

Heleen Buldeo Rai
heleen.buldeo-rai@univ-eiffel.fr

book coming soon @LannooCampus!