
The impact of online shopping on the UK high street

The webinar will begin at 2pm

- You now have a menu in the top right corner of your screen.
- The red button with a white arrow allows you to expand and contract the webinar menu, in which you can write questions/comments.
- We won't have time to answer questions while we are presenting, but will answer them at the end
- You will be on mute throughout – we can't hear you.

The impact of online shopping on the UK high street

Webinar

3 March 2016

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UK Data Service



Overview

- Introduction to the Big Data Network Phase 2
- Introduction to the CDRC
- Overview of the study
- Data used and methodology
- Summary
- Questions



Big Data Network – Phase 2

The ESRC has invested in three Business and Local Government Data Research Centres



ESRC Business and Local Government
Data Research Centre

– blgdataresearch.org



Consumer
Data
Research
Centre

– cdrc.ac.uk



Urban
Big
Data
Centre

– ubdc.ac.uk

The three Research Centres:

- make data, routinely collected by business and local government organisations, accessible for research
- benefit to data owners and society
- ensure that individuals' identities are safeguarded



Big Data Network Support

The UK Data Service was funded by the ESRC to support and coordinate activities between three Centres



- unify data discovery across the BDN2 data collections
- encourage the sharing of information and expertise across the Data Research Centres
- coordinate user training and capacity building in big data analytics for researchers using the data

Consumer Data Research Centre (CDRC)

Data Research Centre established by the ESRC

- University of Leeds
- University College London
- University of Liverpool
- University of Oxford

Data

- covers a range of [topics](#) concerning the characteristics, constraints and outcomes of consumption
- a searchable [data catalogue](#)
- Open, safeguarded and secure data

Training

- Data analytics (R, GIS)

www.cdrc.ac.uk



UK Data Service





Consumer
Data
Research
Centre

An ESRC Data
Investment

e-Resilience of UK retail centres

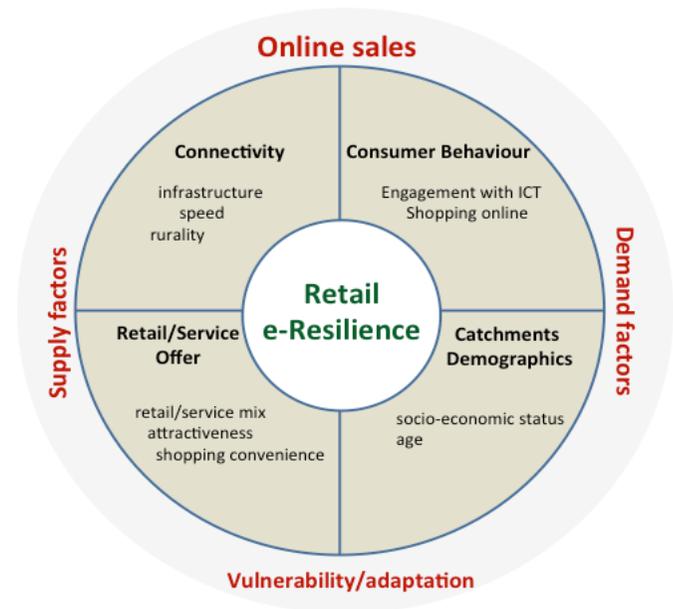
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Content

- Background
- The concept of e-resilience
- Empirical analysis
- Research outputs
- Value added



Retail sector in UK

- Successful sector employing 2.9 million people
- Retail sales (£7.1 billion per week in 2015) – equivalent of 21% GDP
- We make 200 shopping trips (on average) per year
- Shopping destinations:
 - Free-standing store
 - Town centre
 - Shopping centre
 - Retail park



Evolution of town centres

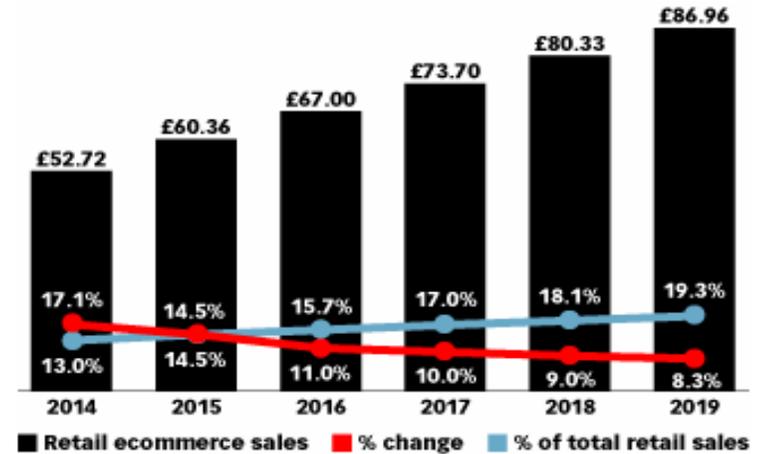
- Competition from out-of-centre large retail developments
- Shock of the economic crisis
- Changing demographics and consumer culture
- Rapid growth of online sales



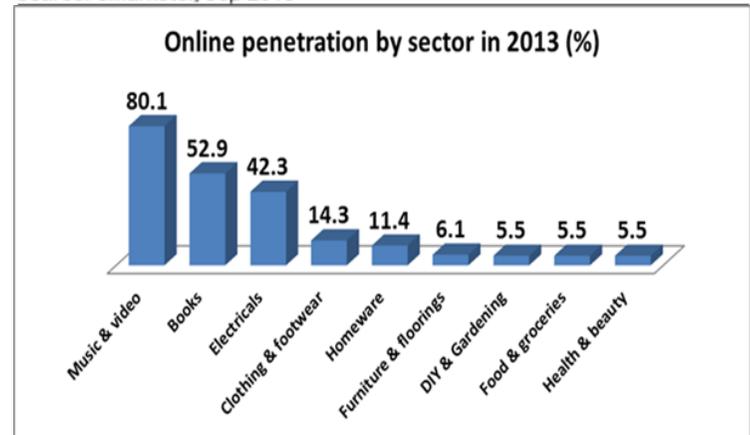
Poundland® 

Online shopping & retail centres

- Online sales reached 15% of total sales in the UK
- Rise of e-commerce, m-commerce and [omni-commerce](#)
- Transformation of major retailers into 'bricks & clicks'
- Variable online penetration levels



Note: includes products or services ordered using the internet via any device, regardless of the method of payment or fulfillment; excludes travel and event tickets
Source: eMarketer, Sep 2015



Research question(s)

- **Impact of online sales on UK retail centres**
 - Geography of online sales little understood?
 - Structure of traditional high streets impacted by consumers' propensity for online shopping?
 - How can we measure 'e-resilience' of retail centres?



substitution

- online shopping replacing trips to retail stores

complementarity

- online shopping enhancing physical shopping e.g. generation of additional trips via online advertisement

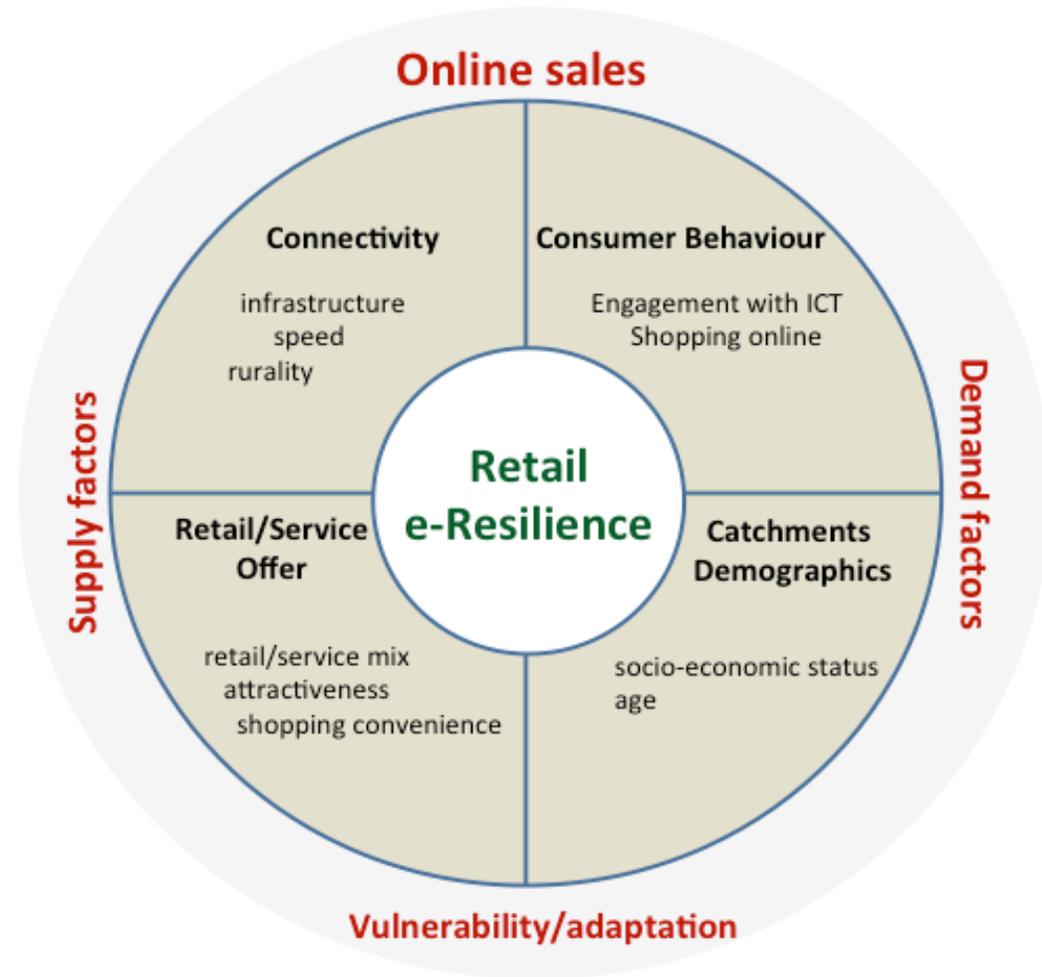
modification

- nature of physical shopping in high street stores is altered by online shopping e.g. click & collect points



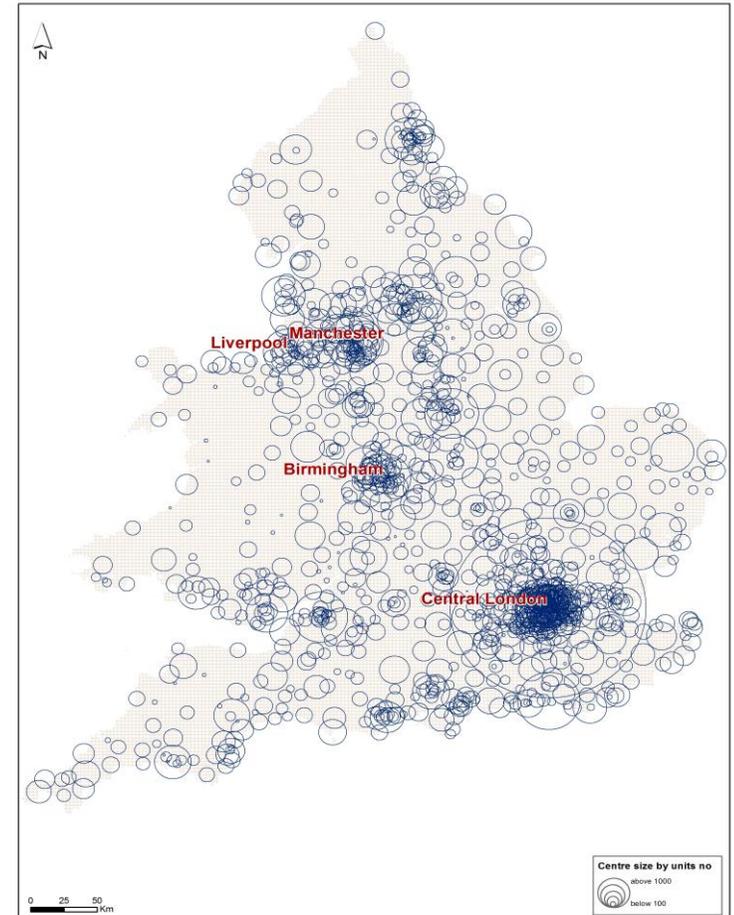
Theoretical framework

- ❑ **Connectivity** - available infrastructure to get online
- ❑ **Behaviour** - propensity to use internet for shopping
- ❑ **Demographics** (ethnicity, age, gender, disability)
- ❑ **Retail supply** - attractiveness, accessibility & convenience



Supply data

- 1300 town centres in Great Britain
- 2600 shopping centres & retail parks
- Retail centre occupancy data - [Goad Experian](#), [LDC](#)
- Road network
- Internet speed data compiled at LSOA level



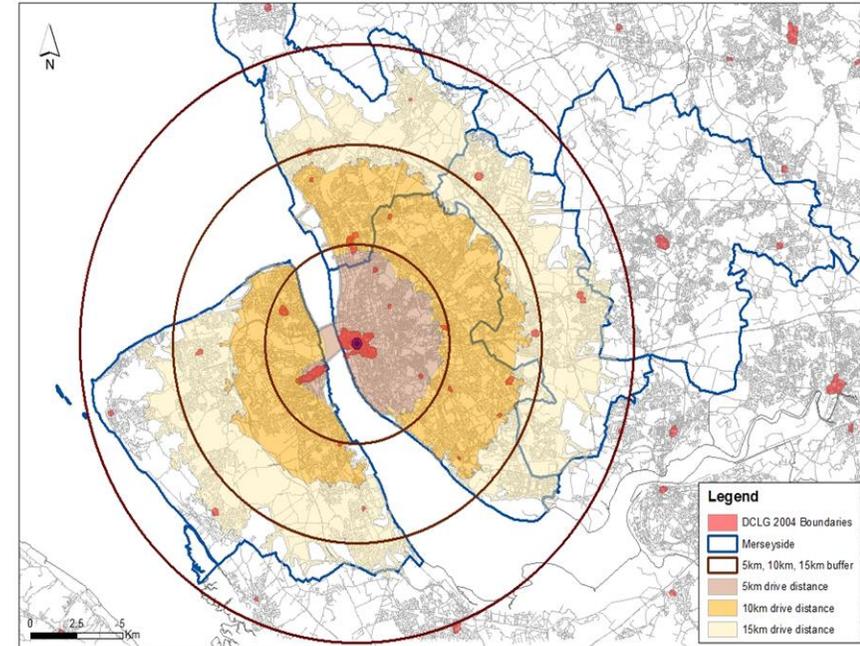
Demand data

- Census 2011 data at LSOA level
 - Demographic
 - Education
 - Employment
 - Engagement
- The Oxford Internet Surveys (OXIS)



Estimating retail catchments

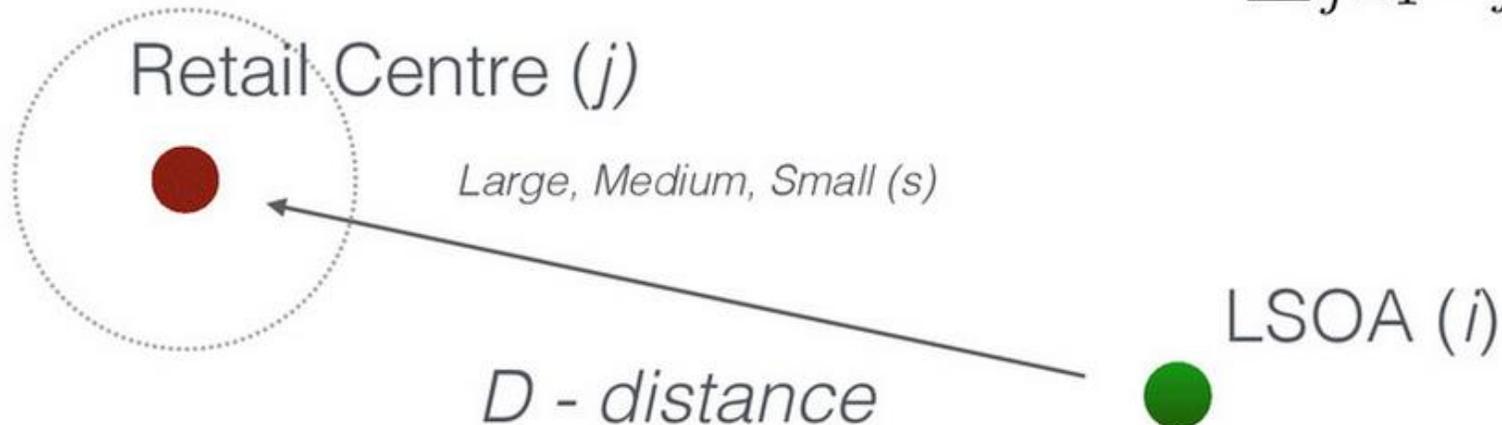
- **Catchment model for a national scale**
- **Catchment area estimation techniques**
 - Simple methods – buffers, drive distance/time
 - Spatial Interaction Models (SIM) – gravity and probabilistic models
- **Components of the SIM model**
 - Competition
 - Attractiveness/hierarchy
 - Distance/decay parameter



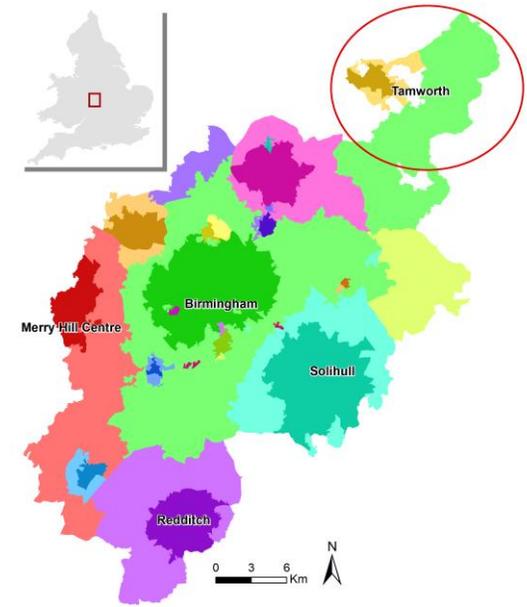
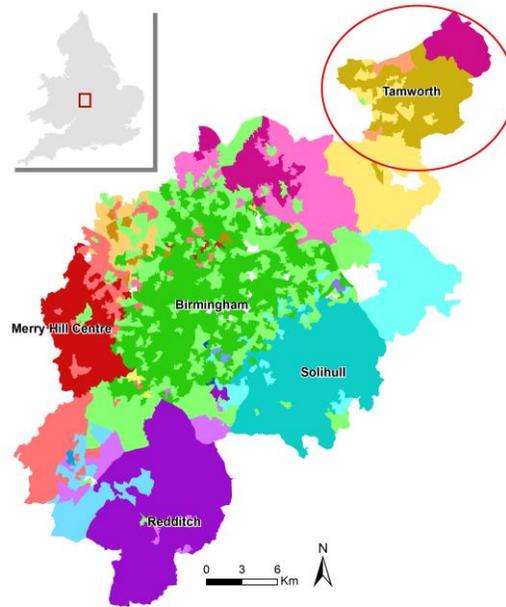
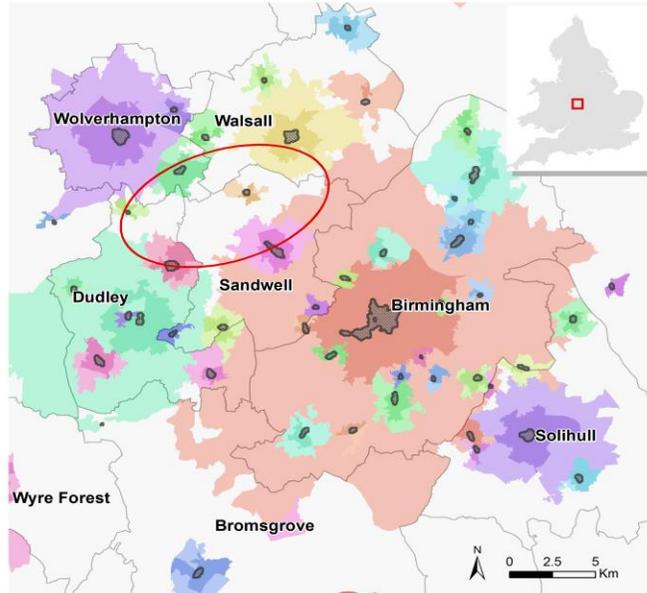
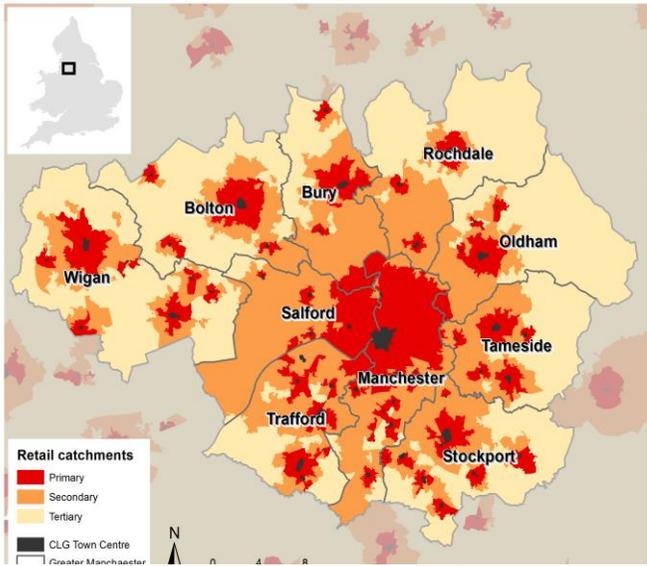
The Huff probability model

A - attractiveness

$$P_{ij} = \frac{A_j^\alpha D_{ij}^{-\beta_{s_j}}}{\sum_{j=1}^n A_j^\alpha D_{ij}^{-\beta_{s_j}}}$$



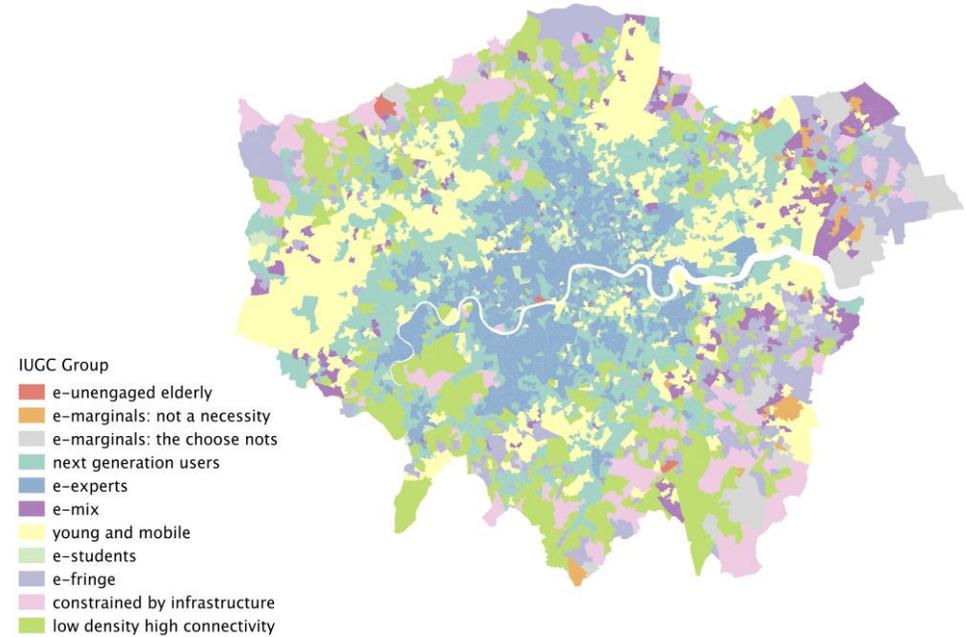
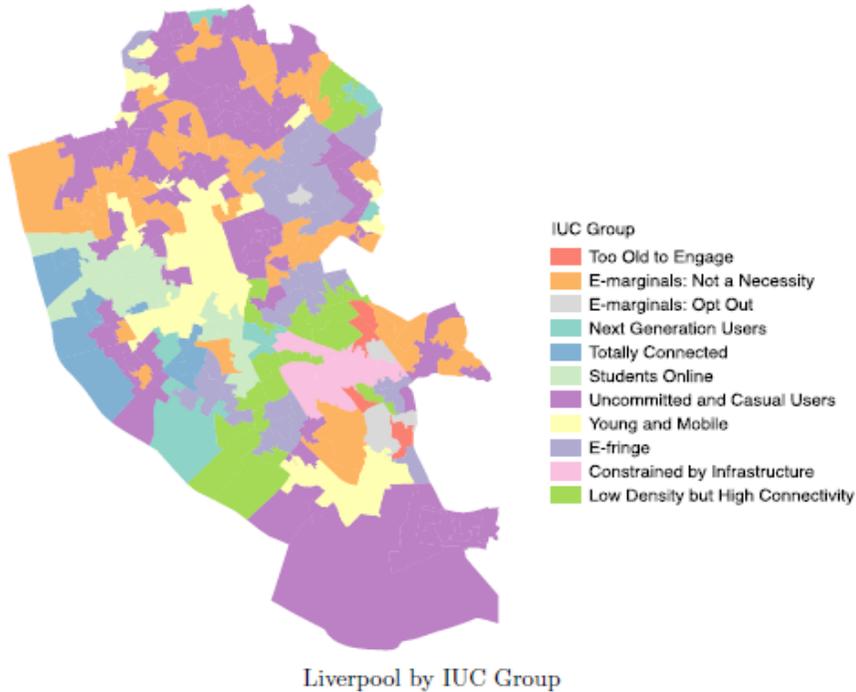
Outputs & model calibration



Dolega, L., Pavlis, M., Singleton, A.D. (2016). Estimating Attractiveness, Hierarchy and Catchment Area Extents for a National Set of Retail Centre Agglomerations, *Journal of Retailing and Consumer Services*, 28: 78 - 90.

Internet User Classification (IUC)

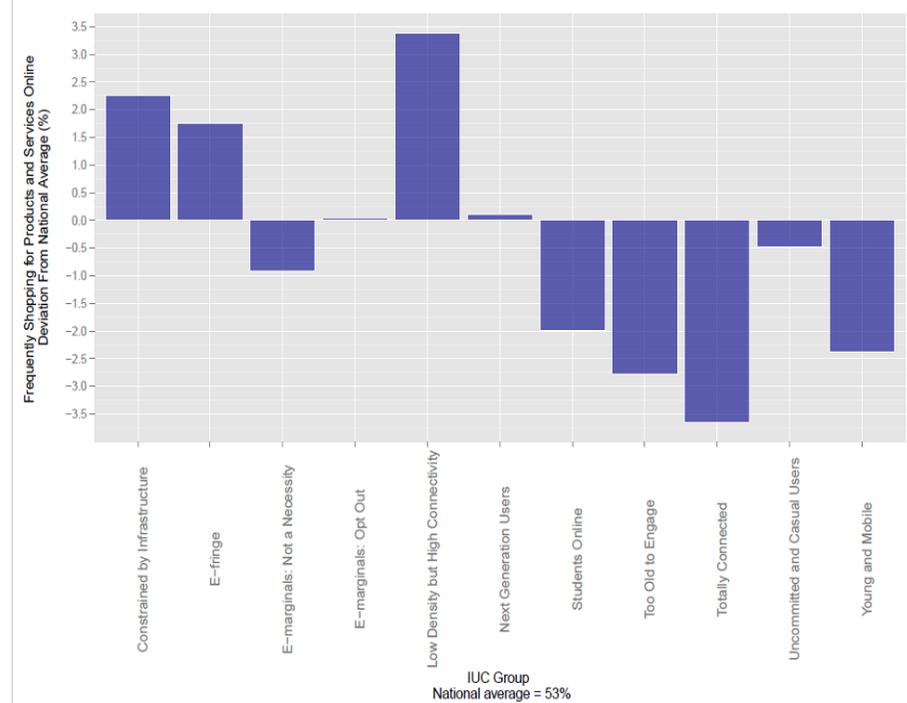
- **IUC** – purpose specific geodemographic classification



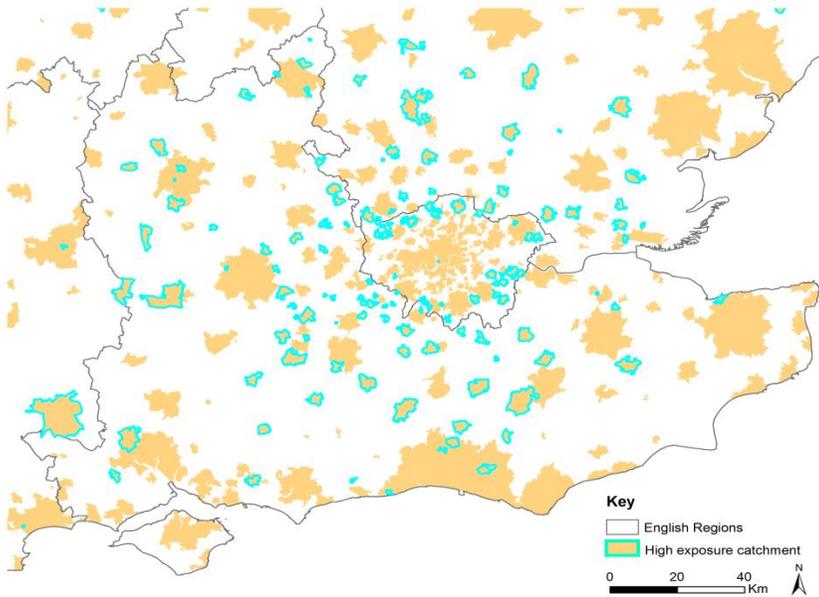
- **Data**
 - Oxford Internet Survey (OXIS)
 - Internet enabling infrastructures
 - Socio-demographic indicators from the 2011 Census

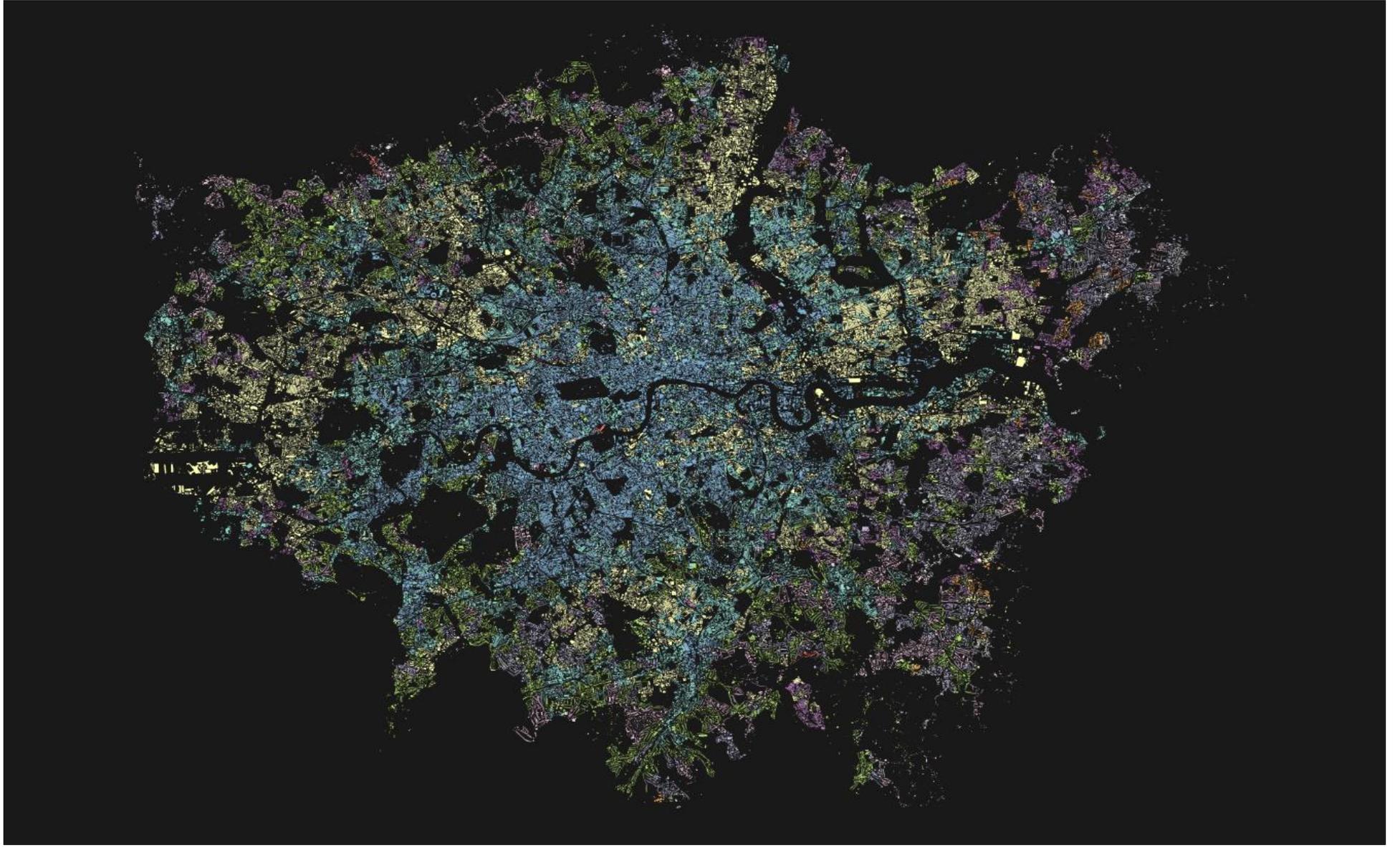
Propensity for online shopping

- Online shopping rates differ between IUC groups
- Retail catchment profiles based on IUC



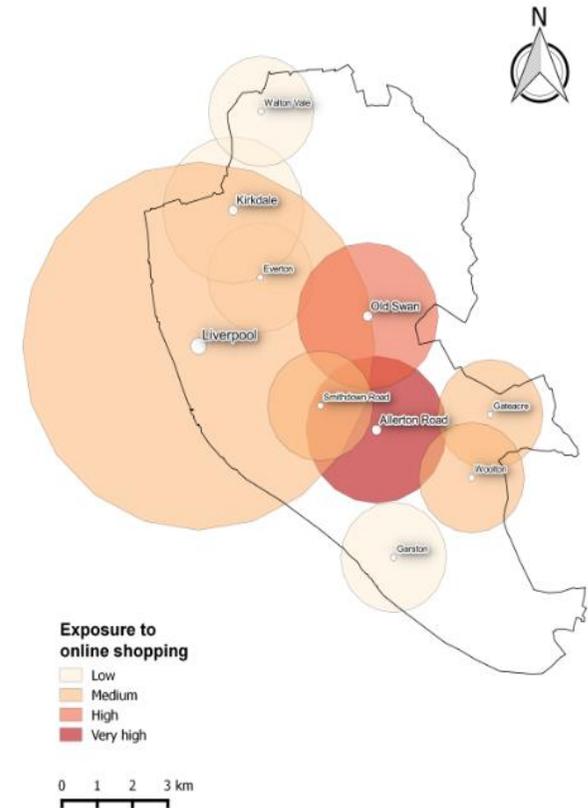
- Index of high exposure





Vulnerability to online shopping

- **Retail supply factors**
 - **Positive** - anchor stores & leisure units
 - **Negative** - 'digitalisation' retail
- **Highest vulnerability** – secondary and tertiary retail centres in rural & suburban locations
- **Lowest vulnerability** – inner city locations, regional shopping centres



e-Resilience scores

- Index of high exposure
- Index of retail supply vulnerability
- **E-resilience score** - intersection of the above indices

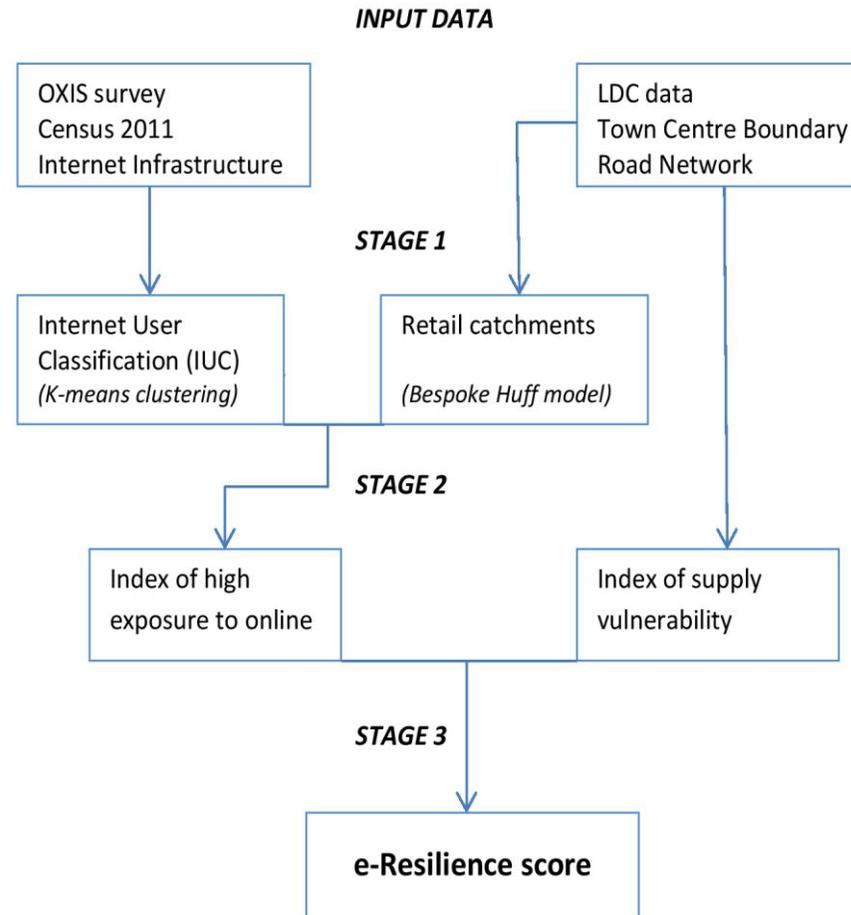
Table1: 10 most e-resilient retail centres

Town Centre	Region	Score
Ravenside Retail Park	South East	100.0
Boughton	East Midlands	95.0
Hersham	South East	89.6
Corbridge	North East	86.4
Halton, Leeds	Yorkshire and the Humber	86.0
Torport	South West	76.1
Marsh Road, Luton	East Of England	73.4
Kingston Park	North East	71.8
Knaphill	South East	71.5
Sky Blue Way, Coventry	West Midlands	70.7

Table2: 10 least e-resilient retail centres

Town Centre	Region	Score
Woburn Sands	South East	1.0
Rochford	East Of England	6.8
Lydney	South West	22.5
Fordingbridge	South East	22.9
Rainham	South East	25.4
Uppingham	East Midlands	26.5
Salford	North West	27.3
Kew	Greater London	28.3
Romford Road	Greater London	28.5
Emsworth	South East	29.0

Calculation of e-resilience scores



Value added

- New insights into the debate on impacts of online retailing on the traditional 'brick and mortar' retailers
- Investigation of how the impact of online sales can be measured, and what role local demographics may have in that context
- Tools for various stakeholders useful to re-evaluation of retail capacity models & improvement of town centres performance

Next steps

- Updating retail centres boundaries
- Re-evaluation of retail catchments based on variable propensity for online shopping
- Evaluation of models using customers' insight data (e.g. click and collect)



Any questions ?