Geographies of crowdsourced information and their implications

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Outline

1. Where are we?
2. Core research questions
3. Paradigm limitations
4. Beyond the usual suspects
5. Case studies: Search behaviour
6. **[Stefano will do the rest]**

Where are we?

The success of crowdsourcing

https://ideascale.com

"85% of the top global brands have used crowdsourcing in the last ten years. […] According to Gartner, 75% of the world's high performing enterprises will be using crowdsourcing by 2018."

(Deloitte, 2016)

It is when new, successful technologies withdraw into the "woodwork of everyday banality" that their effects become real and profound.

(Vincent Mosco, 2004)

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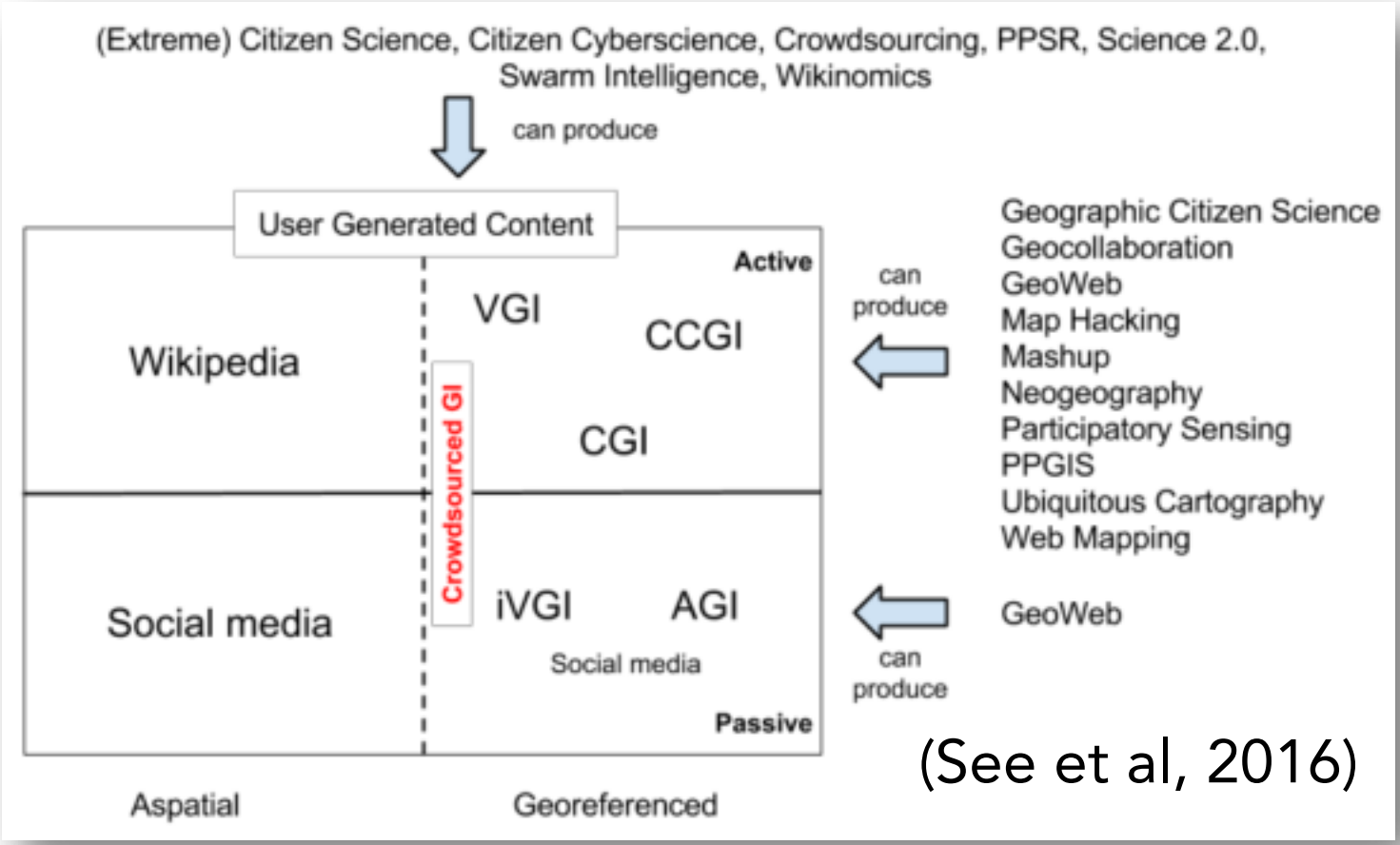
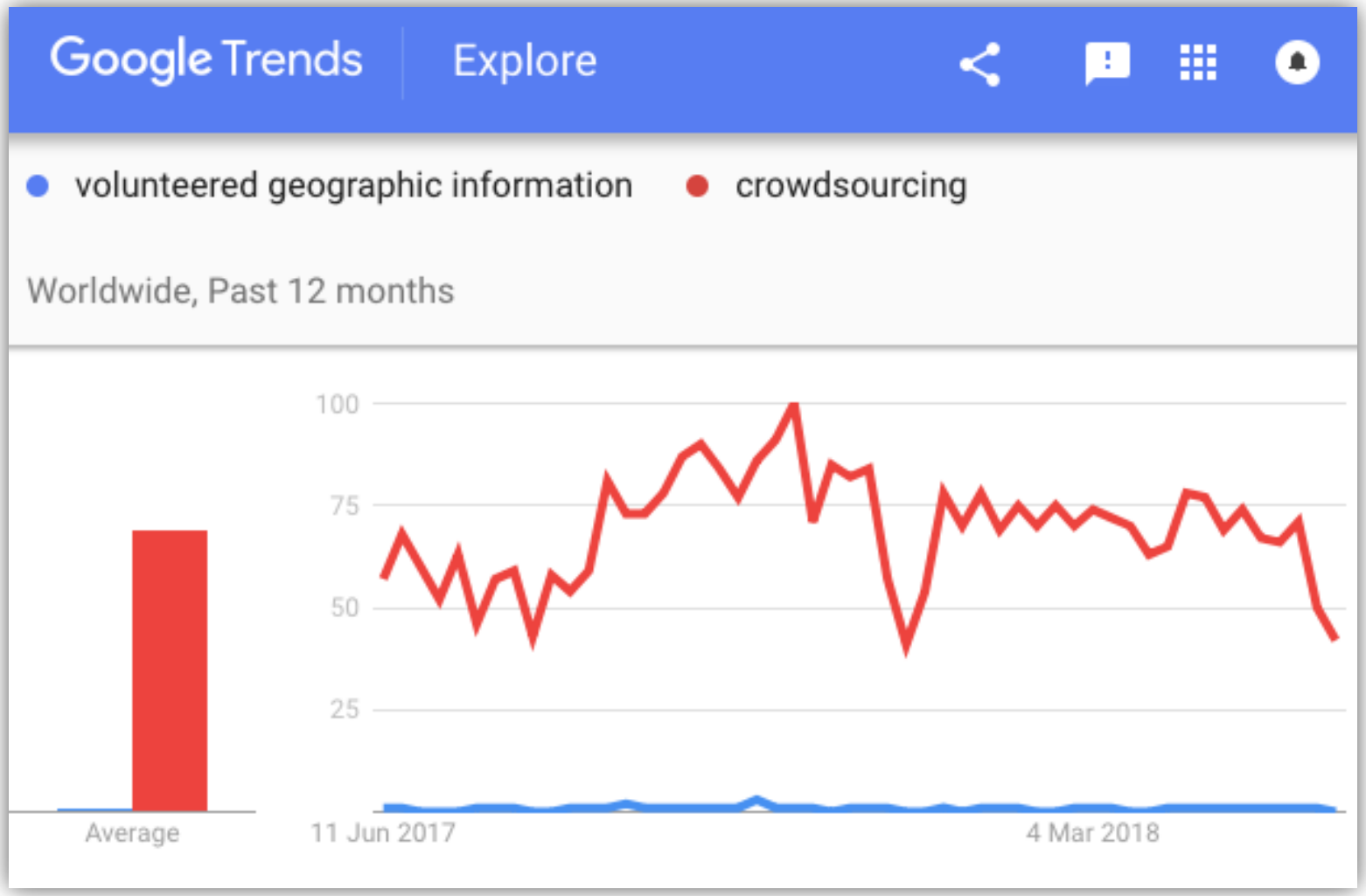
Crowdsourcing + geolocation: A mature field



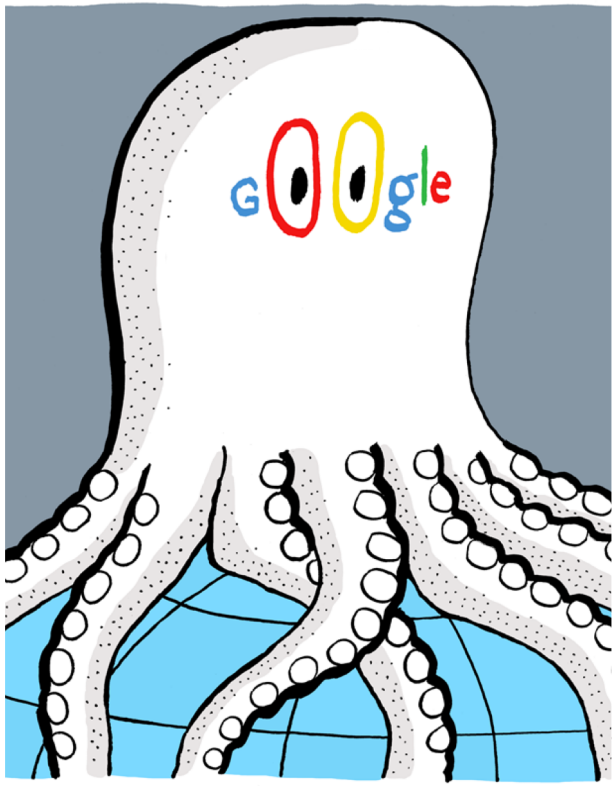
(See et al, 2016)

Volunteered or Crowdsourced GI?



Placing the crowds

- **Crowdsourced geographic information (CGI)**
- From experimental phase to **oligopoly** (e.g., Google, Facebook)
- From **cyberoptimism** to **cyberpessimism**



https://www.cagle.com

Placing the crowds

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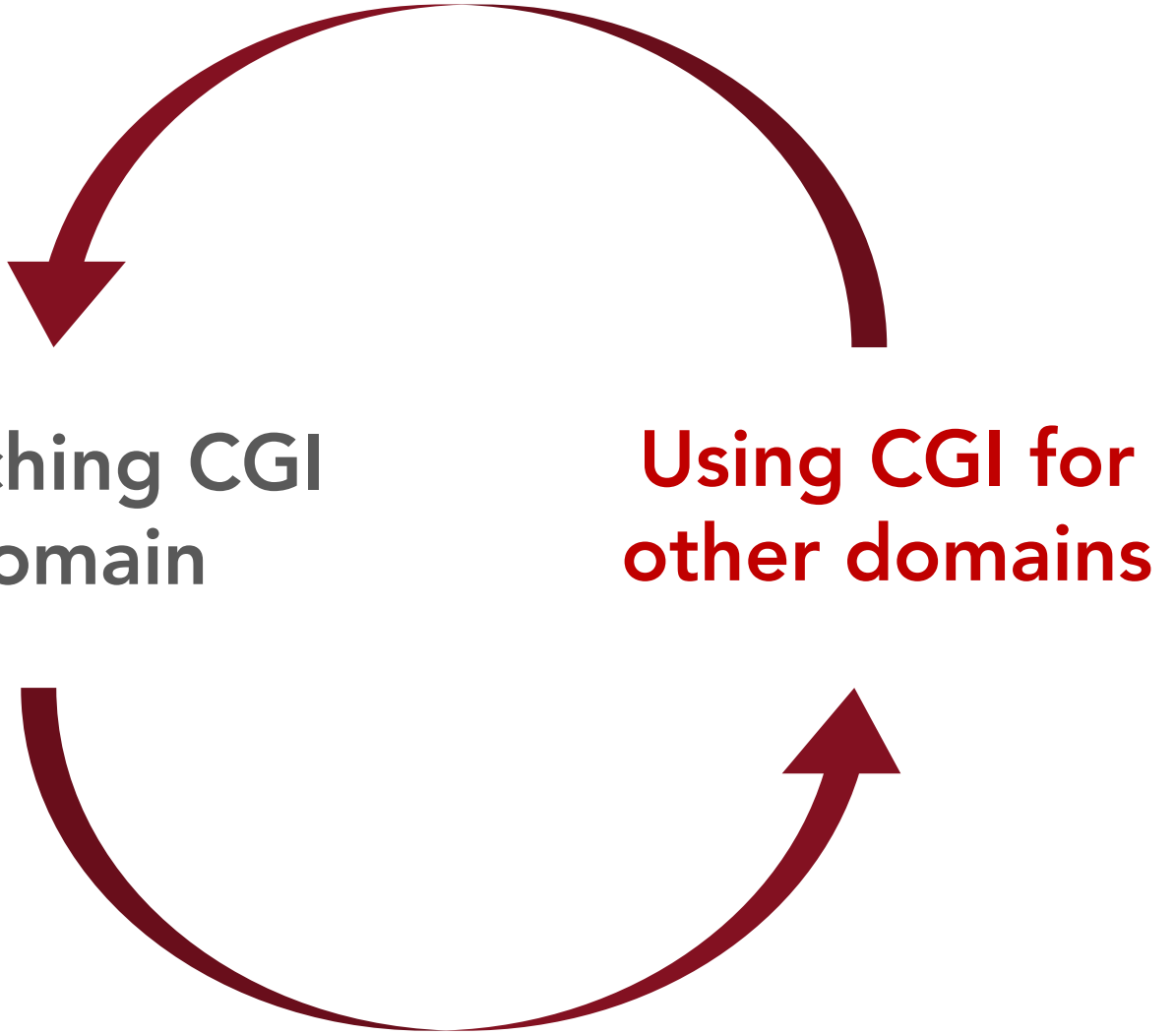
Researching CGI as domain
Using CGI for other domains

Core CGI research

1. **Who** are the contributors and **why** do they engage in spatial information production, and what **incentives** work or do not work? How do they **collaborate** and **organise**? How do we include **marginalised** communities?

   (Budhathoki and Haythornthwaite 2013)

2. How can we calculate the **quality** and fitness for purpose of crowdsourced data in a reliable, preferably intrinsic way? (Goodchild and Li 2012)

3. What are the **limitations** of such models and what are their spatial, epistemic and cultural biases? (Dodge and Kitchin 2013)

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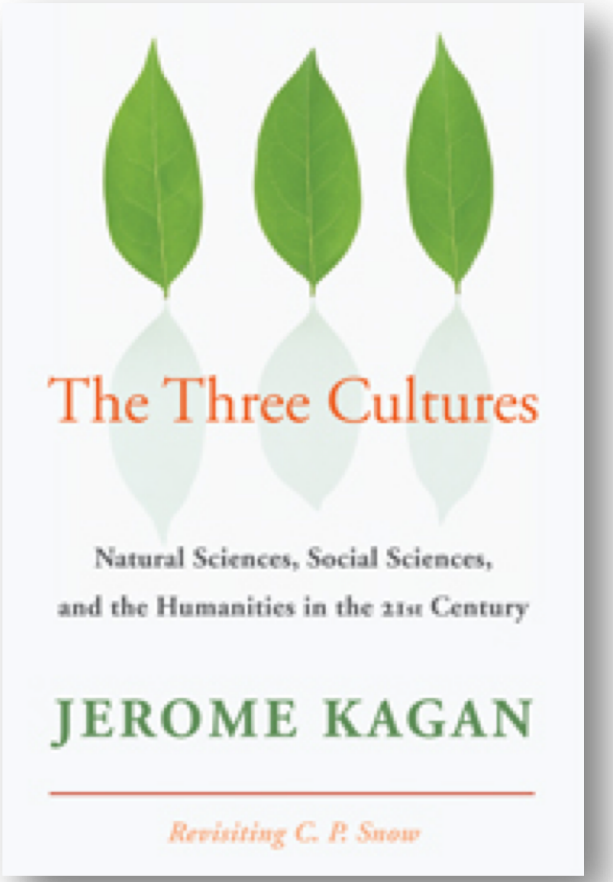
CGI for other domains

Natural sciences: biology, climate science, Earth sensing

Social sciences: urban planning, transportation, public health, economics, human geography

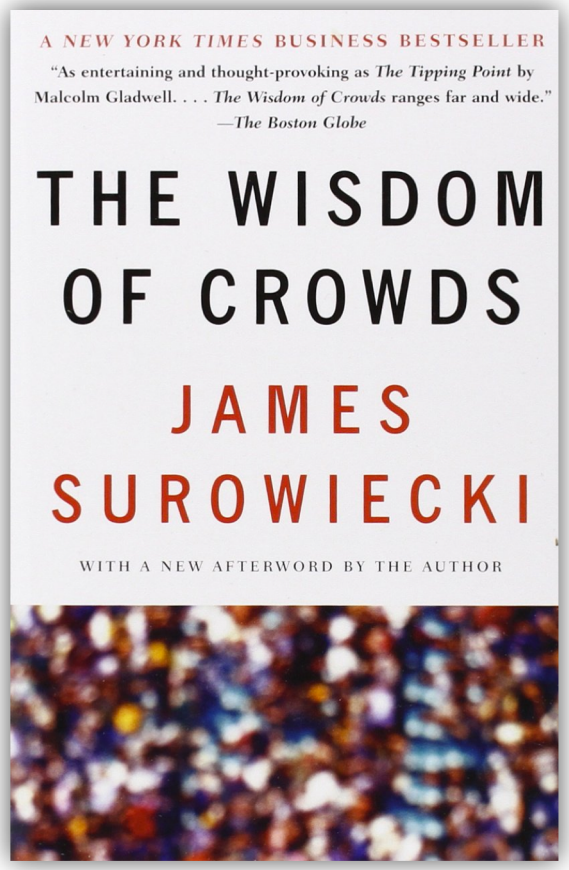
Humanities: digital humanities, history, cultural analytics



Limitations of crowdsourcing

Limitations of the paradigm

- "Ignorance of crowds" (Carr, 2007)
- Conditions for wisdom
- Menial work, no real innovation/creativity
- Undermining paid work
- Variable quality



2004

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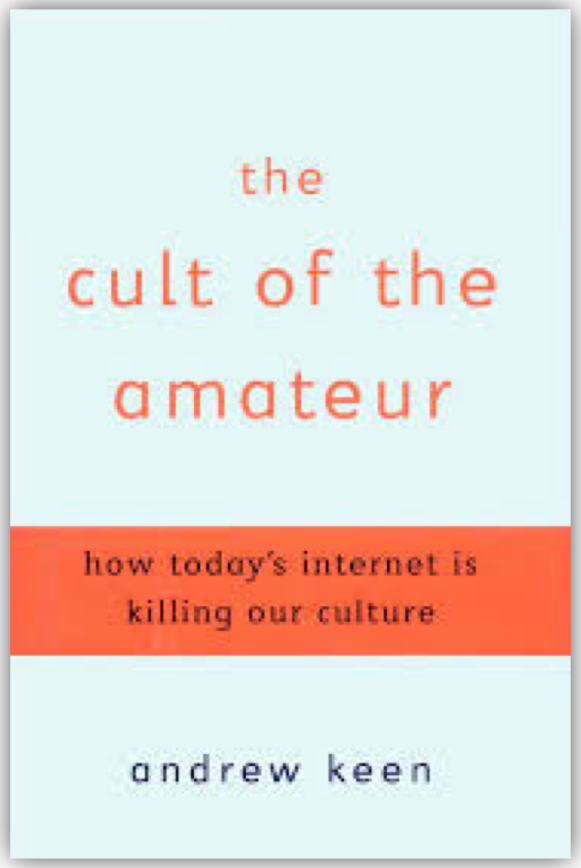
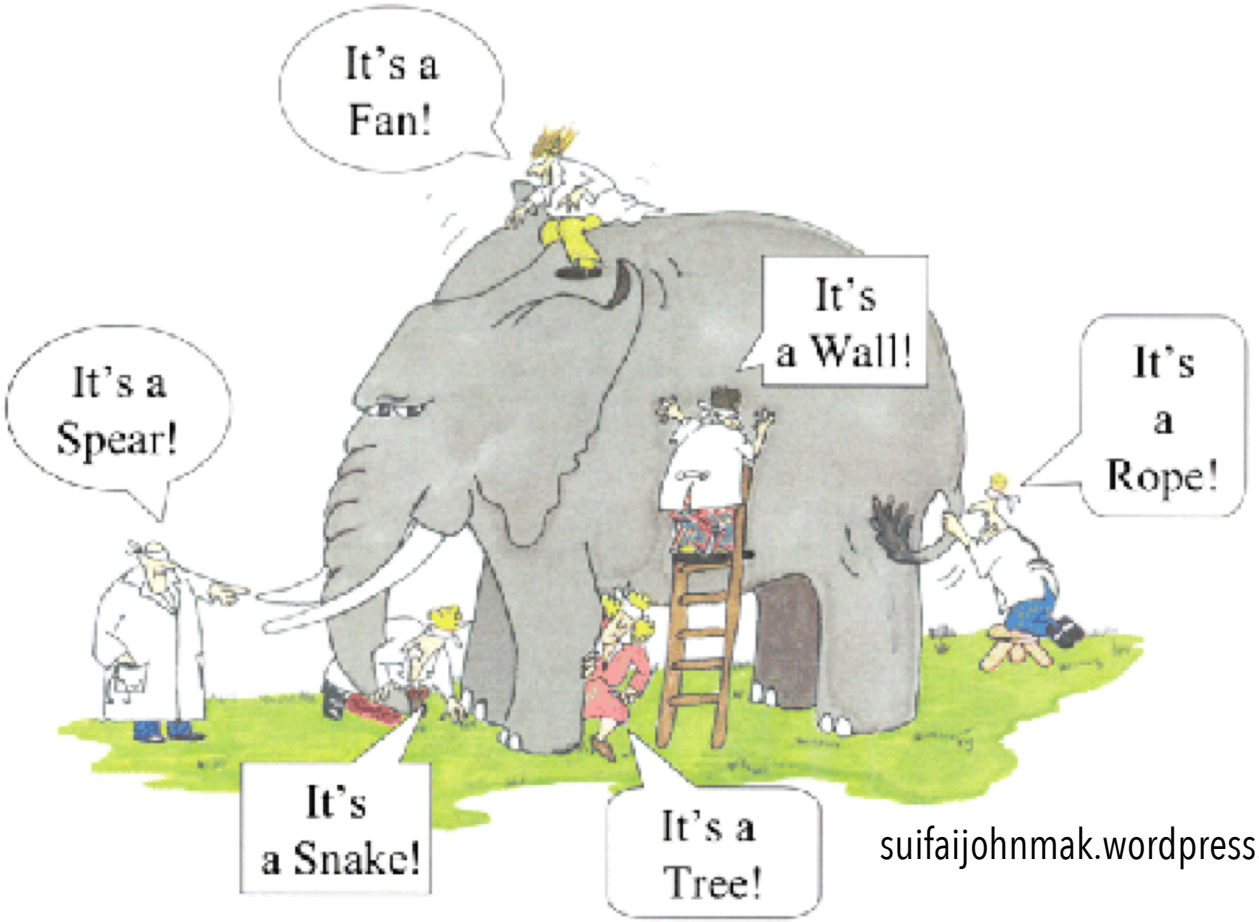


2007

Limitations of the paradigm

- Large volumes of information do **not** imply usefulness or fitness for purpose
- We need **representative samples**, not large samples (e.g., random sample of 1,000 > 1M non-random)



suifaijohnmak.wordpress.com

Each CGI source is a **particular viewpoint** and will return a different image of the social and natural world.

Diversity/biases of CGI

- **Thematic**: e.g., tourism, outdoors, typical/atypical behaviour, sharing bias
- **Demographic**: Western Educated Industrialised Rich Democratic (WEIRD) (not always!)
- **Social**: 90%-9%-1%, hyperactive minorities of contributors
- **Geographic**: urban/rural, developed/developing, central/peripheral, human/natural

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CGI strictures

- Without centralised planning and protocols, data **quality** remains uneven (coverage!)
- **Wikipedia** replaced **Britannica**, but OpenStreetMap is not replacing Google Maps
- CGI **cannot** replace established data collection protocols and sources, but can provide useful **ancillary data**

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Reinventing wheels

- Some CGI **replicates** work that has been done better by professionals
- More useful to focus on "missing" data:

Humanitarian OpenStreetMap Team

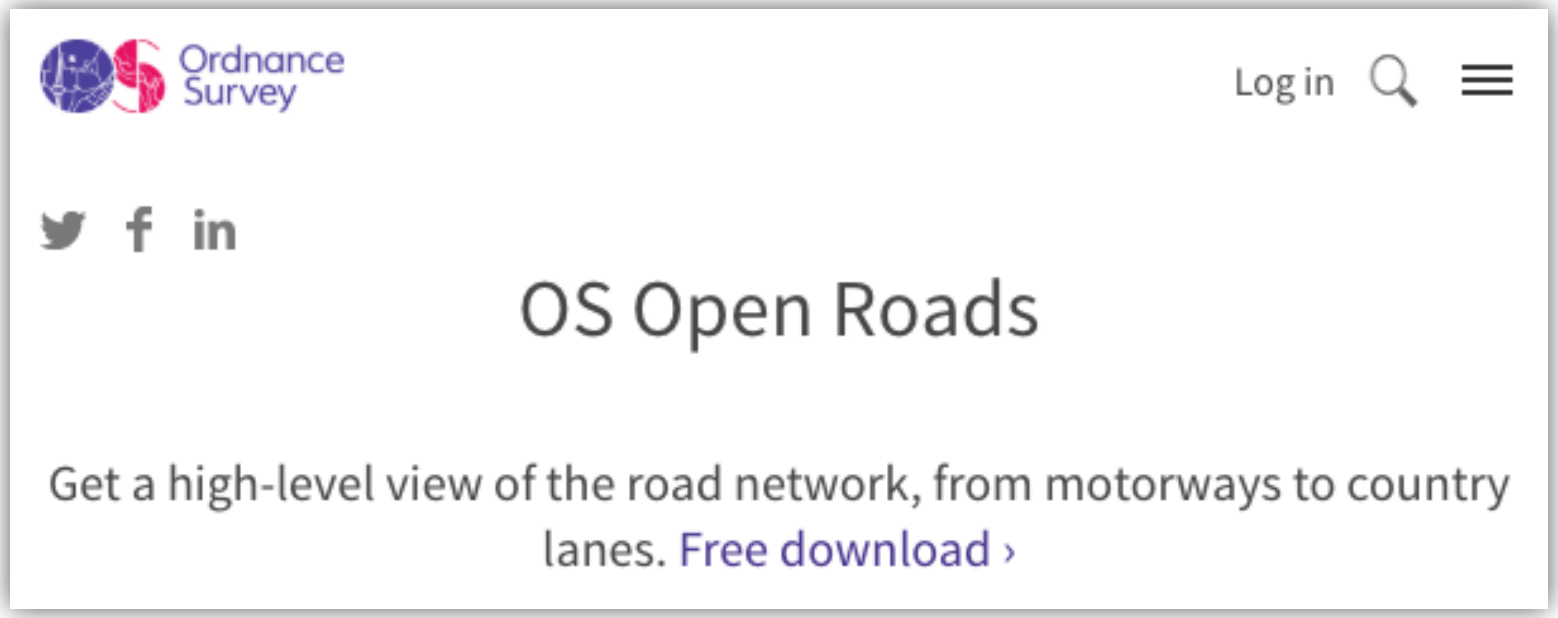
MISSING MAPS

bookscrounger.com

Open data vs CGI

Authoritative datasets are becoming cheaper/free

DATA.GOV.UK Beta
Opening up Government

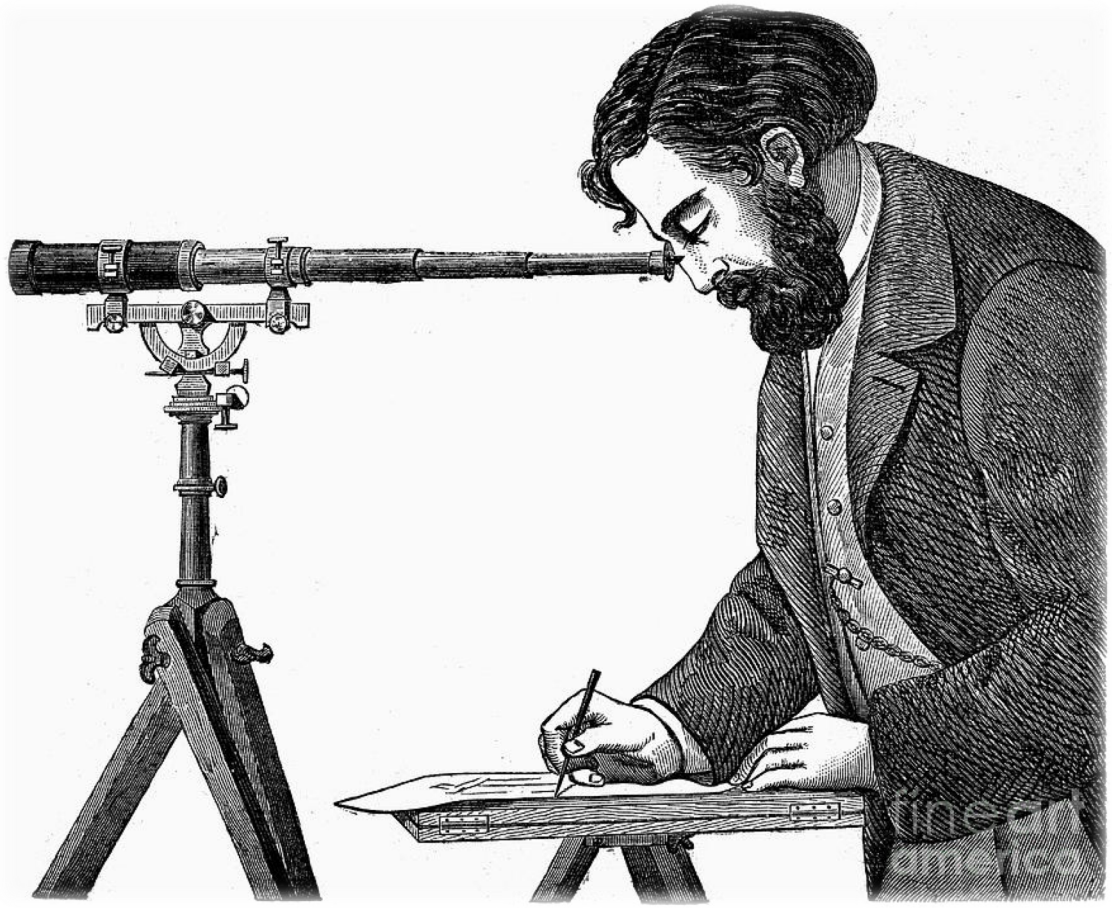


Broadening our horizons

The usual suspects

Most studies on **OSM**, **Wikipedia**, **Twitter**, **Flickr**.

There's more out there!

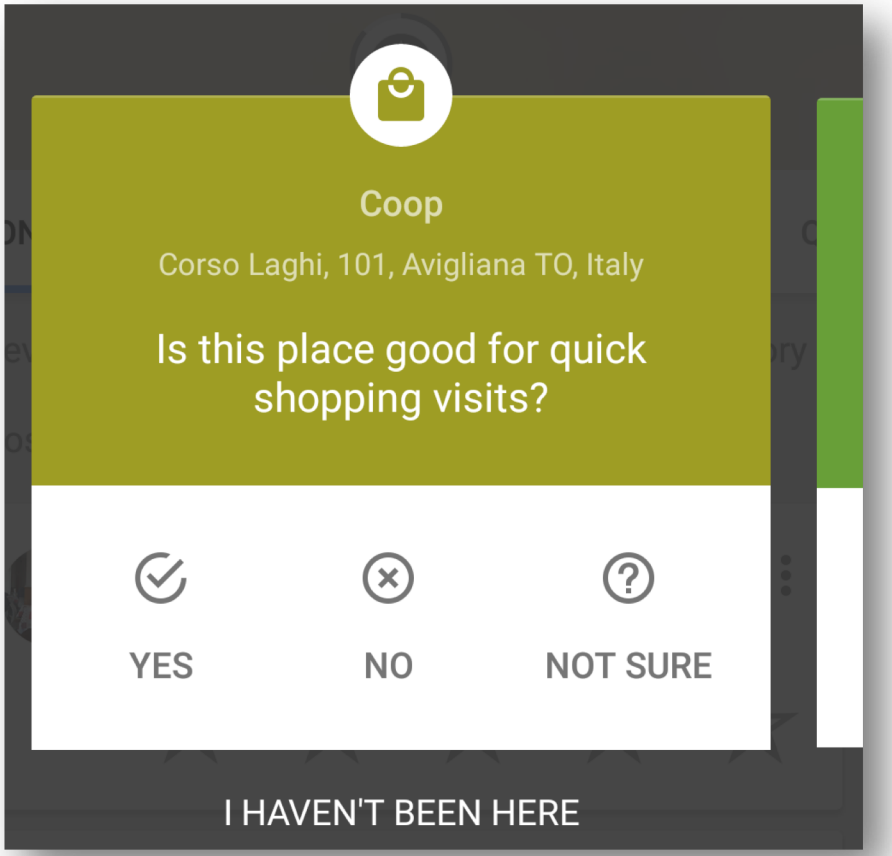


https://fineartamerica.com


Commonplace
geograph
photograph every grid square!
GeoNames
MISSING MAPS
wikimapia
foursquare
craigslist
yelp
airbnb
DBpedia
Insta
reddit
tripadvisor
WIKIDATA
YouTube
Spotify

Local Guides

- Google Maps
- From 5M to 50M contributors in 2017
- 700K new places monthly
- Gamification



- Hundreds of millions of users, billions of reviews
- Measurable effects on spatial and economic behaviour
- Sentiment about points of interest, cities, and neighbourhoods

PREMISE

- Micro-economic data (e.g. price of onions in India, new shops in Ghana)
- For profit, contributors are paid
- Applications: International Development, Government, Global Security, and Business

Case studies

crowdsourcing

examples of crowdfunding and crowdsourcing **include**
appen crowdsourcing
define crowdsourcing
benefits of crowdsourcing
amazon crowdsourcing
types of crowdsourcing
advantages of crowdsourcing
lego crowdsourcing
logo crowdsourcing
jeff howe crowdsourcing

Google Search I'm Feeling Lucky

Online visibility of CGI projects

- **Search engines** are the key entry point to discover new information
- Feedback loop between Wikipedia and Google Search to attract **new contributors**
- Making CGI **findable** and **consumable** for search engines and social media
- Study on **CGI** on **Google Search** (2018)

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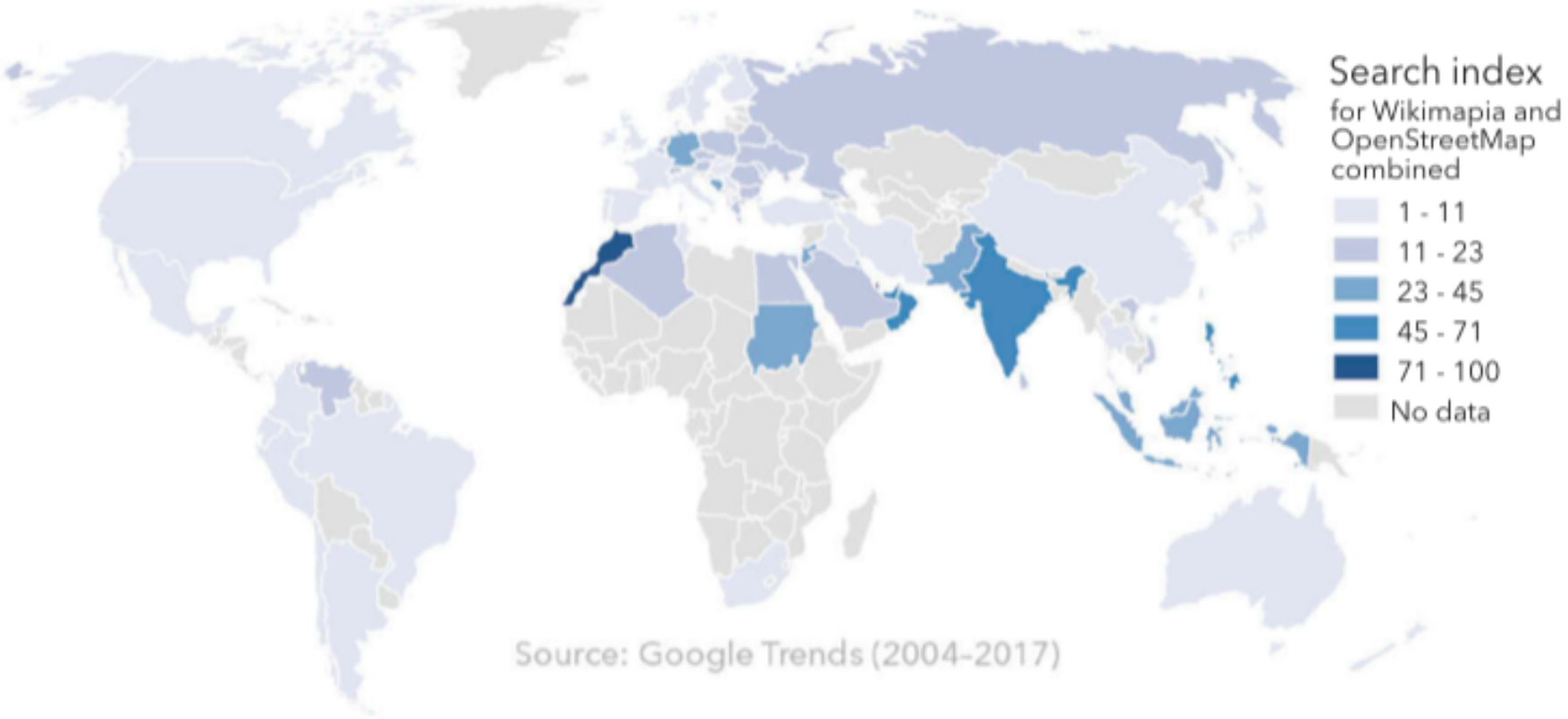
Interest in CGI projects

Figure 4: Google searches for Wikimapia and OpenStreetMap on a monthly basis (source: Google Trends worldwide from 2004 to 2017, accessed on 15 April 2017).

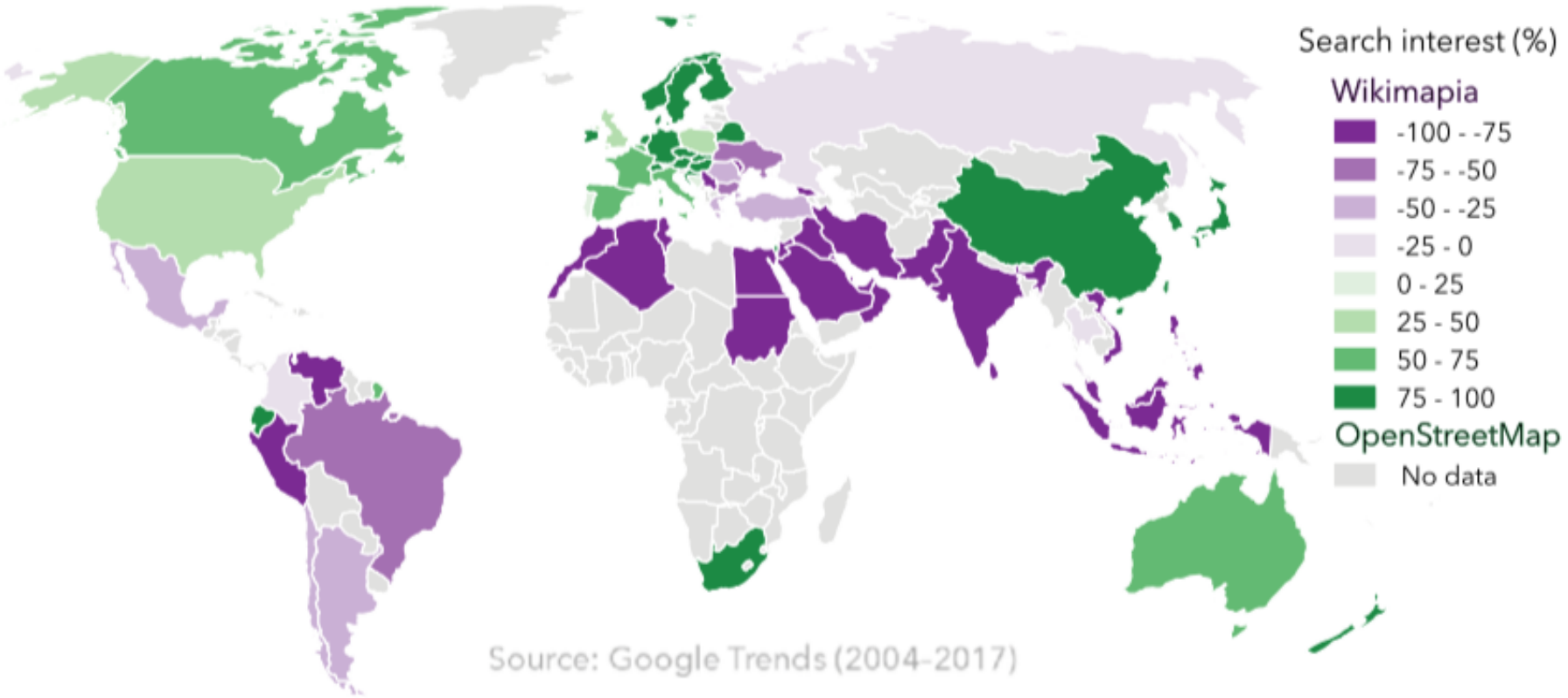
(Ballatore & Jokar Arsanjani, 2018)

Search Interest in Wikimapia/OSM combined



(Ballatore & Jokar Arsanjani, 2018)

Search Interest in Wikimapia vs OSM



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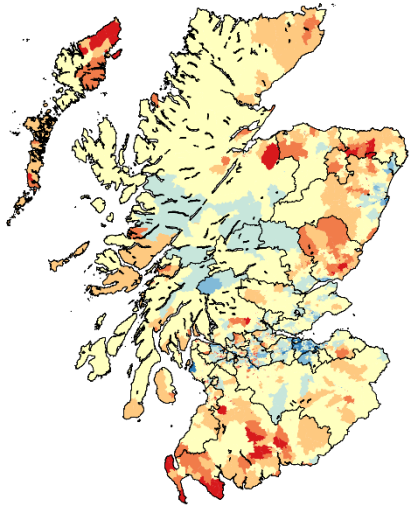
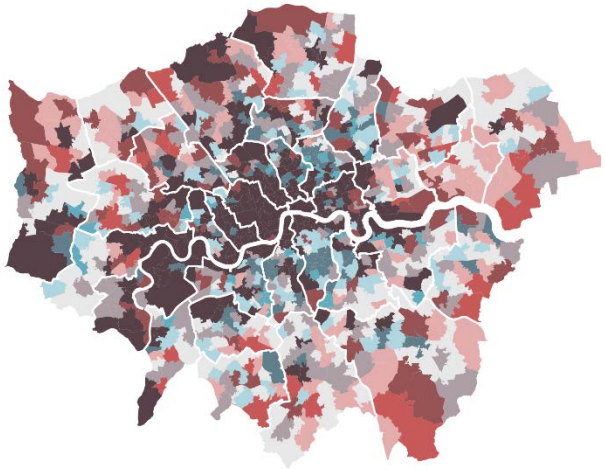
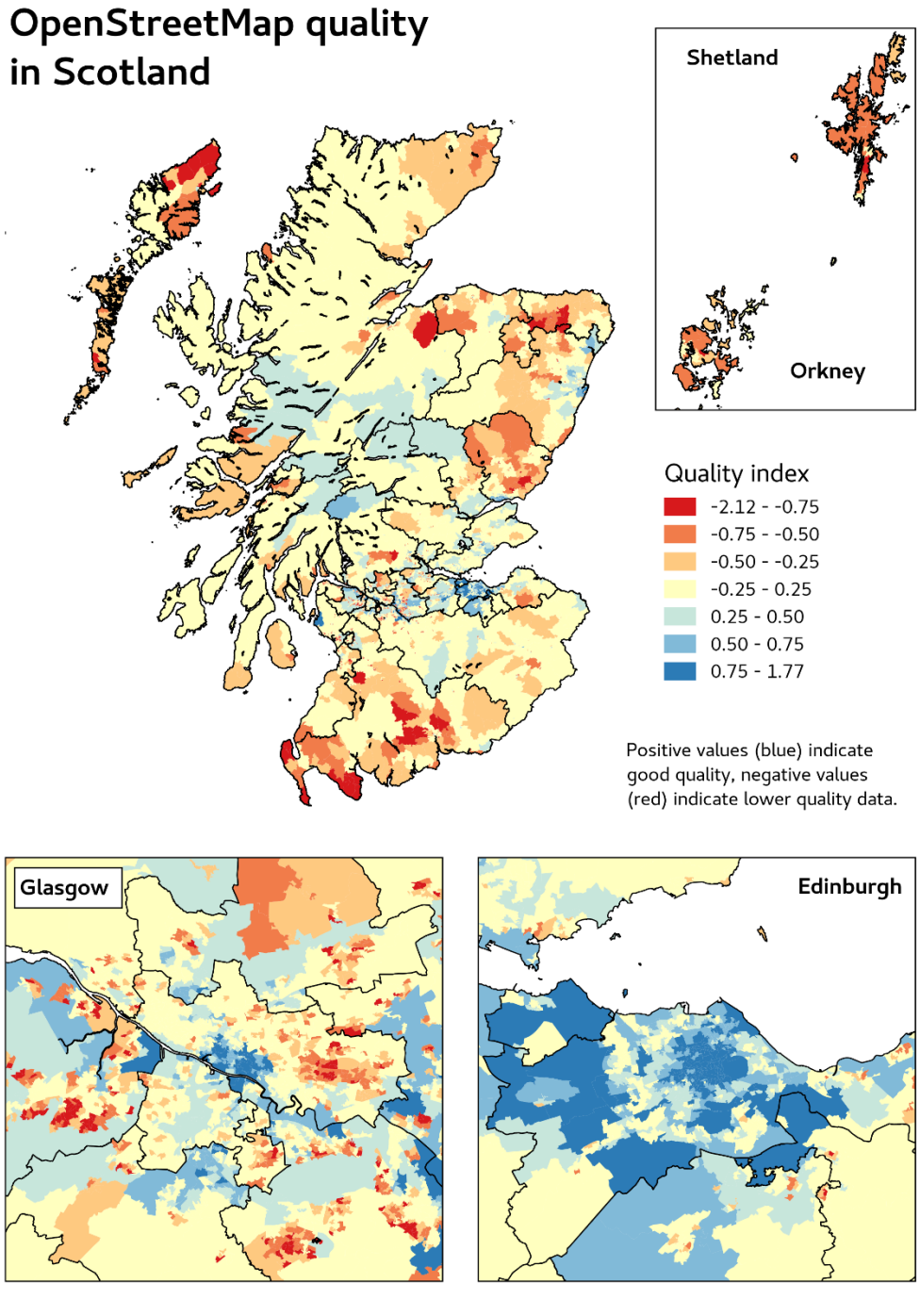
Case studies

- **Operationalising quality** in health studies
  - with J Bright, S Lee, B Ganesh, DK Humphreys
  - OpenStreetMap
  - impact of availability on alcohol-related harm
- Analysis of global **gazetteers**
  - with E Acheson and RS Purves
  - GeoNames and Getty TGN
  - patterns of coverage
- **Urban Information Geographies**
  - with A Ballatore
  - with N Tate
  - quality and representativeness of VGI







Operationalising VGI in health studies

- with J Bright, S Lee, B Ganesh, DK Humphreys
- OpenStreetMap
- impact of availability on alcohol-related harm
- https://www.sciencedirect.com/science/article/pii/S1353829217305804

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Quality indicator

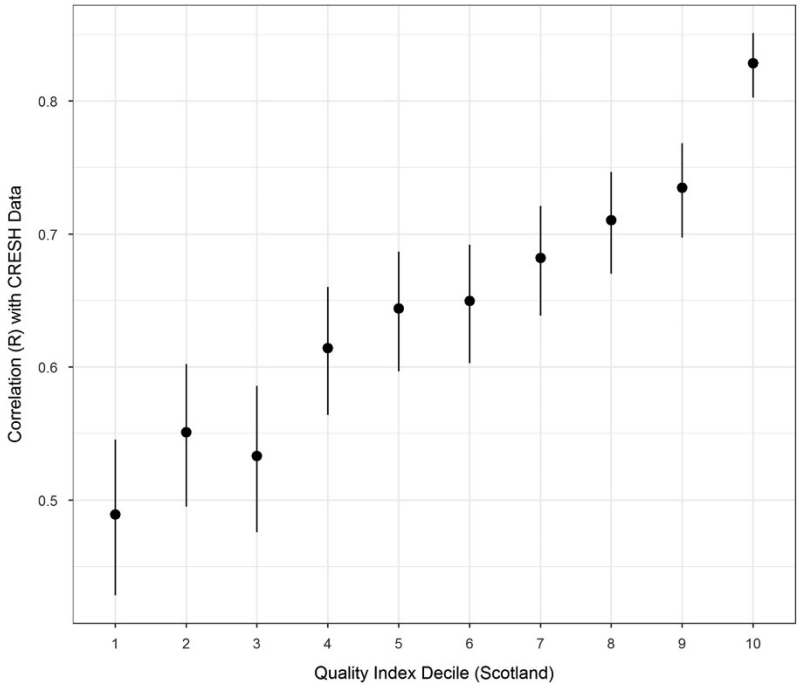
- **Intrinsic** quality indicator based on Barron et al. (2014)
- Calculated as a linear combination of:

Values	Transformation
Num. of map features per square kilometre	Log transformed, scaled
Average num. of edits per map feature	Log transformed, scaled
Num. of users who made at least one edit	Log transformed, scaled
Num. of features edited by more than one user	Log transformed, scaled
Num. of days with at least one edit	Log transformed, scaled
Days since the last edit in the area	Inversed, scaled
Proportion of buildings with full address	-1 if 0%, 0 if no buildings

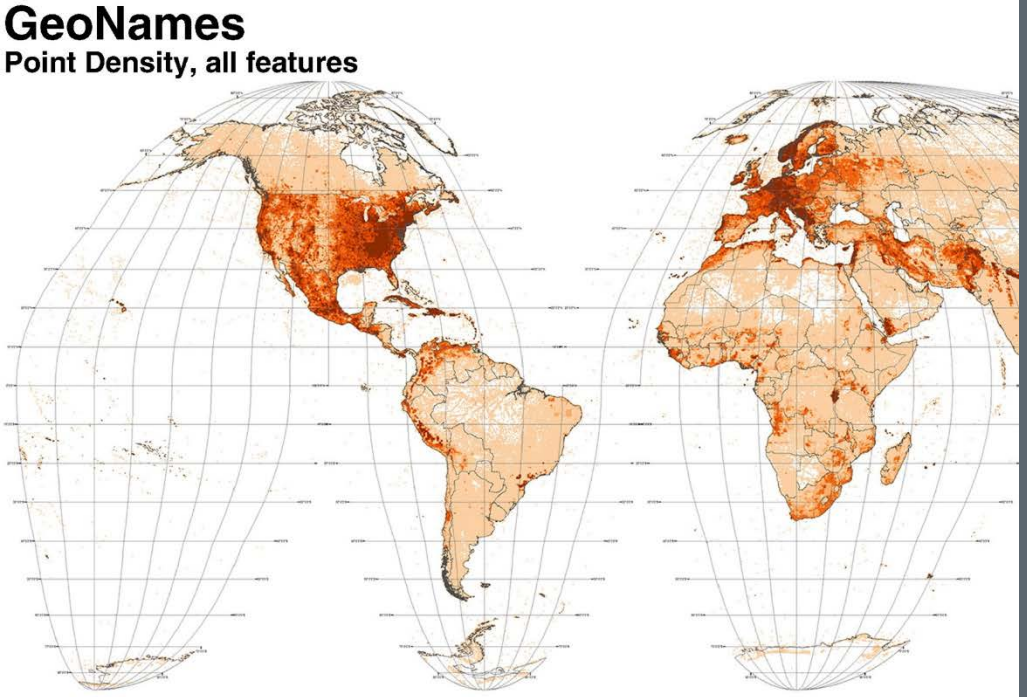
Replicating CRESH study

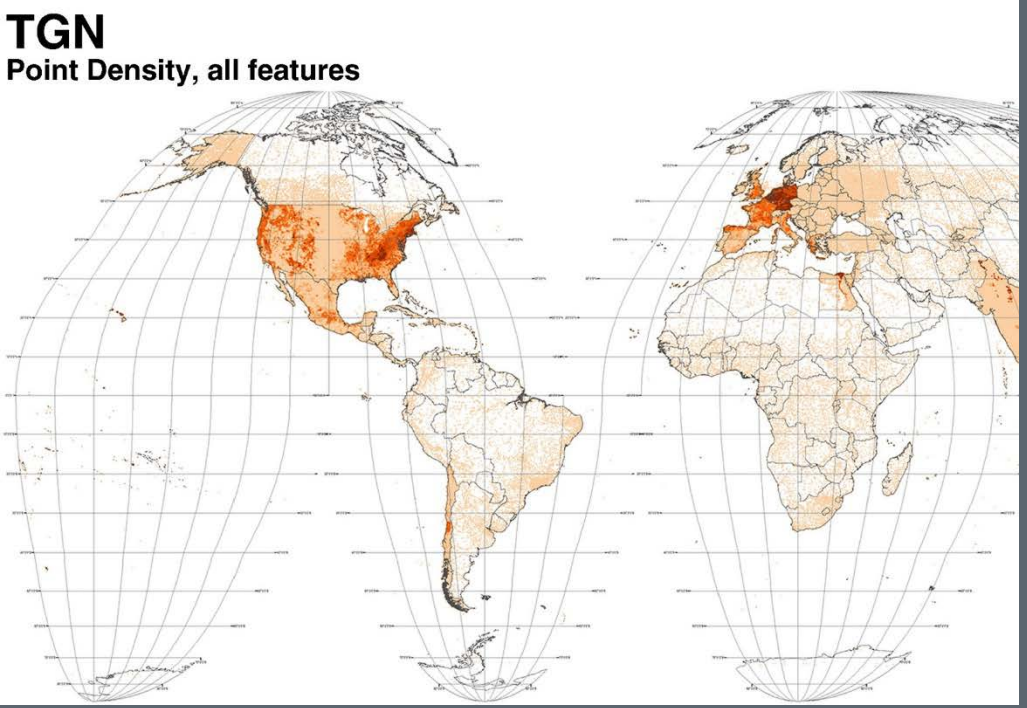
The overall conclusions are essentially **identical**

- significant **positive correlation** between density of alcohol outlets and incidence of alcohol related harms
- an **effect size** which is comparable (though smaller)



The correlation between OSM-based estimates and CRESH is stronger where the quality index is higher





Analysis of global **gazetteers**

- with E Acheson and RS Purves
- GeoNames and Getty TGN
- patterns of coverage
- https://www.sciencedirect.com/science/article/pii/S0198971516302496

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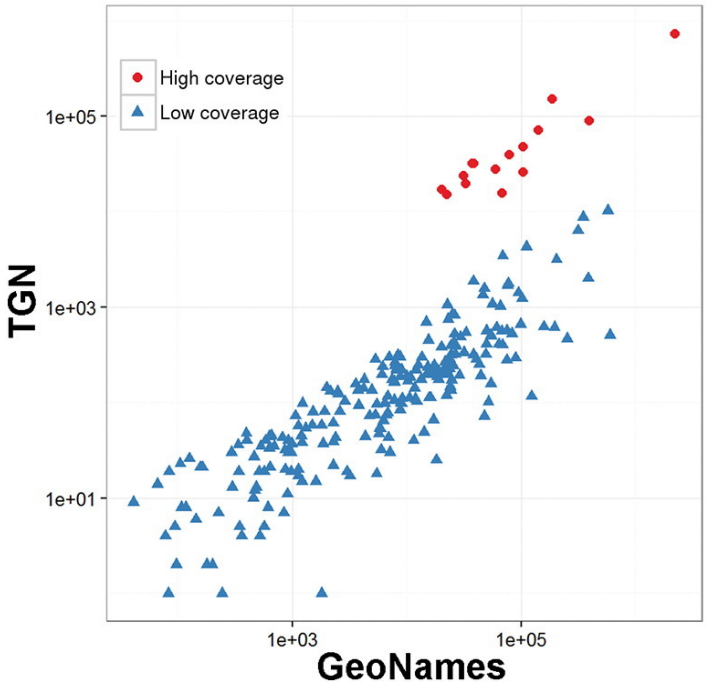
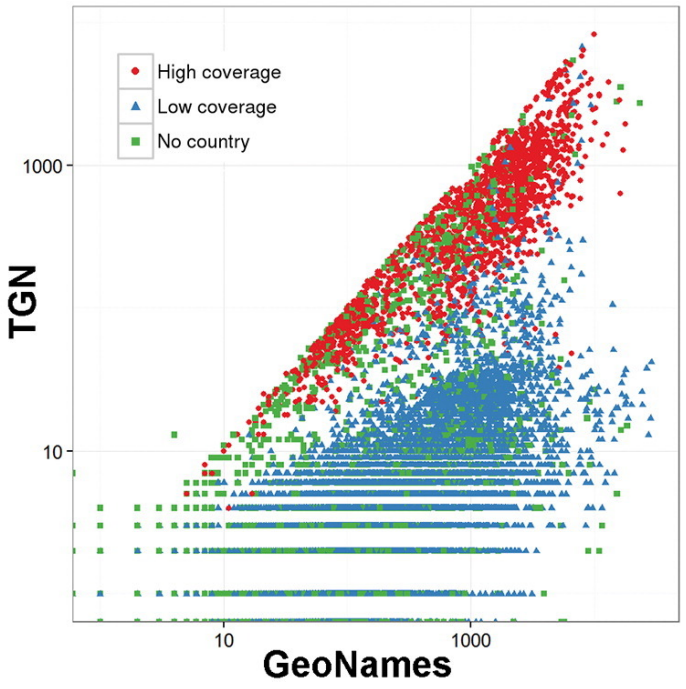
Comparing GeoNames and TGN

Two distinct levels of coverages

- in “high coverage” countries, TGN same order of magnitude as counts in GeoNames
- in “low coverage” countries, GeoNames has over 60 times as much content as TGN





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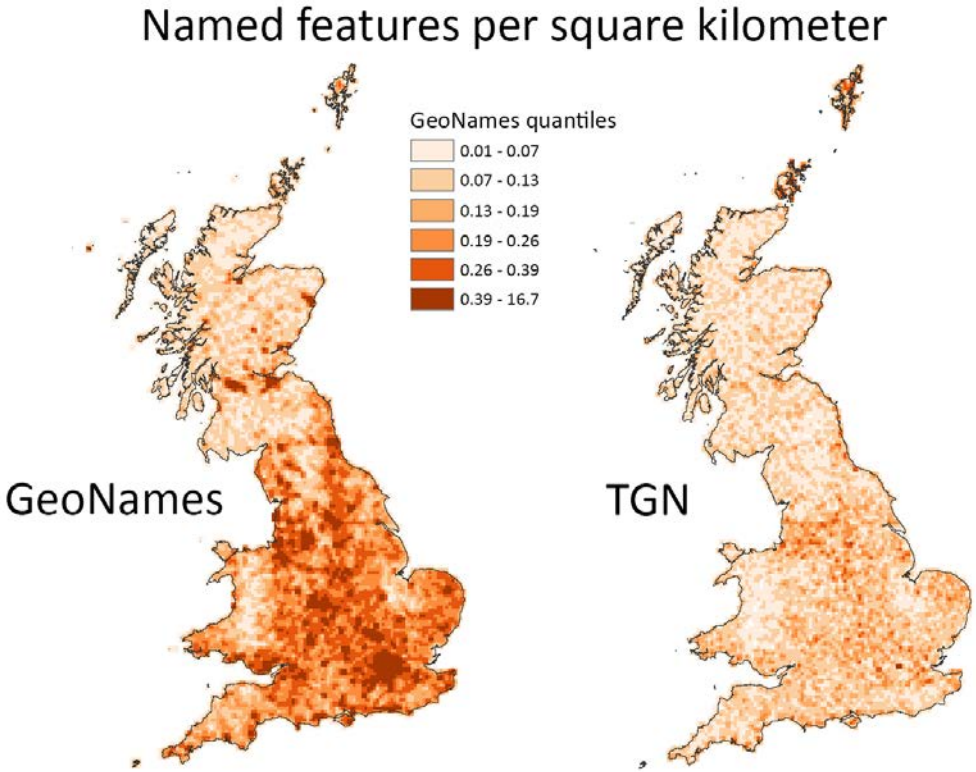
GeoNames and TGN in Great Britain

Gazetteer	Features	Pop place
GeoNames	54,701	16,475
Getty TGN	24,003	16,816
Ordnance Survey 50k	248,626	
Ordnance Survey OpenNames		41,490



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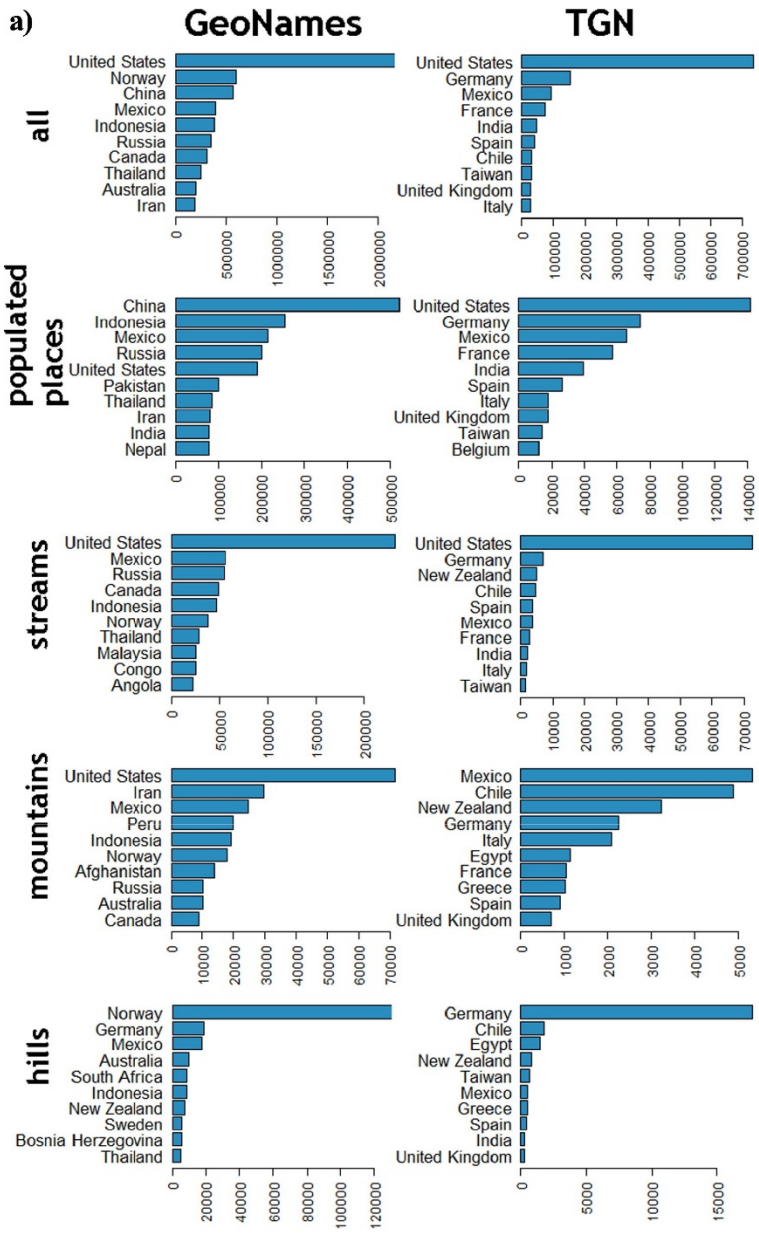

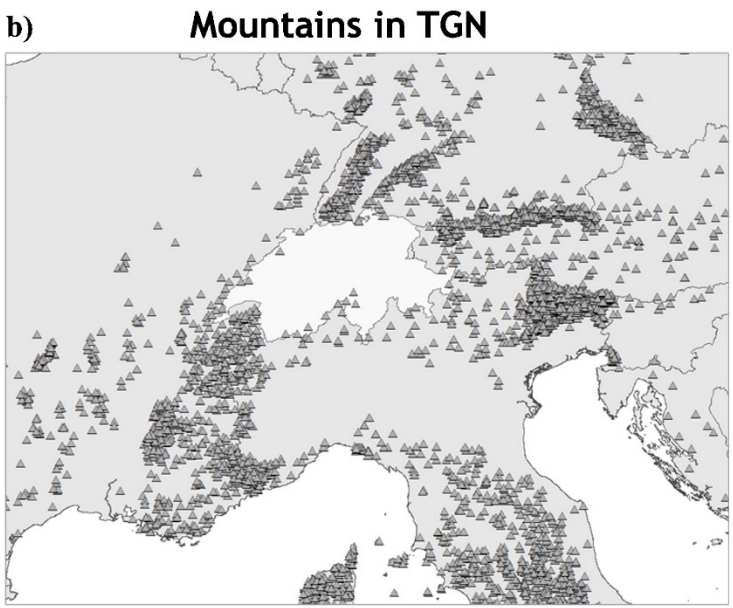

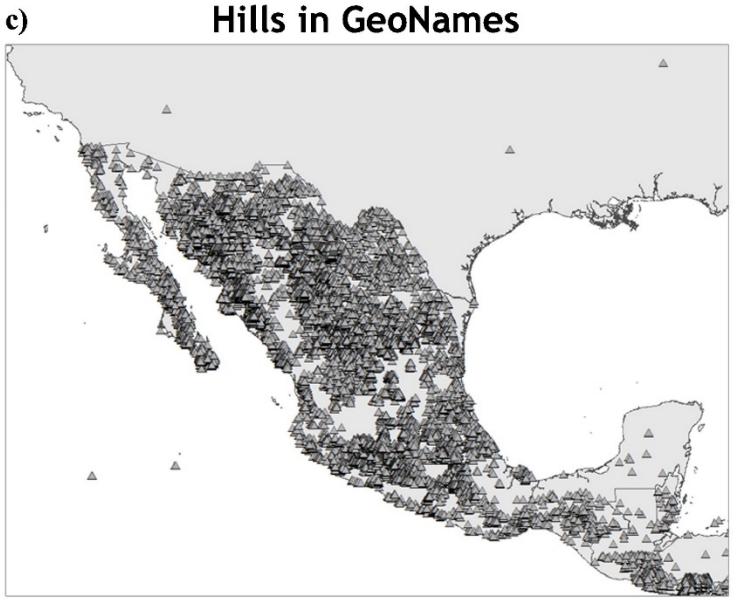

Feature types

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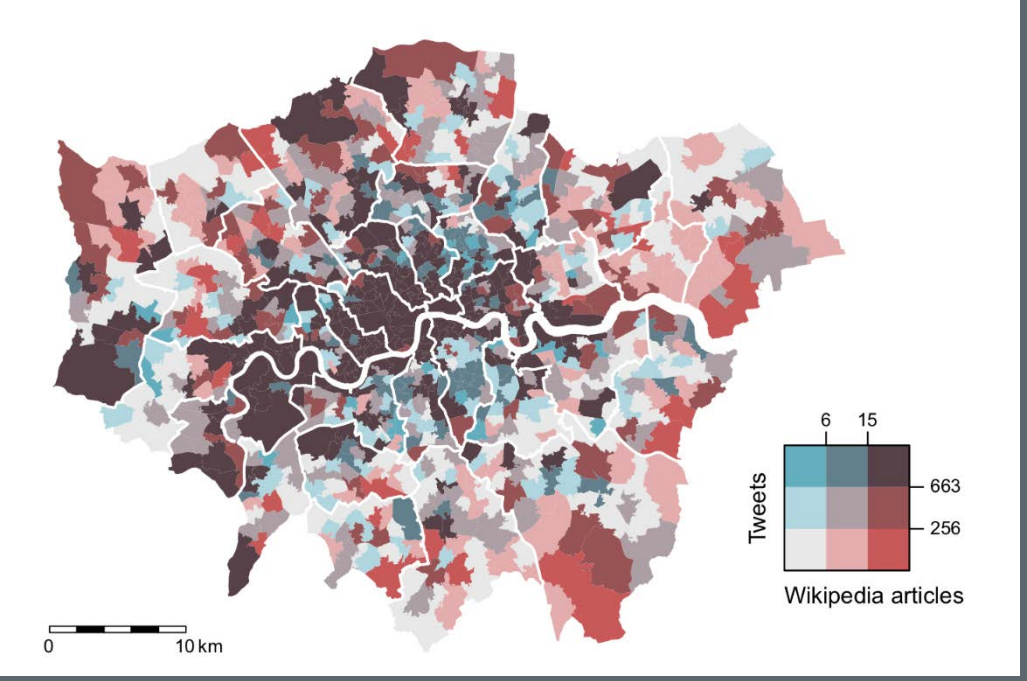

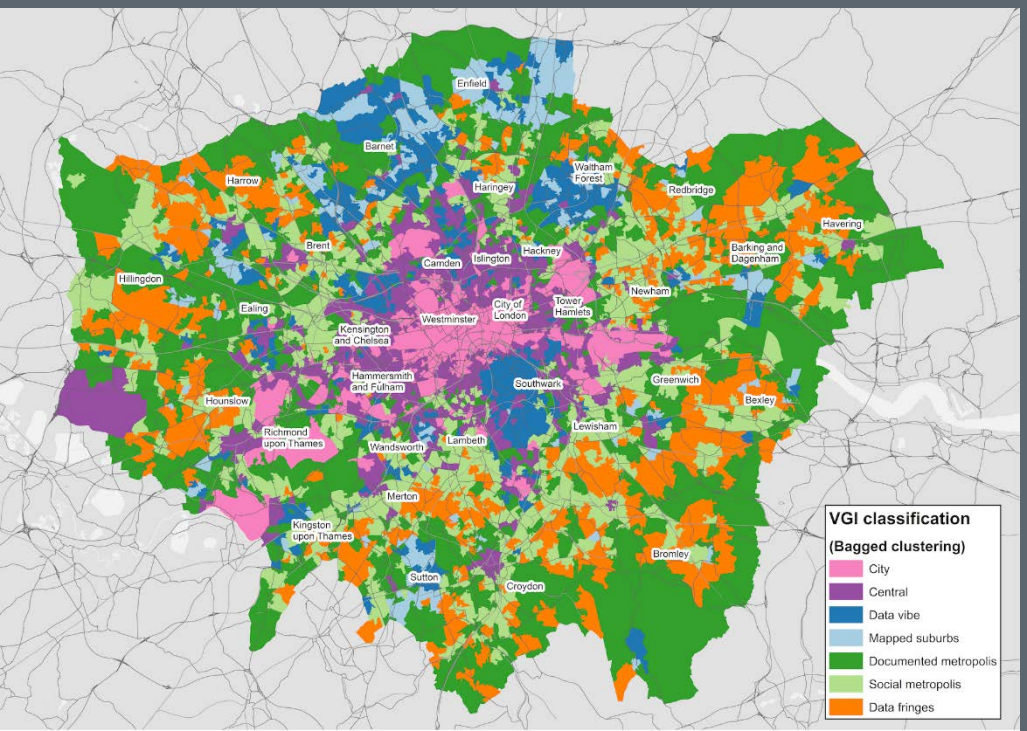

Urban Information Geographies

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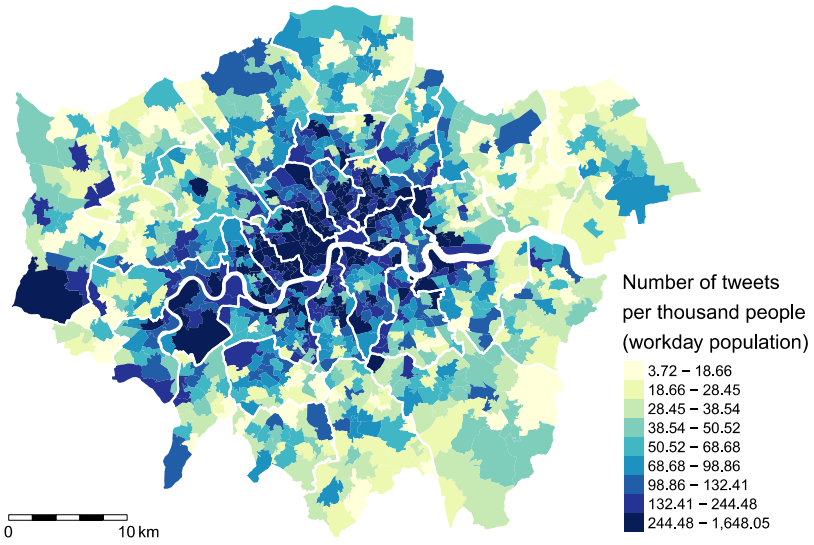

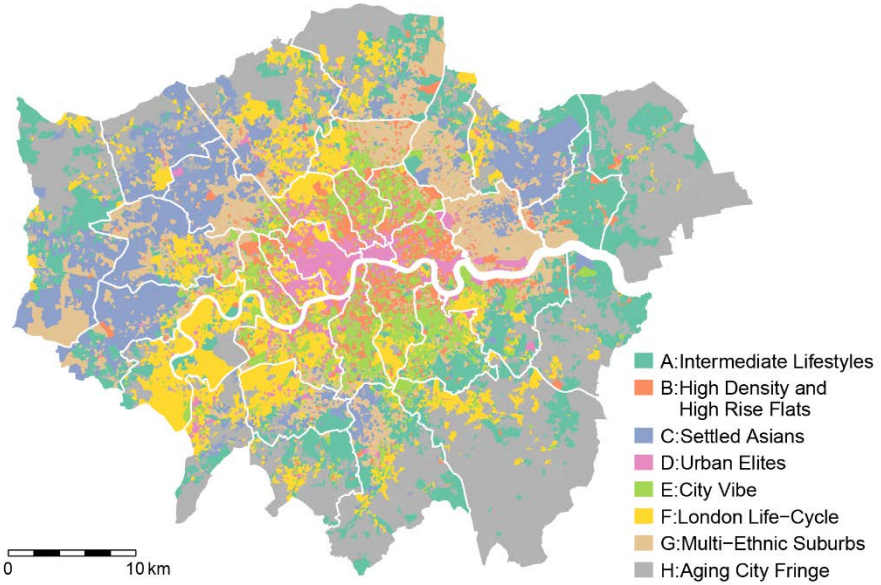

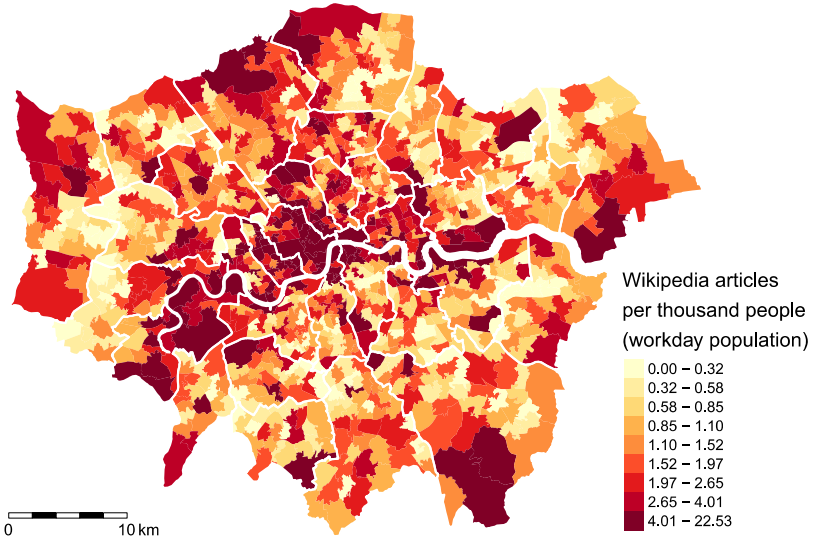

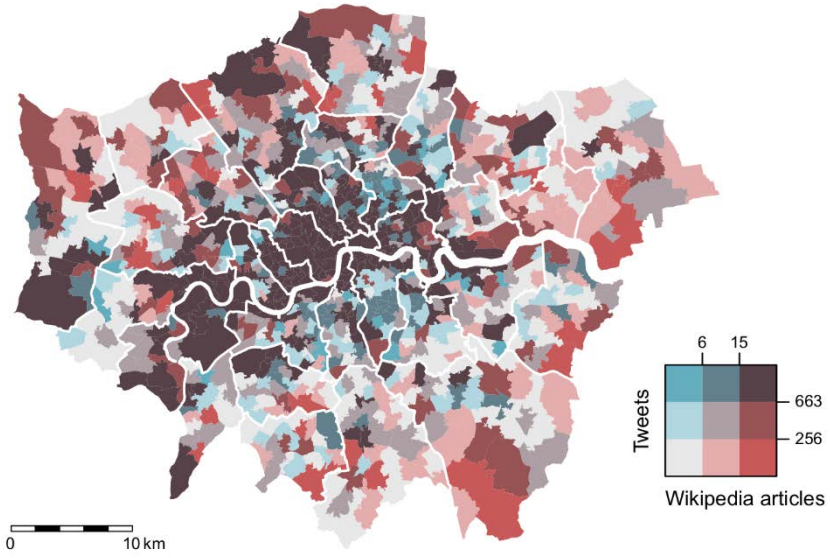

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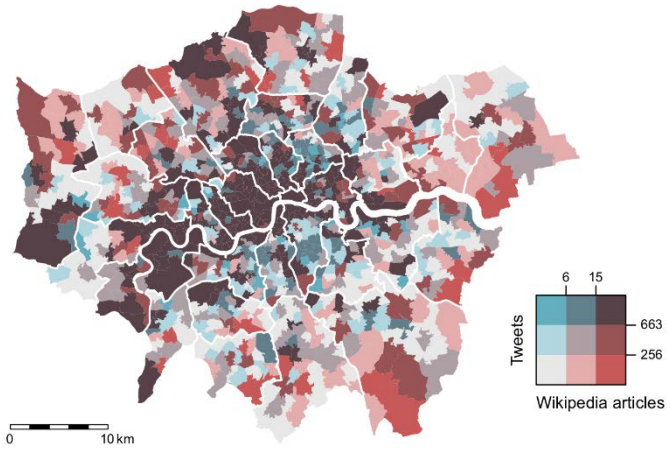
Findings

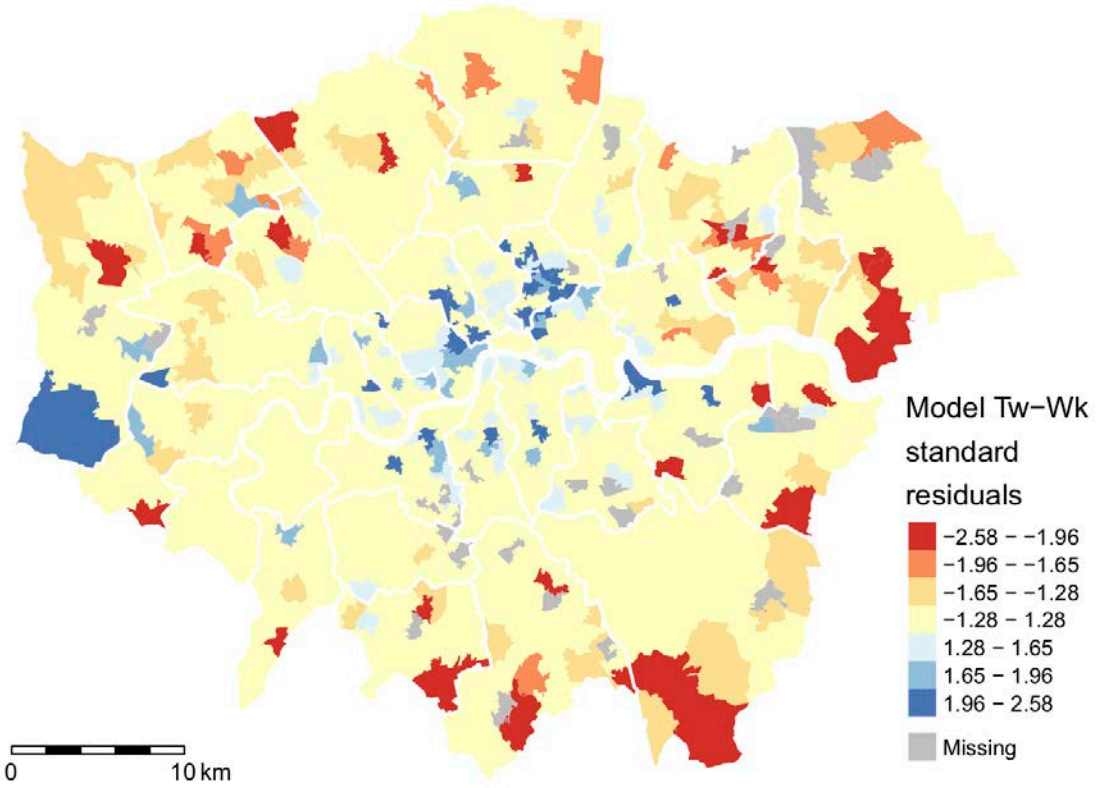
- Overall confirmed (some) hypothesis
  - representation similar biases as participation
  - **Higher qualifications** strongest factor
  - **Wealth** (house prices) strong factor in both, more so for **Wikipedia**
  - **Twitter** strongly influenced by perc. of ppl. **aged 30-44 (positively)** and households with **de-pendent children (negatively)**
- However
  - models account only for about **44–55% of variability**
  - need for more explanatory factors, e.g., tourism-related activities
    - …or can these difference be used as **indicators**?
  - ethnic composition is not a factor in the UK
- Twitter and Wikipedia **similar but distinct** geographies
  - only representative of themselves

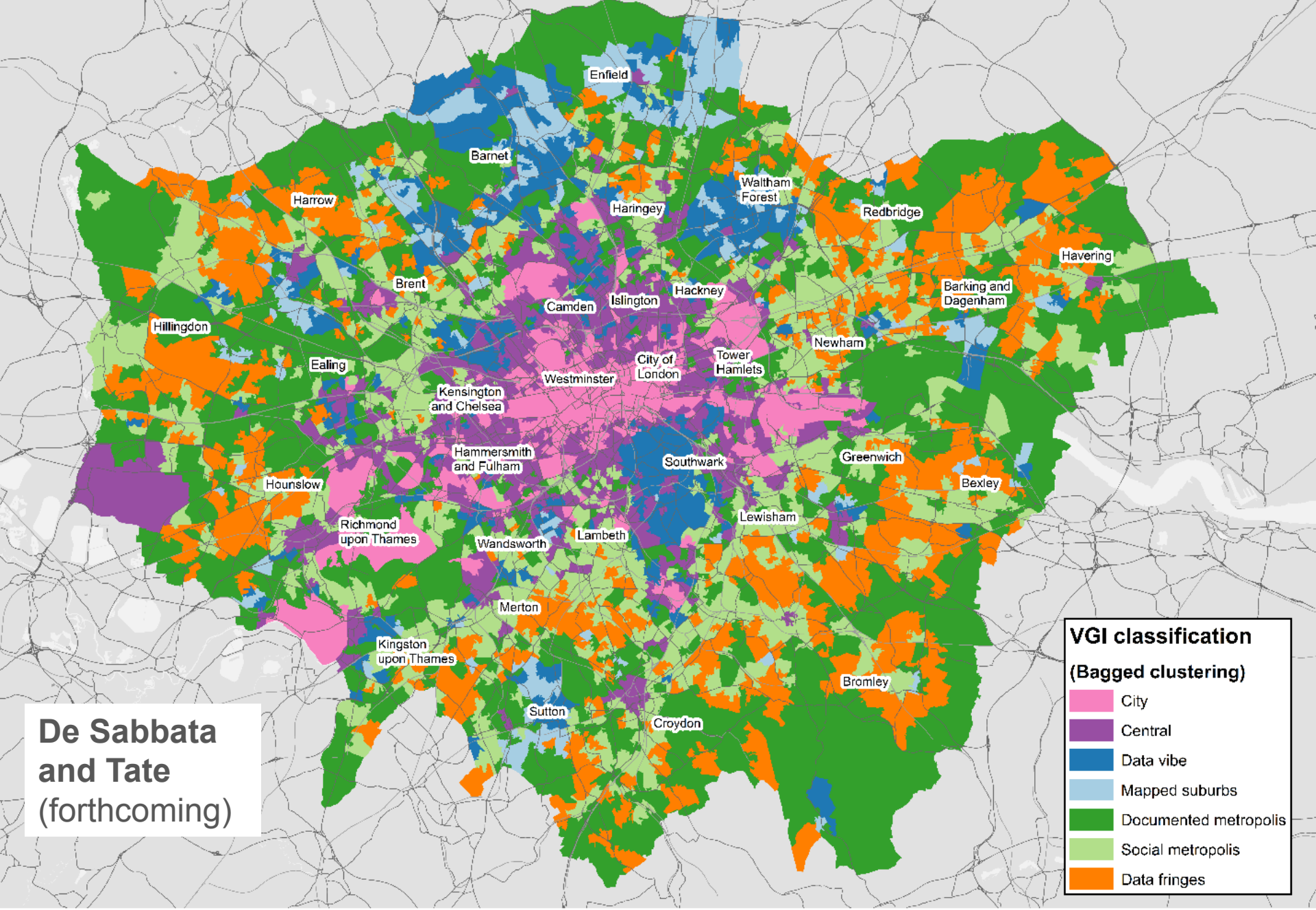
Comparing Twitter and Wikipedia

Number of tweets ~ Number of articles

(951 obs.) **Adj. R^2 = 0.490**







De Sabbata and Tate
(forthcoming)

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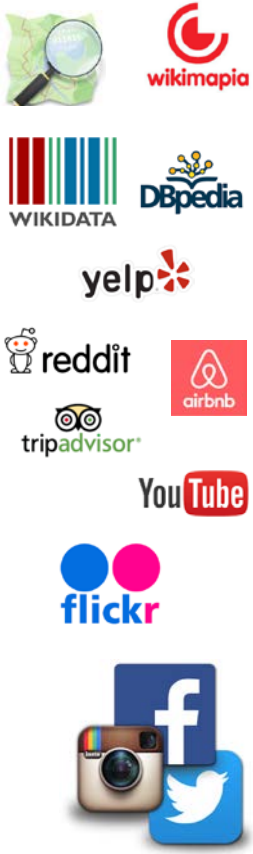
A geodemographic approach

Conclusions

- More interaction between research on CGI **core** and **domain applications**
  - beyond technology, towards social domains
  - beyond the usual suspects (OSM, etc)
- **Access** to data: sampling and scraping
- Systematic work on **limitations** is needed
  - Urban Information Geographies
- Impact of **GDPR** on access and use of data



Thank you for your attention.

Any questions?

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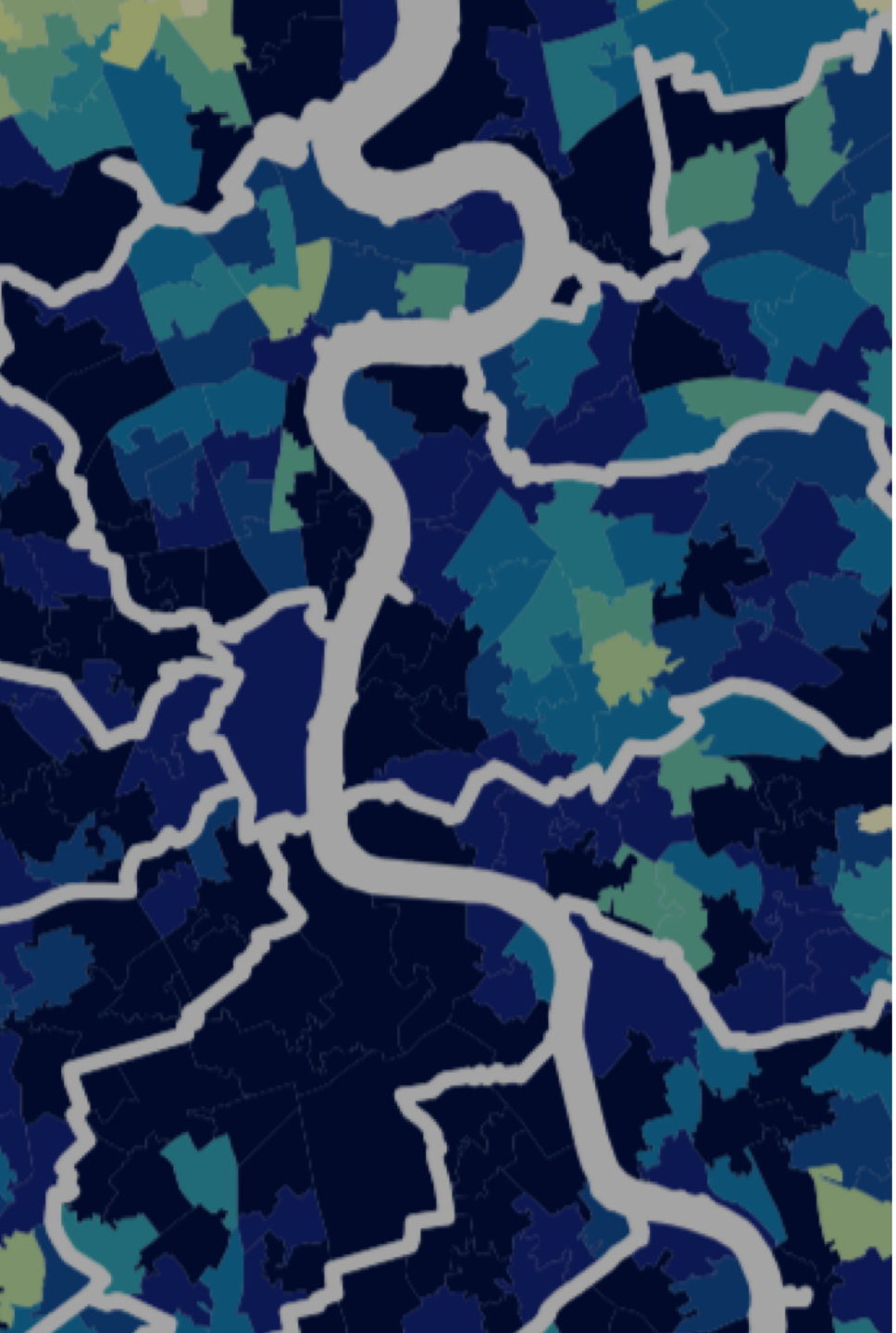

Thanks!

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