

2.8 Using geospatial data in your place studies

In this section you will learn about:

- the value of big data, geospatial data and geographical information systems (GIS)
- examples of quantitative sources of data that you could use to inform a place study



Exciting times

For human geographers these are exciting times because, in the new information age (see 1.1 and 1.3), data about people is often geolocated (**geospatial data**), giving an insight into the way we live and how geographic communities differ.



Figure 1 Barack Obama's 2012 presidential campaign team used big data analysis about voter preferences to good effect

So, pick the scale you'd like to begin with and visit www.neighbourhood.statistics.gov.uk to explore and map the data (as in activity 5, 2.4). Also try the interactive map interface DataShine Census (Figure 3).

DataShine Scotland has data from the Scottish Census.

Both sites allow you to create choropleth maps with additional overlays of spatial information, of the kind presented on an OS map – settlements, rivers, roads, railways. The overlays help users to make sense of places presented. Note that the more detailed DataShine Census maps present data by census output area, instead of aggregating the data by ward as is the case in the ONS mapping tool (activity 5, 2.4).

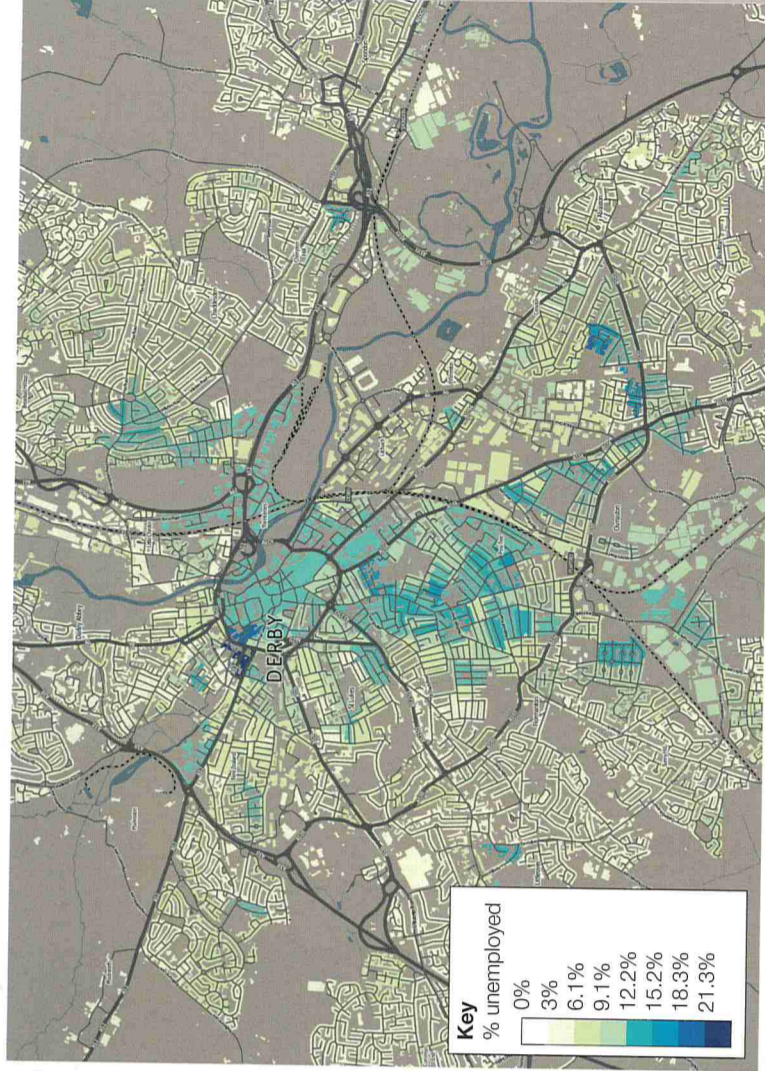


Figure 3 Map of Derby showing the percentage of unemployed people within the economically active age group across the city. DataShine Census is an interactive mapping tool you can use to present data from the 2011 Census.

The English Index of Multiple Deprivation (IMD) 2015

The concept of **deprivation** was introduced in the 'Stretch Yourself' in section 2.4. The English Index of Multiple Deprivation (IMD) is published by the Department for Communities and Local Government on a regular basis and informs national and local government decision-making and associated patterns of investment. It ranks over 32,000 neighbourhoods (LSOAs) across the whole country according to a combination of seven domains of deprivation (see Figure 4). Each of these domains is based on a 'basket' of indicators. As far as is possible, each indicator is based on

the most recent data available although, in practice, most indicators in the 2015 data relate to the tax year 2012/13, for example, the number of recipients of income support benefits in a given area that year.

The **deciles** are produced by ranking the 32,844 lower-layer super output areas (neighbourhoods) and dividing them into 10 equal-sized groups. Decile 1 represents the most deprived 10 per cent of areas nationally and decile 10, the least deprived 10 per cent.

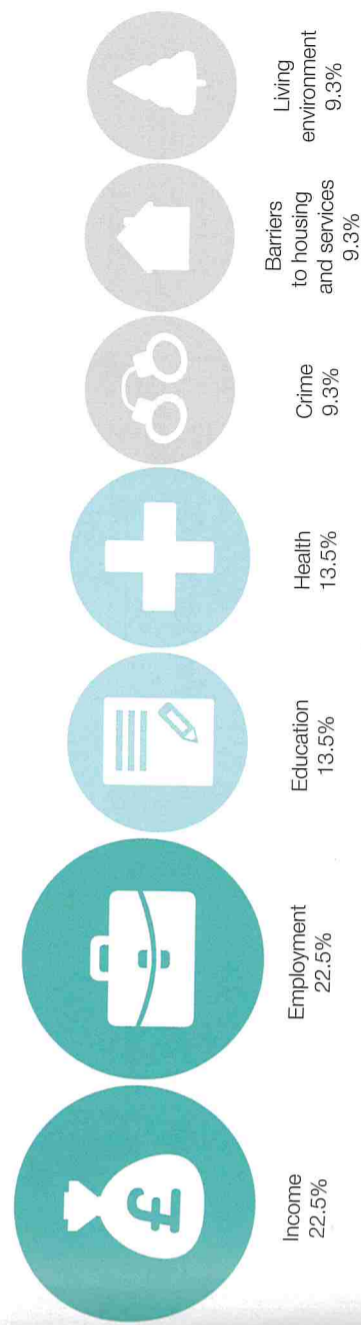


Figure 4 The English IMD is a system of ranking neighbourhoods based on seven indicators of deprivation that are combined according to a weighted formula

Think about

Allow this app to view your location?

With Global Positioning System (GPS) technology in the phones we use to interact with the World Wide Web, organisations (governments, companies, political parties) can map the data they collect, creating a boom-time for the discipline of digital cartography and data visualisation. What would you like to map? How would you present it in a new app and for what purpose?

Analysing the UK Census: a 'big' snapshot

To make sense of data collected in a census, statisticians organise the responses geographically – they aggregate the data. This gives anonymity to those who completed it and allows wider conclusions to be drawn about populations and places at different spatial scales.

For example, in terms of the sort of scale you will need for your place studies, data from the England and Wales Census can be analysed by output area, neighbourhood or ward (Figure 2).

Type of small area – census 2011	Average population	Avg no. of households	Total no. in E&W
Output area (OAs)	309	130	181,408
Neighbourhood or lower layer super output area (LSOAs)	1614	672	34,753
Ward (electoral districts)	6543	2726	6543

Figure 2 Different types of small areas used by the ONS for detailed analysis

What is 'big data'?

Big data is big in terms of its scale (the number of responses, the variety of data sets and the size of populations) and it requires huge amounts of computational power (servers, algorithms). It has huge potential. Lots of social and economic data sets fall into this category. There are different definitions of big data but they each have several things in common:

- Volume: the data is not a sample, it is a record of whole datasets/population of users.
- Velocity: often real-time information, for example, purchase transactions.
- Digital footprint: may be a cost-free by-product of digital interaction, for example, Tweets, Facebook posts at any given moment.

Because a lot of big data has a spatial element (everything happens somewhere and most of the time these activities are geo-tagged), analysts claim to be able to use it to make predictions that relate to the population of an area. In turn, their predictions may inform more cost-effective allocation of resources or, in the case of election campaigns, help a candidate to win by targeting key voters (Figure 1). However, this is still a new area of computer science and statistical analysis and, as with any quantitative source, predictions made using big data are only as good as the quality of the data and people's understanding and interpretation of it.

Concerns have been raised by some groups of people about the idea that our every move or browse online can be monitored and is traceable using big data. However, the vast scale of data produced on a daily basis should allay the fears of most about 'Big Brother' watching you.

Using geospatial data in your place studies

A few notes of caution should be observed when interpreting the map and ranks of individual neighbourhoods:

- ◆ The ranks (and deciles) are relative: they show that one area is more deprived than another but not by how much.
- ◆ When interpreting maps, the eye is drawn to large swathes of colour. This can be misleading as a geographically large local authority district may have a smaller population than a geographically smaller district.
- ◆ The neighbourhood-level indices provide a description of areas but not of individuals within those areas.
- ◆ The indices identify aspects of deprivation, not affluence. The rich aren't mapped.

The IMD is of interest to geographers, both in terms of the spatial pattern of (poor) quality of life it depicts, and also in terms of how it defines deprivation, incorporating a spatial element in the domain of 'barriers to housing and services' (see panel).

The complex pattern of deprivation across England

Most deprived neighbourhoods and least deprived neighbourhoods were spread throughout England (see Figure 5 and the interactive *IMD Explorer* online).

As was the case in previous indices, there are concentrations of deprivation in large urban conurbations – historically industrial, manufacturing or mining areas, coastal towns and large parts of East London. Figure 6 presents the local authorities most affected by relative deprivation.

Local authority district	Number	Per cent
Blackpool	19	20.2
Knowsley	13	13.3
Kingston upon Hull	20	12.0
Middlesbrough	10	11.6
Liverpool	26	8.7
Great Yarmouth	5	8.2
Barrow-in-Furness	4	8.2
Burnley	4	6.7
North East Lincolnshire	7	6.6
Manchester	18	6.4

Geographic distance: a barrier to services?

The IMD 2015 considers physical distance to be a contributory factor in areas of deprivation. The following is incorporated into the ranking for every neighbourhood:

- ◆ Road distance to a post office
- ◆ Road distance to a primary school
- ◆ Road distance to a general store or supermarket
- ◆ Road distance to a GP surgery

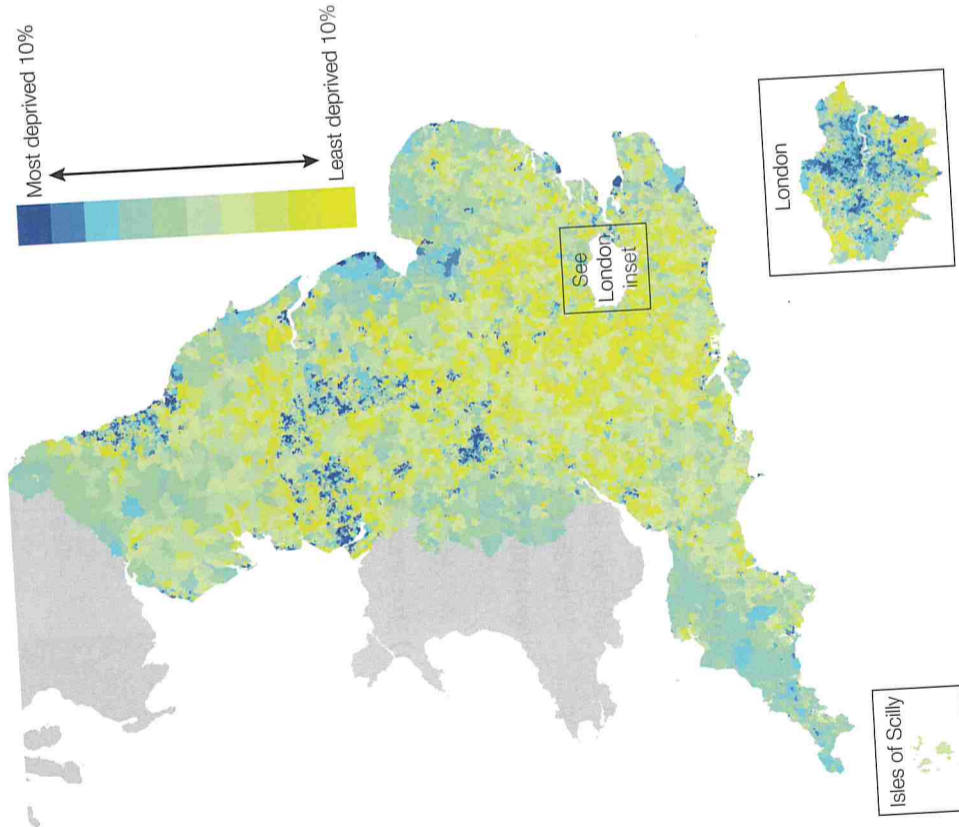


Figure 5 Map of multiple deprivation across England (IMD 2015)

Figure 6 Local authority districts with the highest proportion of neighbourhoods (LSOAs) in the most deprived one per cent of areas nationally (based on the IMD)

Deprivation over time and space

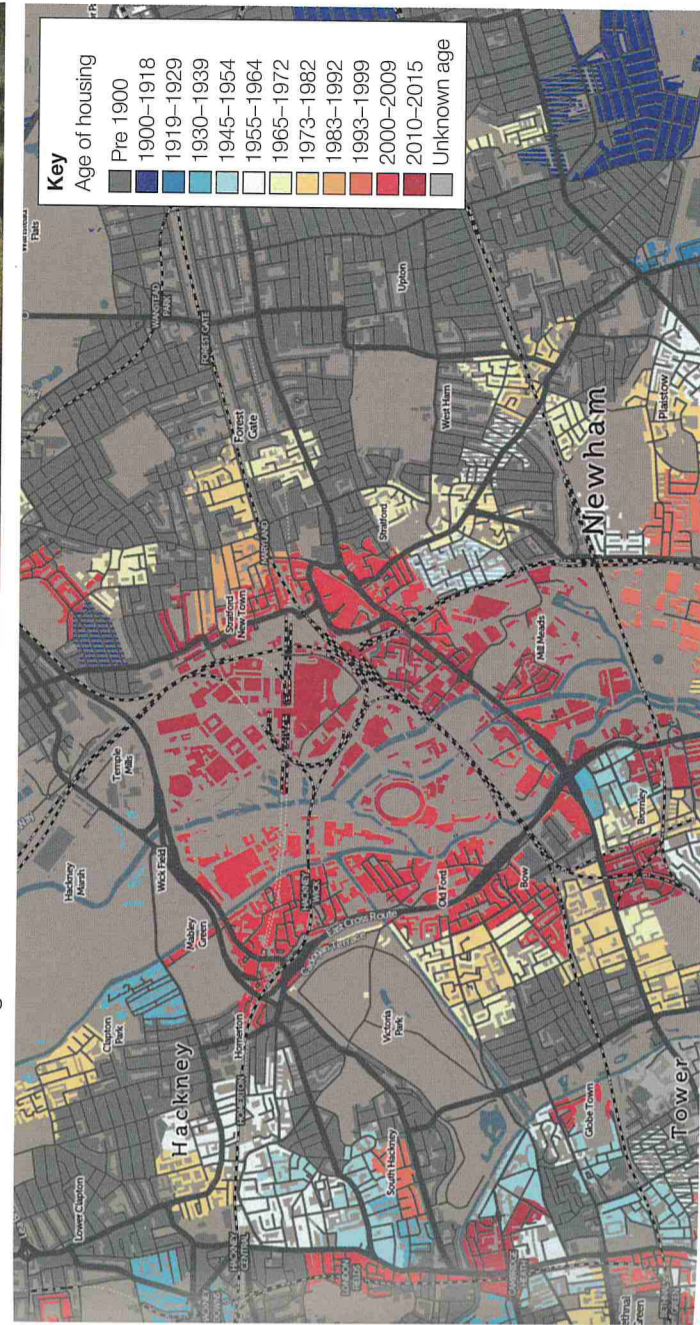
There are 98 neighbourhoods that have been ranked among the most deprived one per cent in each IMD update (in 2004, 2007, 2010 and 2015). These are places where the community has experienced the poorest quality of life in the UK for over a decade.

The areas most affected by persistent relative poverty are in Merseyside and Greater Manchester. In contrast, no neighbourhoods in London were ranked among the most deprived one per cent in each and every update.

Figure 7 East Village in E20, a new postcode for an area of Newham that has benefited from Olympic investment



Figure 8 Age of housing mapped across the Queen Elizabeth Olympic Park and surrounding areas in East London



ACTIVITIES

- 1 Write your own definition of 'big data'.
- 2 Use the www.datashine.org.uk and www.neighbourhood.statistics.gov.uk websites to investigate the results of the 2011 Census for your place. Compare these two GIS software sites in terms of the clarity of maps created; ease of construction; ease of interpretation.
- 3 Read the text about the IMD and look at the IMD Explorer site <http://dclgapps.communities.gov.uk/imd/idmap.html>
 - a Who might be interested in the Index of Multiple Deprivation? Why?
 - b Look at Figure 4. Comment on the different domains (data sets) used to create this index of neighbourhoods.
 - c What are the limitations of the IMD?

STRETCH YOURSELF

Using online resources locate the CDRC map of 'dwelling age' created by combining data from the Government's Valuations Office Agency and the ONS (also see Figure 8). Use the map to find out about the different ages of housing in your local area. How might you use this information to direct further research for your place study or make sense of other data you have already collected?