# West Midlands Futures

## Economic Geographies of the West Midlands

*Annex Report*

West Midlands Combined Authority

SQW

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# Contents



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# Annex A: The methodology underpinning the COMBO approach

In this study we employed an algorithmic approach to identifying economic geographies that builds upon previous methods implemented by Nelson and Rae (2016) for the United States and Hamilton and Rae (2018) for Scotland. Put simply, the methodology is based on input origin-destination data (e.g. migration data, travel to work data, consumer spending data) and it uses a network partitioning algorithm called COMBO (developed by a team of researchers at MIT) to identify discrete functional areas. COMBO iteratively works through every single origin-destination link between places and then puts each area into a group (sometimes known as a 'community') based on how strongly it is tied to other places. In this study, the areas used are typically Middle-Layer Super Output Areas (MSOAs) but in some cases, owing to data publishing standards, we have used postcode-level data for the analysis.

COMBO is part of a wider family of so-called 'network partitioning' algorithms (such as Louvain, Martelot or Sp+Ref) and the reason we use it here is because it produces the most robust results – in terms of partitioning, and because it builds regions 'from the ground up', without any predetermined instructions as to how many areas should emerge or which locations are most central. Such tools have rarely been used in studies of economic geography in the UK but they are extremely powerful and, previous research suggests, highly effective in identifying clusters of human activity where the ties between places are strongest (e.g. Sobolevsky et al., 2010). The COMBO approach is fundamentally different to other approaches based on travel to work data, and particularly the longstanding method used to create Travel to Work Areas (TTWAs) in the UK. The TTWA algorithm is based on the principle of 'self-containment', and it creates areas where most workers living in an area also work there.

However, when we talk of algorithms and 'network partitioning' in the context of economic geographies, it is necessary to provide some further explanation – for two reasons. First, the term 'algorithm' is ubiquitous in today's society but it is not particularly well understood in the context of studying the linkages between places. Second, the areas produced by COMBO – based on real-world data – are driven not by any pre-determined set of boundaries but by the *strength of connection* between places. In the context of this study, the 'strength' of connection is measured in relation to things like the flow of people moving house between one area and another, or the daily flow of commuters. On the latter point, due to the potential impact of Covid-19 on 2021 Census data, we also used COMBO to analyse origin-destination data from the 2011 Census, in order to provide a useful reference baseline. The COMBO areas produced are very similar, but the intensity of the flows aren't as high given the impact of the pandemic.

In terms of the step-by-step procedure COMBO uses, this can be described by outlining each individual step, as shown below. The only real requirement in terms of data is that COMBO must have origin-

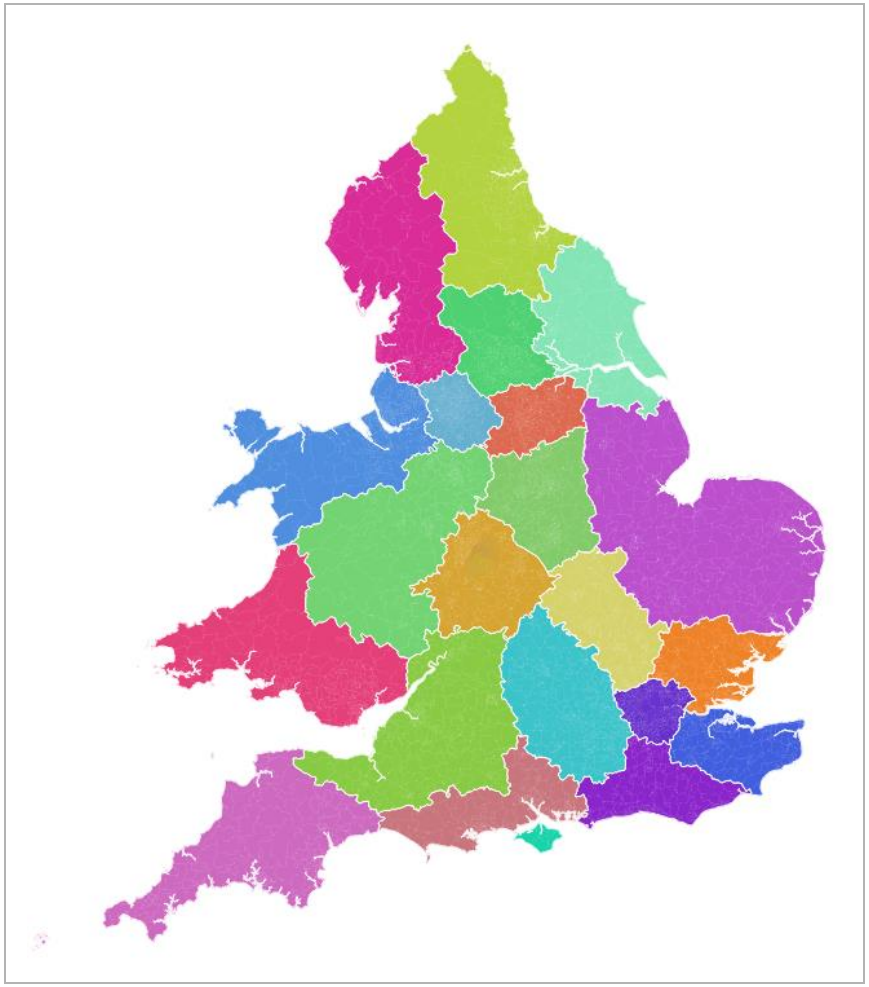
destination data and a column with flow data (typically commuting or migration numbers, but it can be any origin-destination data).

**COMBO algorithm** (as specified by Sobolevsky et al., 2010)

input : A network net containing n nodes, initial partition initial communities (by default initially
all nodes in one community), the maximal number of communities max communities
(inf inity by default)
output: A partition of the network into communities
1 Initialize variables for storing partitions and their gains;
2 for each pair (origin, dest) of communities do // dest may be empty community
// Calculate best gain from moving nodes from origin to dest
3 ReCalculateGain(origin, dest);
4 while BestGain() > T HRESHOLD do
5 PerformMove(best origin, best dest, best partition);
// Update gains for changed communities
6 for each community i do
7 ReCalculateGain(best origin, i); ReCalculateGain(i, best origin);
8 ReCalculateGain(best dest, i); ReCalculateGain(i, best dest);
9 Procedure PerformMove(origin, dest, partition)
10 Move nodes from origin to dest according to partition;
11 Procedure BestGain()
12 Select from remembered partitions one with the best gain;
13 Return this gain and corresponding best origin, best dest and best partition;
14 Procedure ReCalculateGain(origin, dest)
15 if dest is new community and we already have max communities then
16 return;
17 Define and initialize number of tries;
18 for tryI ← 1 to number of tries do
19 foreach vertex v from origin community do
20 move v to dest or leave in origin with equal probability;
21 Calculate new gain, assign zero to previous gain;
22 while new gain > previous gain do
23 PerformKernighanLinShifts(origin, dest);
24 if achieved gain is greater then current maximum then
25 Remember current partition and gain;
26 Procedure PerformKernighanLinShifts(origin, dest)
27 Calculate gains from moving each node to opposite community;
28 for i ← 1 to size of origin community do
29 Perform temporary movement that produces maximal gain;
30 Remember current gain and moved node;
31 Recalculate all gains;
32 Retrieve the movements leading to a maximal gain among intermediately calculated and perform them.

The specification of the algorithm above is, of course, rather hard to decipher unless you are familiar with computer programming and/or algorithmic computation. For this reason, the map below is presented as a way to illustrate how commute data can be used to partition areas into discrete 'regions'. In this case we have used travel to work data from the 2021 Census to generate larger 'regions' for England, using COMBO. It should be noted that although the number of people commuting during the pandemic was much lower, the geography is similar to previous years.

**Figure A-1: COMBO Analysis of Travel to Work Data (Nationally), 2021**



*Source: Automatic Knowledge analysis of Travel to Work Data, Census 2021*

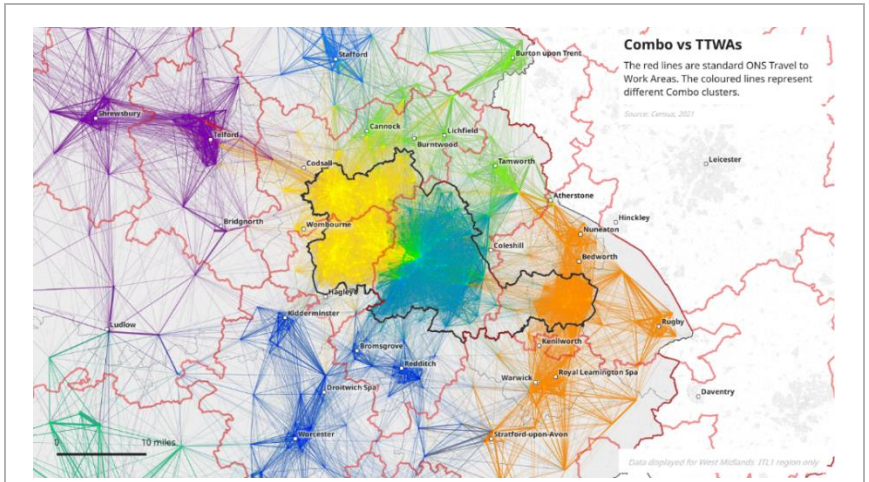
As we can see from the illustrative map above, COMBO creates regions purely on the functional geography it identifies from the underlying data (in this case MSOA-level commute data) and pays no attention to existing administrative boundaries. In that sense, it is 'spatially blind', given that it groups locations based purely on the level of connectivity between them; in fact, COMBO does not actually use any geolocation data to assign areas to groups. But because nearer areas are almost always more closely tied together than distant areas, when we're looking at economic geography, the results are spatially coherent and – to those with local knowledge – reflective of local functional spatial patterns (such as commuting and migration). An important point to note here is that there is always some interaction between different areas, so in this study we purposely do not map COMBO areas with hard-line borders and instead use interconnected coloured lines or blurred edges.

***Identifying polycentric and monocentric spatial structures***: how should the COMBO maps be read? The areas grouped together by COMBO are not always similar in character. For example, in this study we see some COMBO regions that are more monocentric (such as those centred on Birmingham) and some that appear more polycentric, with multiple important settlements tied together as an overlapping network of places. A good example of this would be the area containing Coventry and surrounding locations such as Bedworth, Rugby, Warwick and Leamington Spa.

***How different are COMBO areas from TTWAs?*** In the map below we have shown coloured lines to represent COMBO areas, overlaid with

existing Travel to Work Areas (in red outline). There is a good degree of spatial matching here but in some cases (e.g. Black Country) COMBO groups areas that the TTWA approach splits, whereas in others (e.g. Birmingham) COMBO differentiates between areas that TTWAs groups as one. Unlike the TTWA approach, the COMBO approach does not begin with any parameters relating to things like self-containment or number of workers in an area. COMBO also allows us to see the 'mixing' between places, as illustrated by the blending and colour overlaps on the map below.

**Figure A-2: COMBO Analysis (produced for this report) vs ONS Travel to Work Areas**




*Source: Automatic Knowledge, 2024*

**Can we make COMBO produce *more* areas?** All algorithms can be manipulated by the user if we adjust the settings and parameters used, and COMBO is no different. However, in this study we did not begin with any preconceived notions of how many areas the algorithm should return. We took the raw data, applied the default settings and explored the outputs. In each case, we also tested the outputs using different parameters – as in the maps *overleaf* where we asked COMBO to return 10, 15 or 20 areas within the West Midlands ITL1 region rather than the default set. In each case, when we tested the effects of using a predetermined number, the modularity score was lower. In network partitioning, modularity is a measure of how well the dataset has been partitioned. All our results are based on the default approach, which maximises the modularity (i.e. the efficiency of the algorithm).

**References**

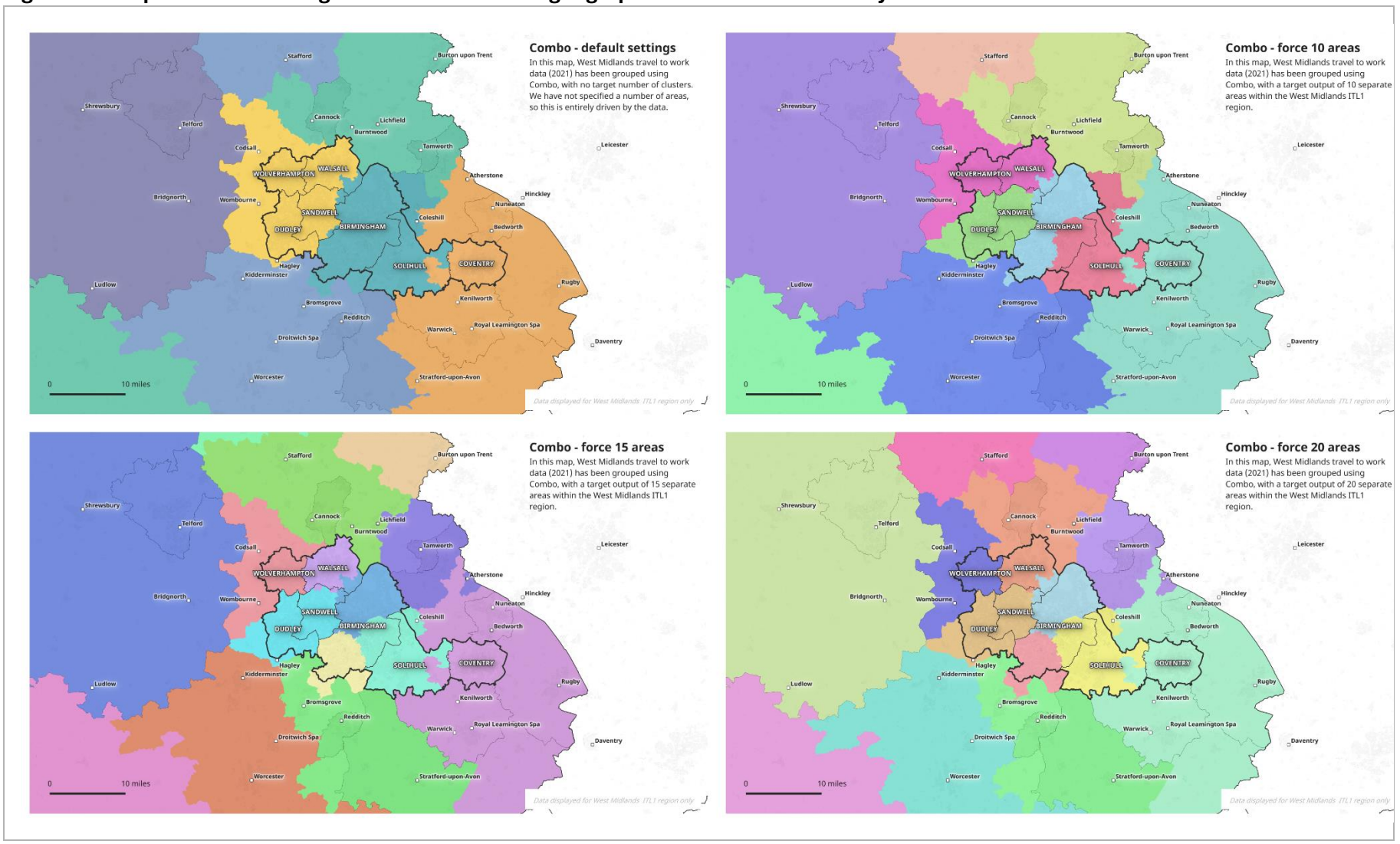
Hamilton, R., & Rae, A. (2020). Regions from the ground up: a network partitioning approach to regional delineation. Environment and planning B: urban analytics and city science, 47(5), 775-789.

Nelson, G. D., & Rae, A. (2016). An economic geography of the United States: From commutes to megaregions. PloS one, 11(11), e0166083.

Ratti, C., Sobolevsky, S., Calabrese, F., Andris, C., Reades, J., Martino, M., ... & Strogatz, S. H. (2010). Redrawing the map of Great Britain from a network of human interactions. PloS one, 5(12), e14248.

Sobolevsky, S., Campari, R., Belyi, A., & Ratti, C. (2014). General optimization technique for high-quality community detection in complex networks. Physical Review E, 90(1), 012811. https://senseable.mit.edu/community_detection/

**Figure A-3: Implications of using different numbers of geographies within COMBO analysis**




*Source: Automatic Knowledge, 2024*

# Annex B: West Midlands atlas

This Annex provides a compendium of contextual evidence that has been used to inform the main body of the report. This evidence provides insights into the current socio-economic conditions across the West Midlands that are both the cause and/or consequence of the region's inter-relationships.

The datasets have been chosen because they are particularly relevant to the economic geographies of the West Midlands:

- **People**: including data on population density, output area classifications and deprivation.
- **Economy**: including data on incomes and sectoral structure.
- **Commuting Flows**: including more detail on working from home and commuting flows from individual local authority areas.

### Headlines from the data

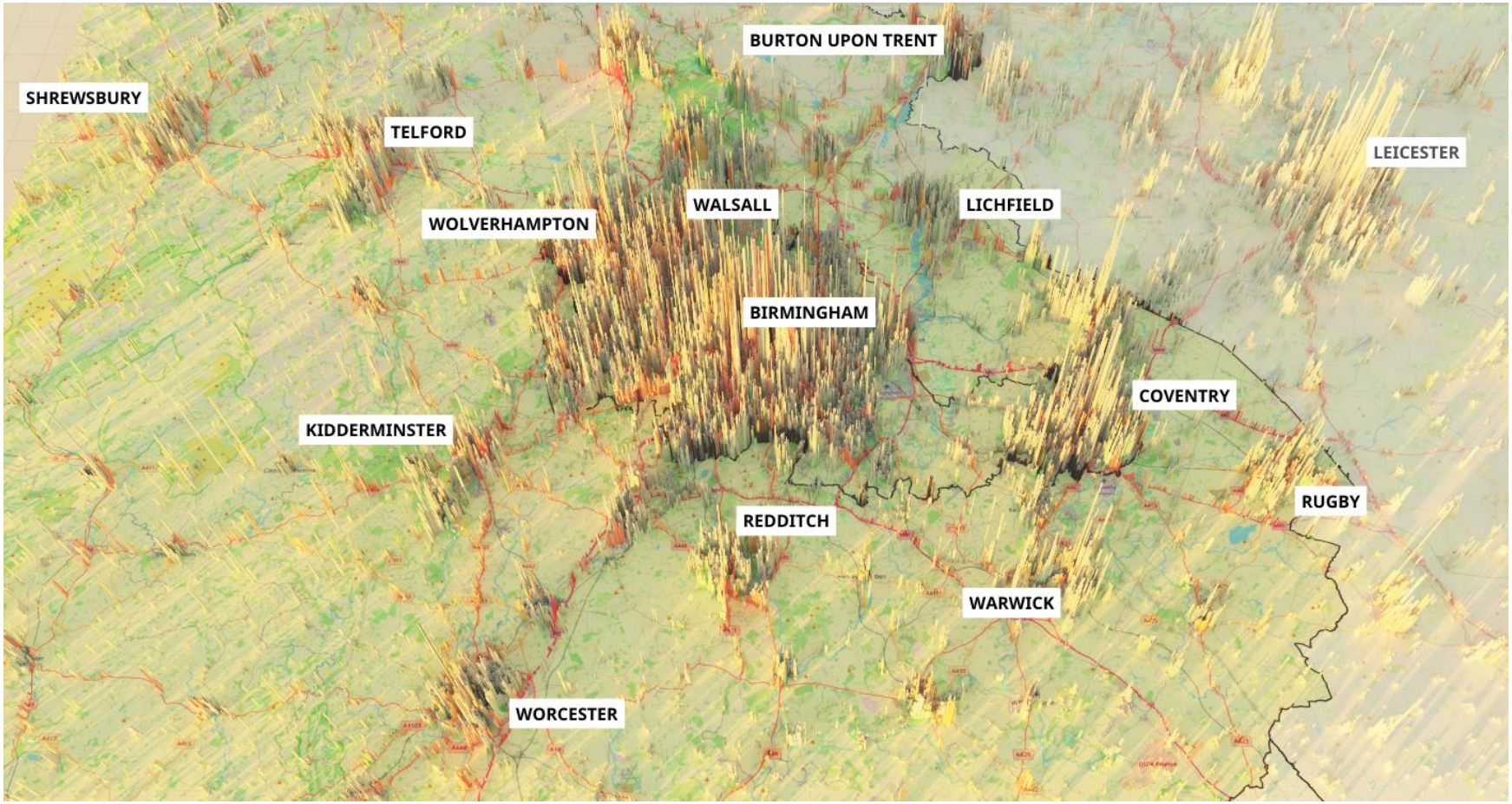
Some of the headlines from the data are as follows:

- The majority of migration moves occur within the same local authority area; between 47% and 58% of moves in the WMCA constituent authorities over the year prior to the 2021 Census were to another location within the same local authority area. The largest migration flows outside of a local authority boundary in the West Midlands were from Birmingham to other WMCA constituent authorities, the largest being from Birmingham to Solihull (accounting for 23% of in-migrants to Solihull), Birmingham to Sandwell (15%), and Birmingham to Walsall (11%). Reflecting some of the findings in the main report, flows between Coventry and the other WMCA constituent authority area were very small.
- Mapping of Output Area Classification and the neighbourhoods (Figure B-2) with the highest/lowest levels of deprivation (Figure B-3) across the West Midlands shows that there were pockets of deprivation (and in-turn higher levels of low-skilled migrant and student communities, and semi- and unskilled workforce within the Output Area Classification) in central/east Birmingham and across large parts of the Black Country. Lower pockets of deprivation (in turn higher proportions of 'retired professionals', 'ethnically diverse suburban professionals' and 'suburbanites and peri-urbanites') are found on the periphery of the Birmingham urban area, including in Solihull, southern Dudley, north Birmingham and across large parts of the areas outside of the WMCA constituent authorities (e.g. Warwickshire, Shropshire and Staffordshire). There is a similar pattern in the Net Annual Household Income map (Figure B-4).
- Broadly, higher levels of home working (as shown in Figure B-11) correlate with lower levels of deprivation (Figure B-2)

- In terms of economic sectors (based on the level of employment in each sector), the West Midlands has a real mix in each of the WMCA constituent authorities:
  - **Birmingham**: has a high concentration of employment in professional / financial services, public sector (education, health and public administration) and property, reflecting its role as one of the largest cities in the UK.
  - **Coventry**: has a high concentration of employment in utilities (reflecting the presence of national utilities firms with headquarters in the city), the automotive industry (in particular the manufacturing of motor vehicles) and in the public sector (education, health and public administration).
  - **Dudley, Sandwell, Walsall and Wolverhampton (Black Country):** all of these local authority areas have high concentrations of employment in more traditional industries (e.g. manufacturing and construction), the retail and wholesale sector, and in public services (in particular education and health). All areas (with the exception of Dudley) also have a high concentration of activity in transport and storage, reflecting their locations close to the M5/M6.
  - **Solihull**: has a high concentration of employment in professional-based sectors (in particular business support services), the transport and storage sector (reflecting the presence of Birmingham Airport) and in some manufacturing sub-sectors.

# People

**Figure B-1: Population Density, 2021**



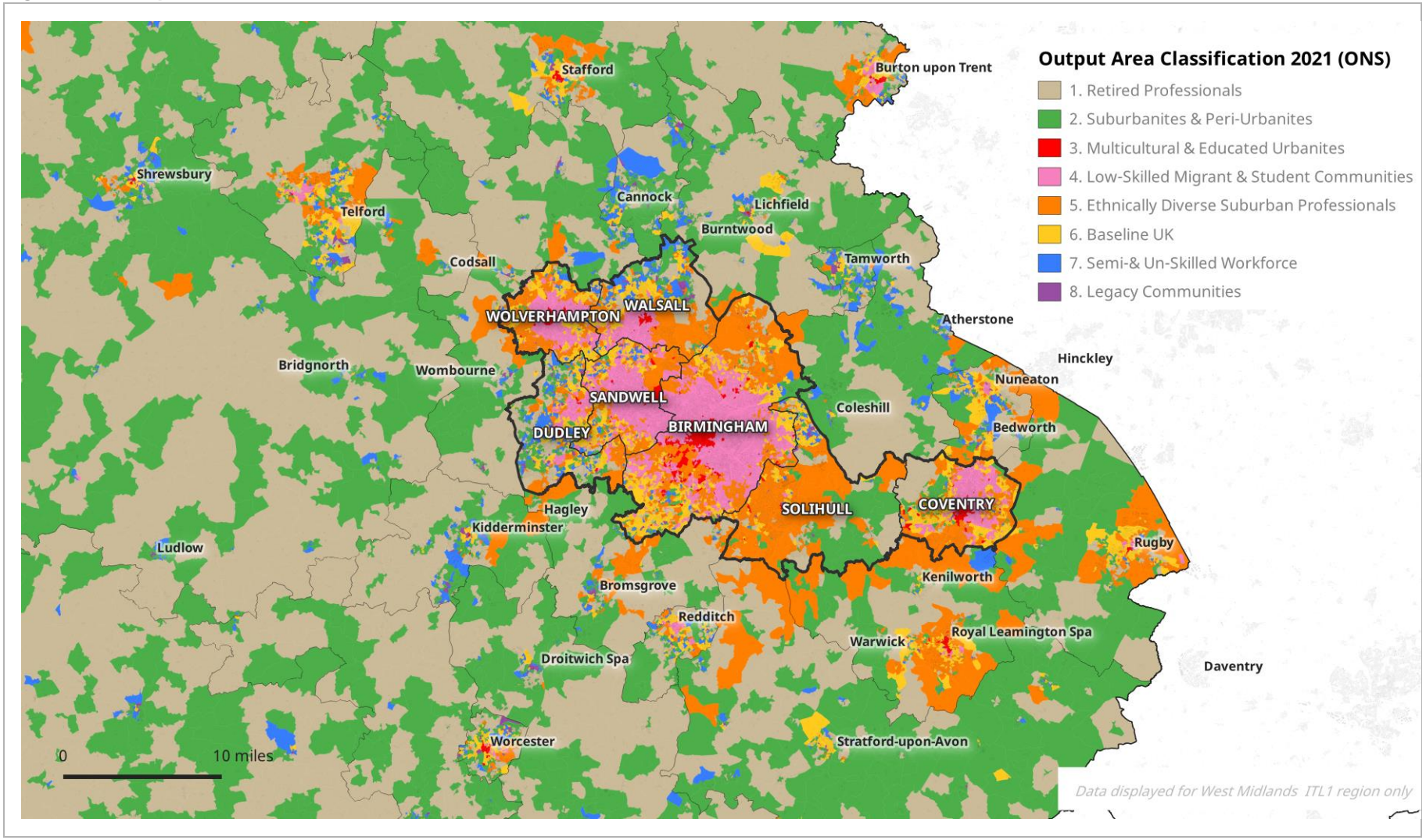

*Source: Population Statistics, ONS, 2023*

**Table B-1: Migration Flows within WMCA Constituent Authority Areas, 2021**

| | | | Origin Local Authority/Area (within the last 12 months | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Birmingham | Coventry | Dudley | Sandwell | Solihull | Walsall | Wolverhampton | Rest of UK | Outside of UK |
| Destination Local Authority | Birmingham | % | 58% | 1% | 1% | 2% | 2% | 1% | 1% | 23% | 11% |
| | | No | 71,453 | 990 | 982 | 2,746 | 2,435 | 1,346 | 681 | 28,402 | 13,642 |
| | Coventry | % | 2% | 53% | 0% | 0% | 1% | 0% | 0% | 29% | 14% |
| | | No | 1,032 | 26,023 | 123 | 148 | 348 | 85 | 114 | 14,365 | 7,123 |
| | Dudley | % | 7% | 0% | 58% | 11% | 0% | 1% | 4% | 14% | 5% |
| | | No | 1,550 | 85 | 12,970 | 2,459 | 67 | 250 | 799 | 3,235 | 1,057 |
| | Sandwell | % | 15% | 0% | 6% | 49% | 0% | 4% | 2% | 13% | 11% |
| | | No | 3,853 | 115 | 1,401 | 12,315 | 77 | 982 | 403 | 3,189 | 2,622 |
| | Solihull | % | 23% | 2% | 0% | 1% | 47% | 0% | 0% | 20% | 6% |
| | | No | 4,078 | 423 | 40 | 113 | 8,426 | 81 | 56 | 3,498 | 1,156 |
| | Walsall | % | 11% | 0% | 1% | 8% | 0% | 52% | 5% | 15% | 7% |
| | | No | 2,296 | 64 | 215 | 1,645 | 83 | 10,581 | 980 | 2,973 | 1,400 |
| | Wolverhampton | % | 4% | 0% | 4% | 4% | 0% | 5% | 52% | 19% | 12% |
| | | No | 874 | 113 | 842 | 851 | 42 | 1,204 | 12,317 | 4,522 | 2,797 |

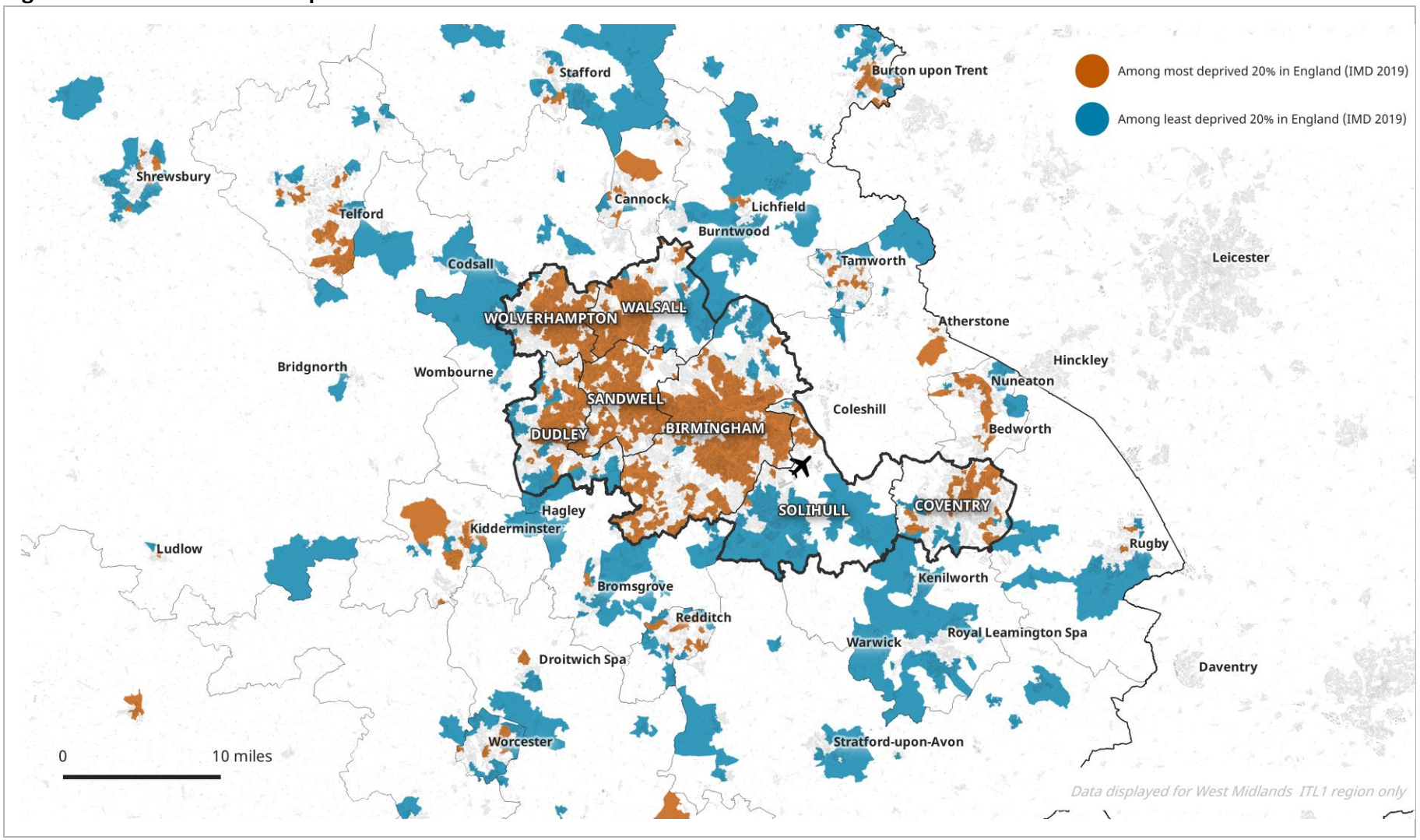
*Source: Census, ONS, 2021*

**Figure B-2: Output Area Classification, 2021**




*Source: Output Area Classification, ONS, 2021*

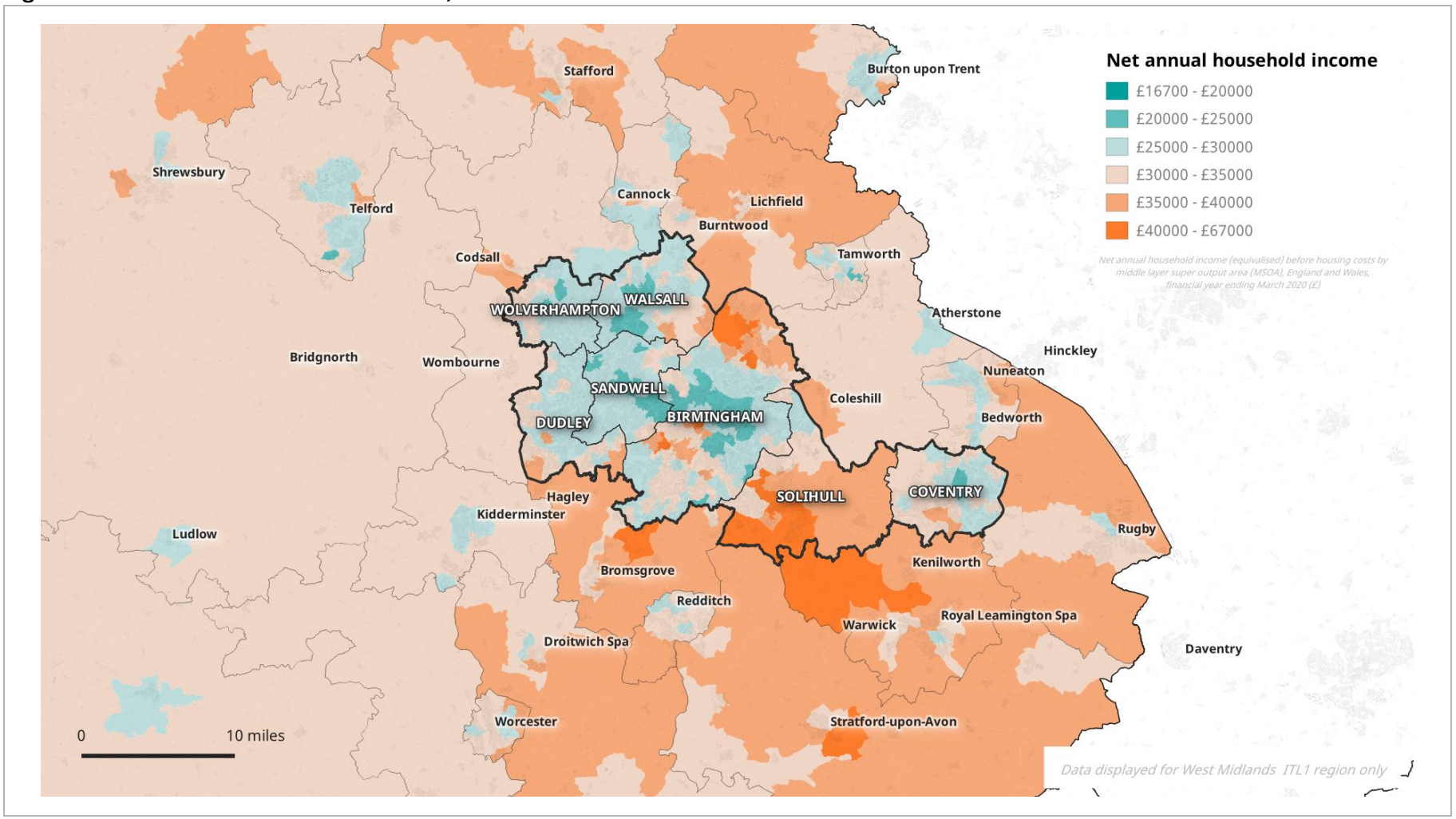
**Figure B-3: Most and Least Deprived Areas in the West Midlands**




*Source: Index of Multiple Deprivation, MHCLG, 2019*

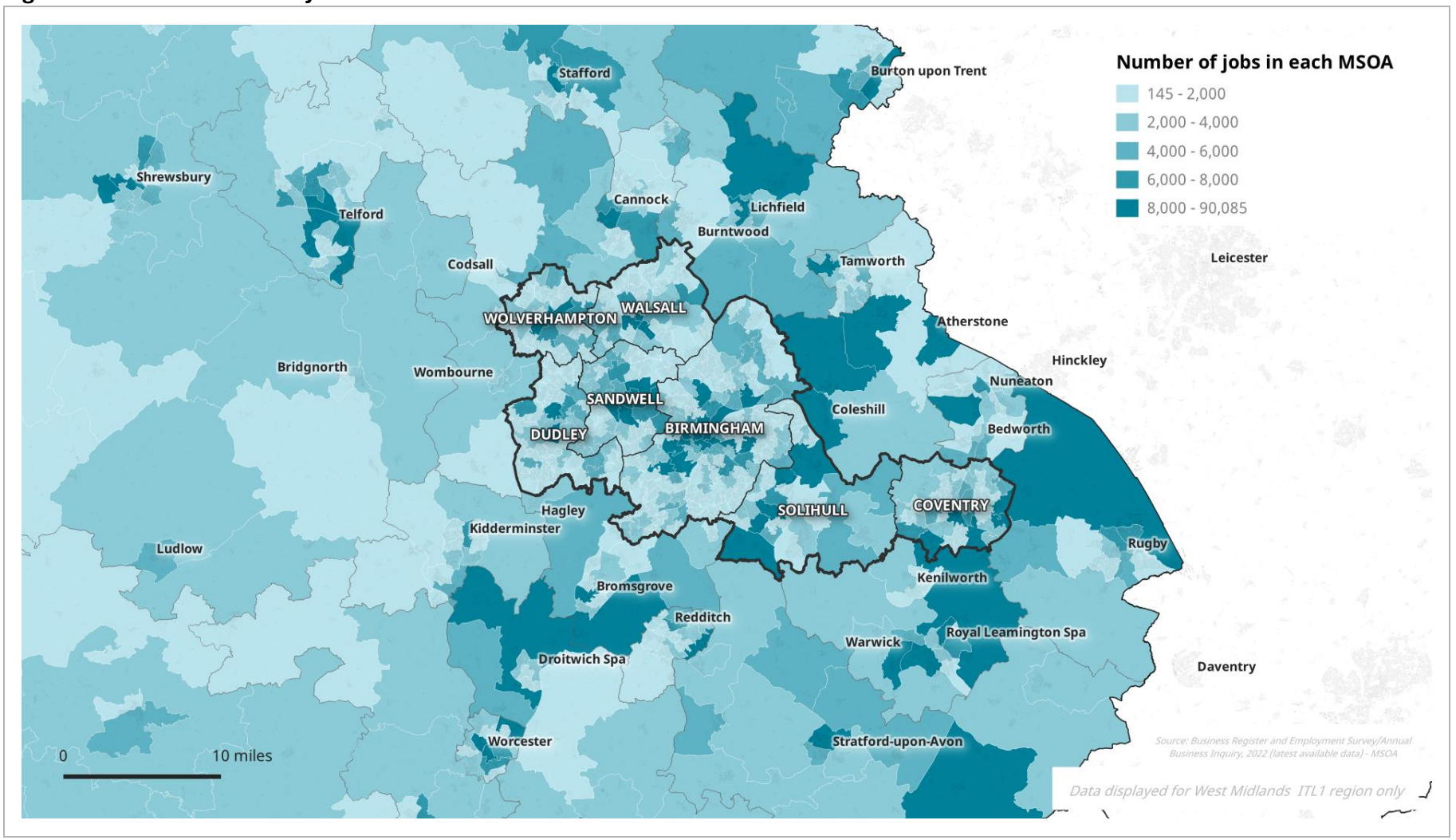
# Economy

**Figure B-4: Net Annual Household Income, 2020**




*Source: ONS, 2023*

**Figure B-5: Number of Jobs by MSOA**



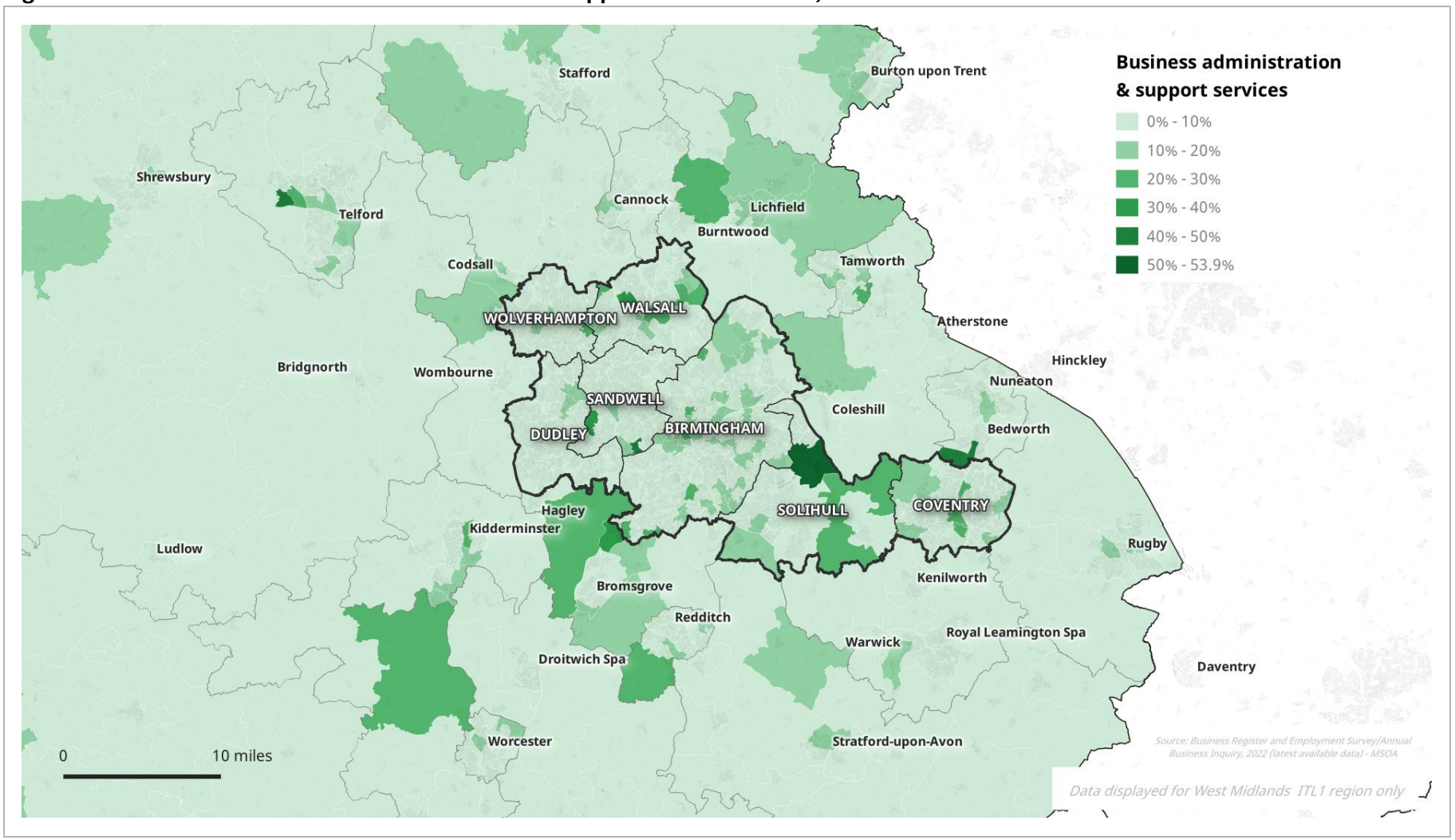

*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

**Table B-2: Sector Specialisation (Location Quotients) in Broad Sectors** *(1 = national proportion of employment in a sector)*

| Industry | Birmingham | Coventry | Dudley | Sandwell | Solihull | Walsall | Wolverhampton | West Midlands CA |
|---|---|---|---|---|---|---|---|---|
| Agriculture, forestry & fishing | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 |
| Mining, quarrying & utilities | 0.5 | 3.3 | 0.6 | 1.2 | 0.8 | 0.8 | 1.0 | 1.0 |
| Manufacturing | 0.8 | 1.2 | 2.1 | 2.4 | 1.3 | 1.8 | 1.6 | 1.3 |
| Construction | 0.7 | 0.6 | 1.3 | 0.9 | 0.8 | 0.9 | 0.8 | 0.8 |
| Motor trades | 0.8 | 1.4 | 1.3 | 1.5 | 0.8 | 1.2 | 1.3 | 1.1 |
| Wholesale | 1.0 | 1.0 | 1.7 | 1.8 | 0.5 | 1.5 | 1.4 | 1.1 |
| Retail | 0.9 | 0.9 | 1.3 | 1.0 | 0.8 | 1.1 | 1.1 | 1.0 |
| Transport & storage | 0.9 | 1.2 | 0.6 | 1.8 | 1.3 | 1.7 | 1.4 | 1.1 |
| Accommodation & food services | 0.8 | 0.7 | 0.7 | 0.5 | 0.8 | 0.5 | 0.6 | 0.7 |
| Information & communication | 0.7 | 0.5 | 0.4 | 0.2 | 0.9 | 0.2 | 0.3 | 0.6 |
| Financial & insurance | 1.3 | 0.8 | 0.5 | 0.3 | 0.7 | 0.4 | 1.0 | 0.9 |
| Property | 1.5 | 1.0 | 0.9 | 1.3 | 2.0 | 1.2 | 1.3 | 1.4 |
| Professional, scientific & technical | 1.2 | 0.7 | 0.6 | 0.4 | 0.9 | 0.4 | 0.5 | 0.8 |
| Business administration & support services | 1.0 | 1.1 | 0.5 | 0.7 | 2.9 | 1.2 | 0.5 | 1.1 |
| Public administration & defence | 1.4 | 1.0 | 0.9 | 0.6 | 0.6 | 0.6 | 1.1 | 1.0 |
| Education | 1.1 | 1.7 | 1.1 | 0.9 | 0.6 | 1.3 | 1.2 | 1.1 |
| Health | 1.3 | 1.1 | 1.4 | 1.1 | 0.5 | 1.1 | 1.5 | 1.2 |
| Arts, entertainment, recreation & other services | 1.0 | 0.8 | 1.0 | 1.2 | 0.8 | 1.0 | 0.9 | 1.0 |

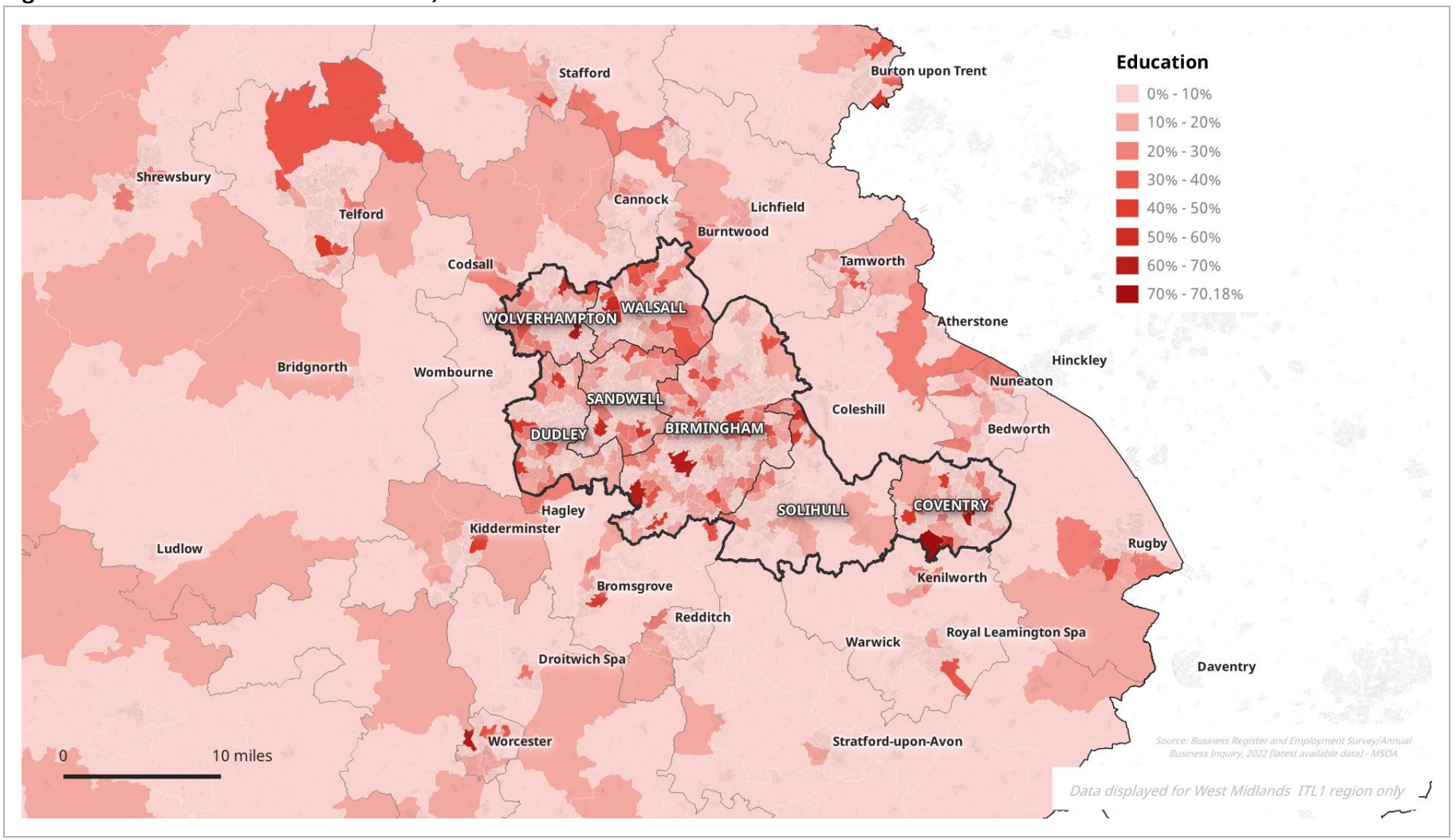
*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

**Figure B-6: % of Jobs in Business Administration and Support Services Sector, 2022**



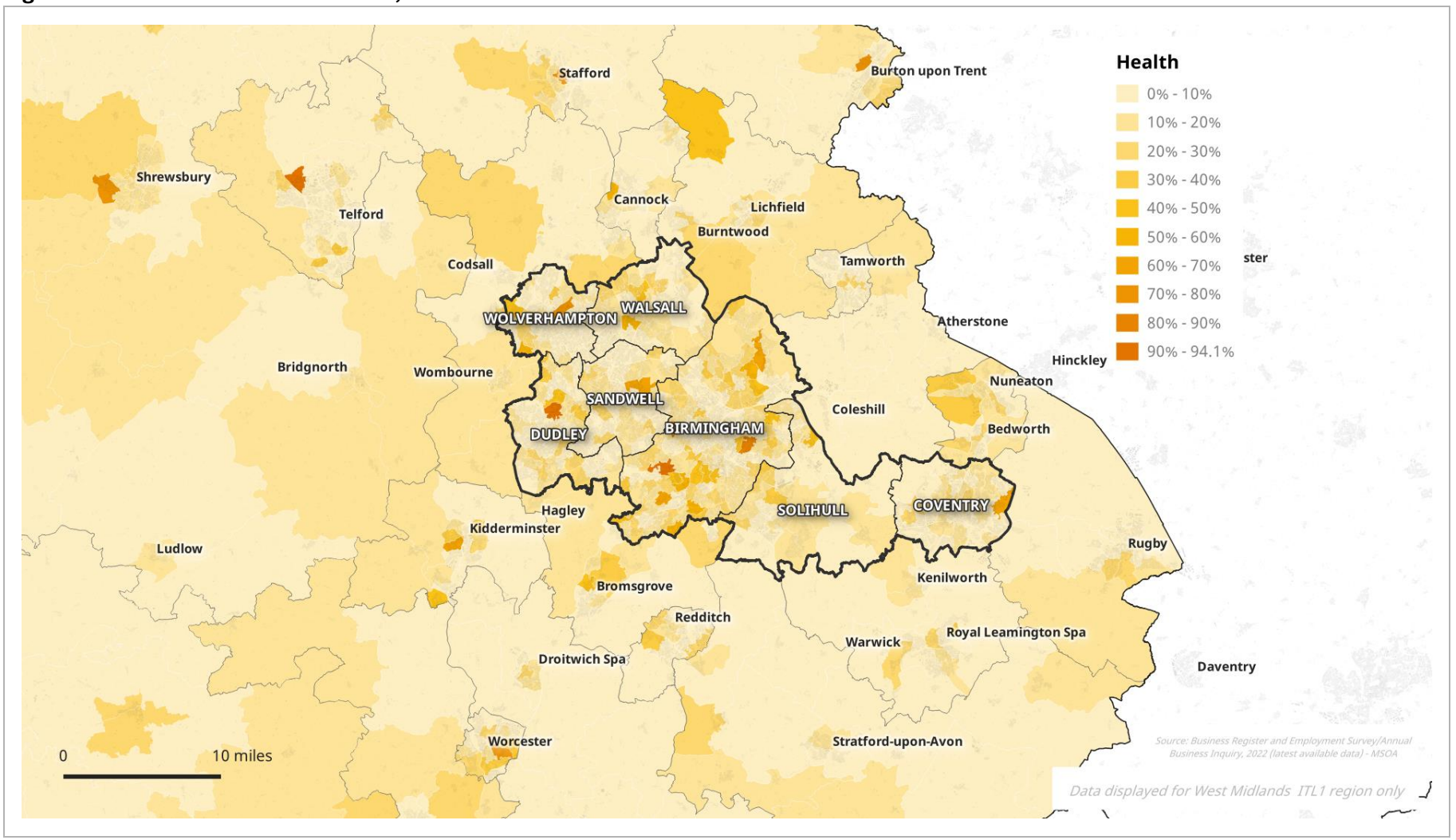

*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

**Figure B-7: % of Jobs in Education Sector, 2022**



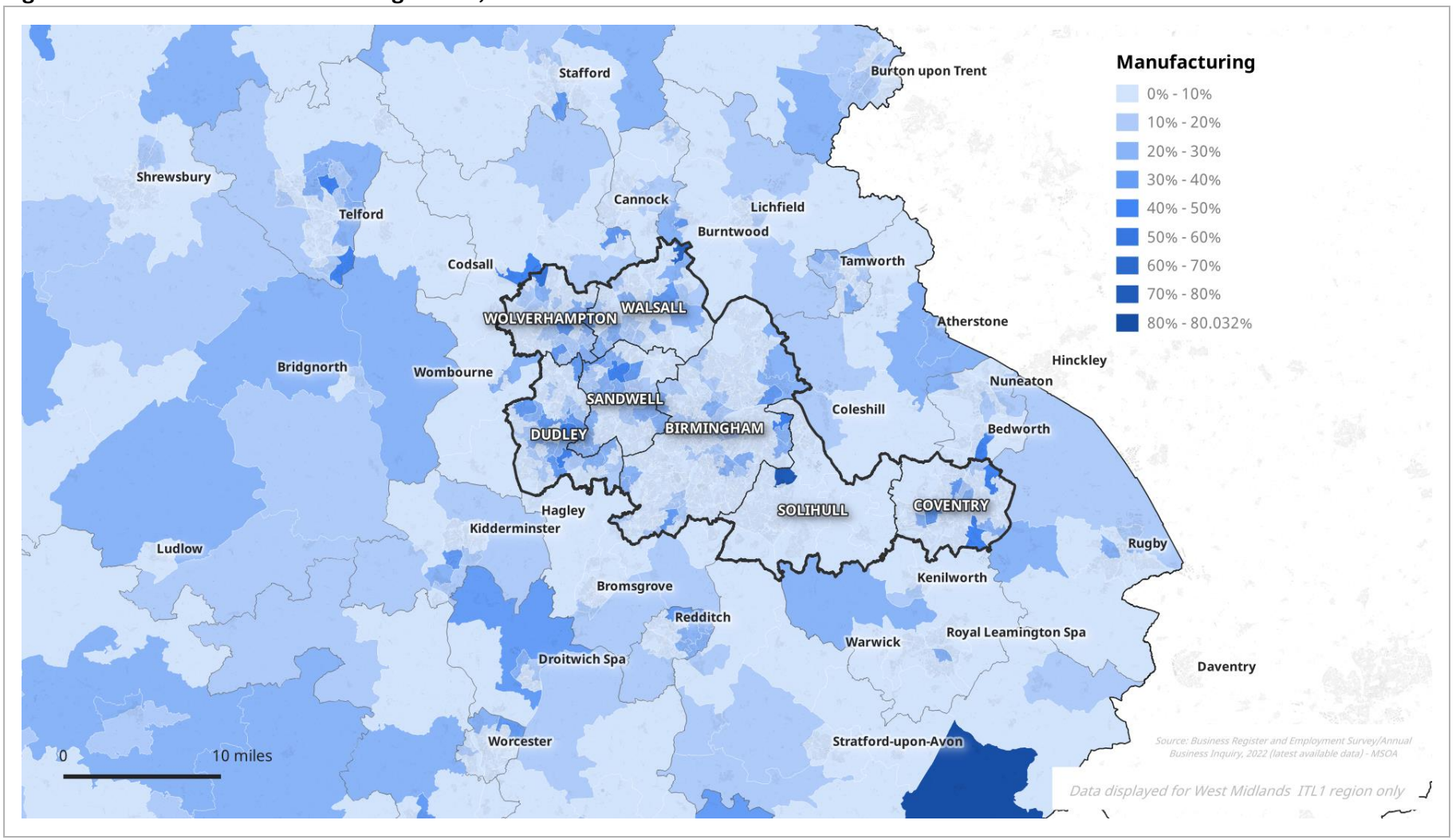

*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

**Figure B-8: % of Jobs in Health Sector, 2022**



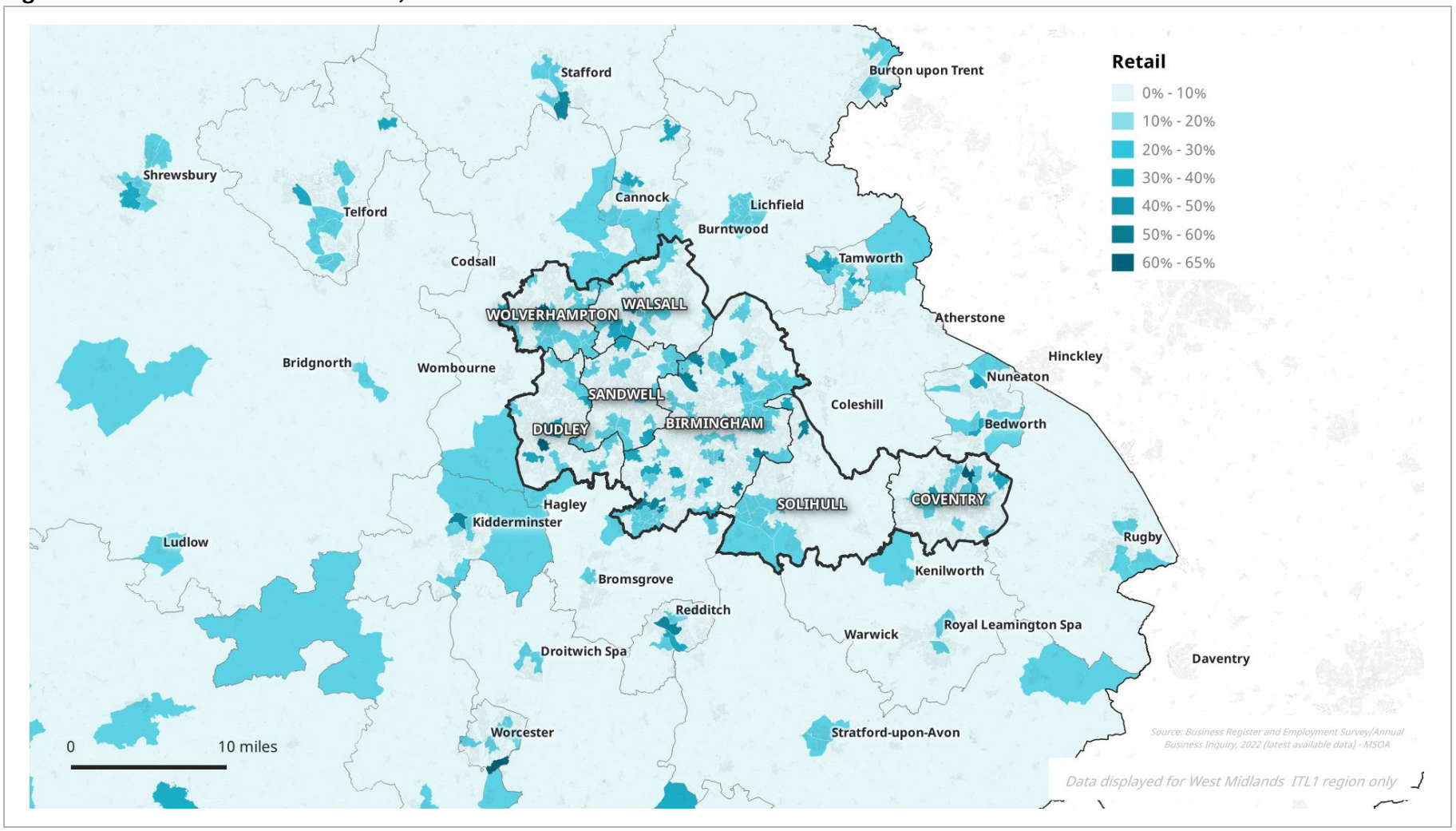

*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

**Figure B-9: % of Jobs in Manufacturing Sector, 2022**




*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

**Figure B-10: % of Jobs in Retail Sector, 2022**




*Source: Business Register and Employment Survey/Annual Business Inquiry, 2022*

# Commuting Flows

**Table B-3: Travel to Work Flows between WMCA Constituent Authority Areas, 2021**

| | | | Location of Work | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mainly working at or from home | Birmingham | Coventry | Dudley | Sandwell | Solihull | Walsall | Wolverhampton | Total in WMCA (incl. home) |
| Location of Home Address | Birmingham | % | 40% | 41% | 1% | 1% | 3% | 5% | 1% | 0% | **91%** |
| | | No | 176,115 | 179,556 | 3,537 | 3,785 | 11,477 | 23,181 | 4,815 | 2,163 | **404,629** |
| | Coventry | % | 38% | 2% | 38% | 0% | 0% | 2% | 0% | 0% | **80%** |
| | | No | 56,727 | 2,876 | 56,927 | 85 | 198 | 2,842 | 125 | 67 | **119,847** |
| | Dudley | % | 37% | 7% | 0% | 32% | 9% | 1% | 1% | 4% | **92%** |
| | | No | 53,918 | 9,980 | 231 | 46,472 | 13,296 | 972 | 2,034 | 6,289 | **133,192** |
| | Sandwell | % | 34% | 16% | 0% | 7% | 28% | 1% | 5% | 3% | **94%** |
| | | No | 47,818 | 22,798 | 517 | 9,760 | 39,345 | 1,576 | 6,652 | 3,563 | **132,029** |
| | Solihull | % | 48% | 17% | 3% | 0% | 1% | 22% | 0% | 0% | **90%** |
| | | No | 46,586 | 16,859 | 2,519 | 277 | 547 | 21,193 | 276 | 216 | **88,473** |
| | Walsall | % | 35% | 10% | 0% | 1% | 6% | 1% | 30% | 5% | **89%** |
| | | No | 41,002 | 12,097 | 284 | 1,584 | 7,702 | 1,070 | 35,383 | 6,256 | **105,378** |
| | Wolverhampton | % | 33% | 4% | 0% | 4% | 5% | 0% | 6% | 33% | **86%** |
| | | No | 36,972 | 4,283 | 195 | 4,890 | 5,394 | 516 | 6,525 | 37,031 | **95,806** |

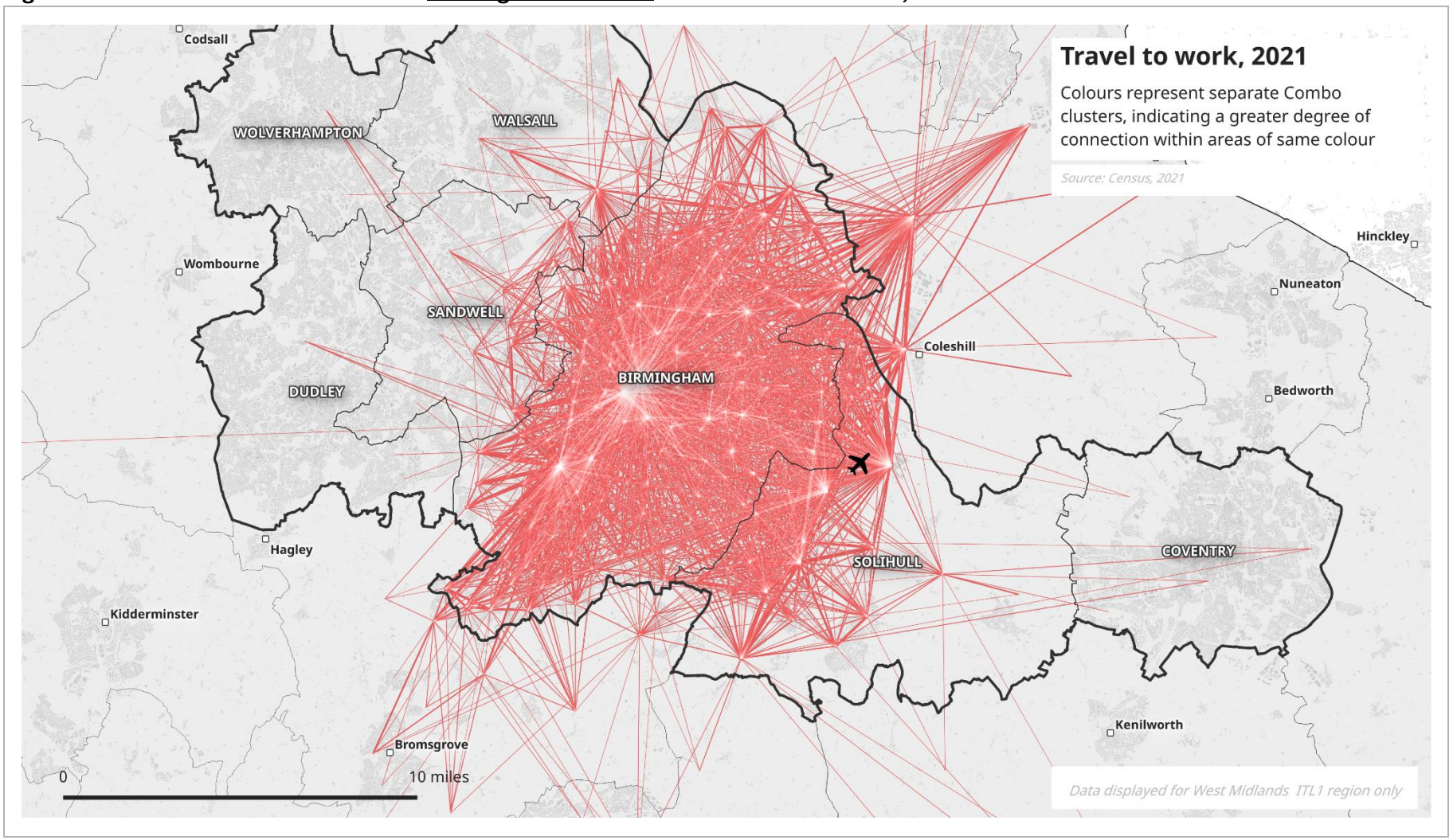
*Source: Census, ONS, 2021*

**Table B-4: Travel to Work Flows between WMCA Constituent Authority Areas, 2011**

| | | | Location of Work | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mainly working at or from home | Birmingham | Coventry | Dudley | Sandwell | Solihull | Walsall | Wolverhampton | Total in WMCA (incl. home) |
| Location of Home Address | Birmingham | % | 9% | 63% | 1% | 1% | 4% | 7% | 2% | 1% | **88%** |
| | | No | 33,231 | 223,580 | 4,596 | 4,547 | 13,661 | 26,479 | 5,872 | 2,760 | **314,726** |
| | Coventry | % | 9% | 4% | 58% | 0% | 0% | 3% | 0% | 0% | **74%** |
| | | No | 10,157 | 4,472 | 68,610 | 151 | 288 | 3,072 | 205 | 153 | **87,108** |
| | Dudley | % | 9% | 12% | 0% | 43% | 14% | 1% | 2% | 6% | **88%** |
| | | No | 11,139 | 14,057 | 436 | 52,625 | 16,877 | 1,075 | 2,638 | 7,757 | **106,604** |
| | Sandwell | % | 7% | 25% | 1% | 10% | 38% | 1% | 6% | 3% | **92%** |
| | | No | 7,902 | 28,088 | 562 | 11,739 | 42,397 | 1,511 | 6,843 | 3,780 | **102,822** |
| | Solihull | % | 12% | 36% | 4% | 1% | 1% | 27% | 1% | 0% | **83%** |
| | | No | 10,163 | 29,458 | 3,654 | 415 | 909 | 21,951 | 461 | 293 | **67,304** |
| | Walsall | % | 9% | 17% | 0% | 2% | 9% | 3% | 41% | 8% | **86%** |
| | | No | 8,251 | 16,037 | 409 | 1,852 | 8,679 | 967 | 38,965 | 7,700 | **82,860** |
| | Wolverhampton | % | 8% | 6% | 0% | 6% | 7% | 7% | 9% | 47% | **84%** |
| | | No | 7,343 | 5,842 | 278 | 5,249 | 6,133 | 491 | 8,052 | 42,045 | **75,433** |

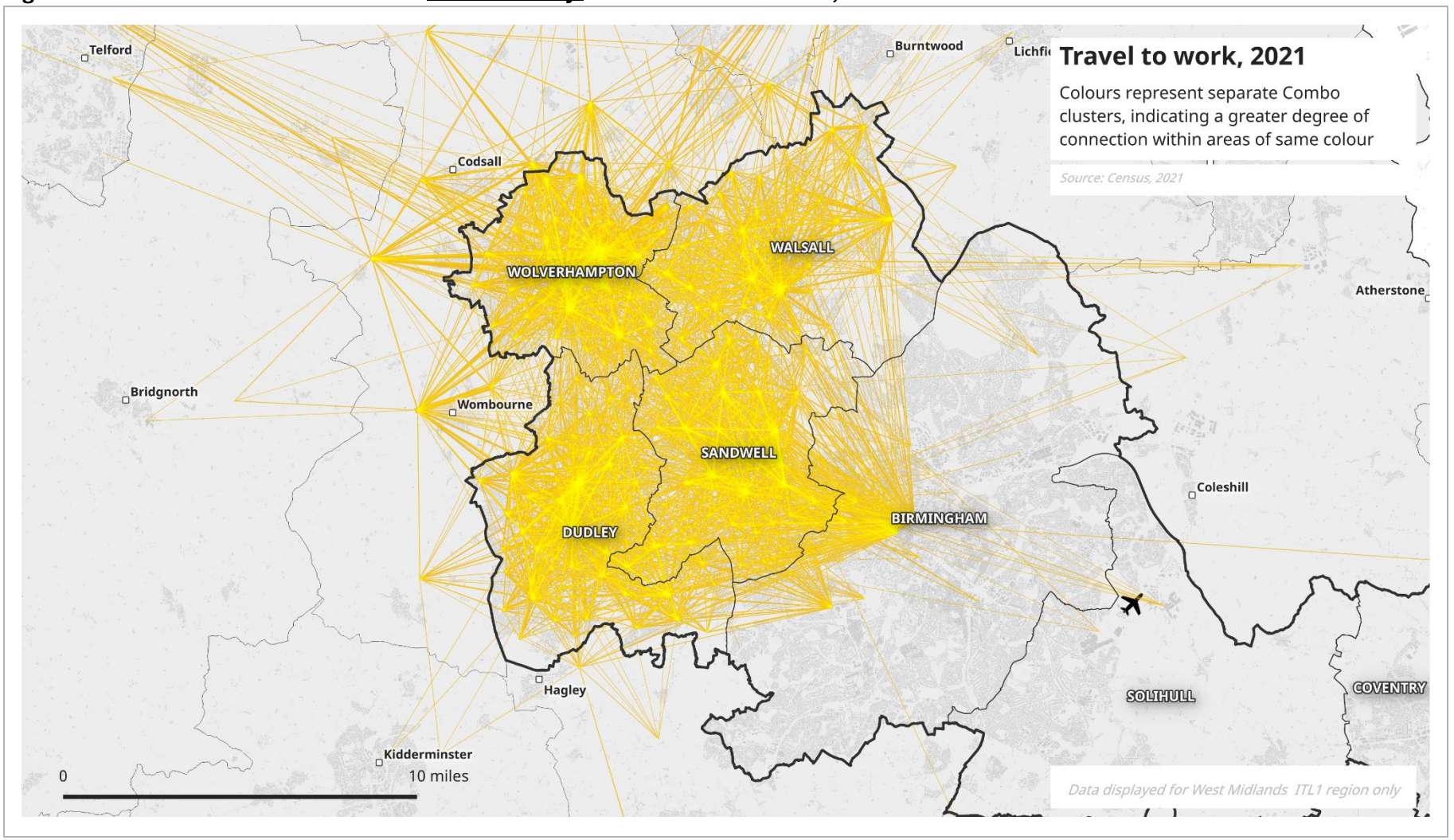
*Source: Census, ONS, 2011*

**Figure B-11: Travel to Work Data for the 'Birmingham/Solihull' COMBO area identified, 2021**



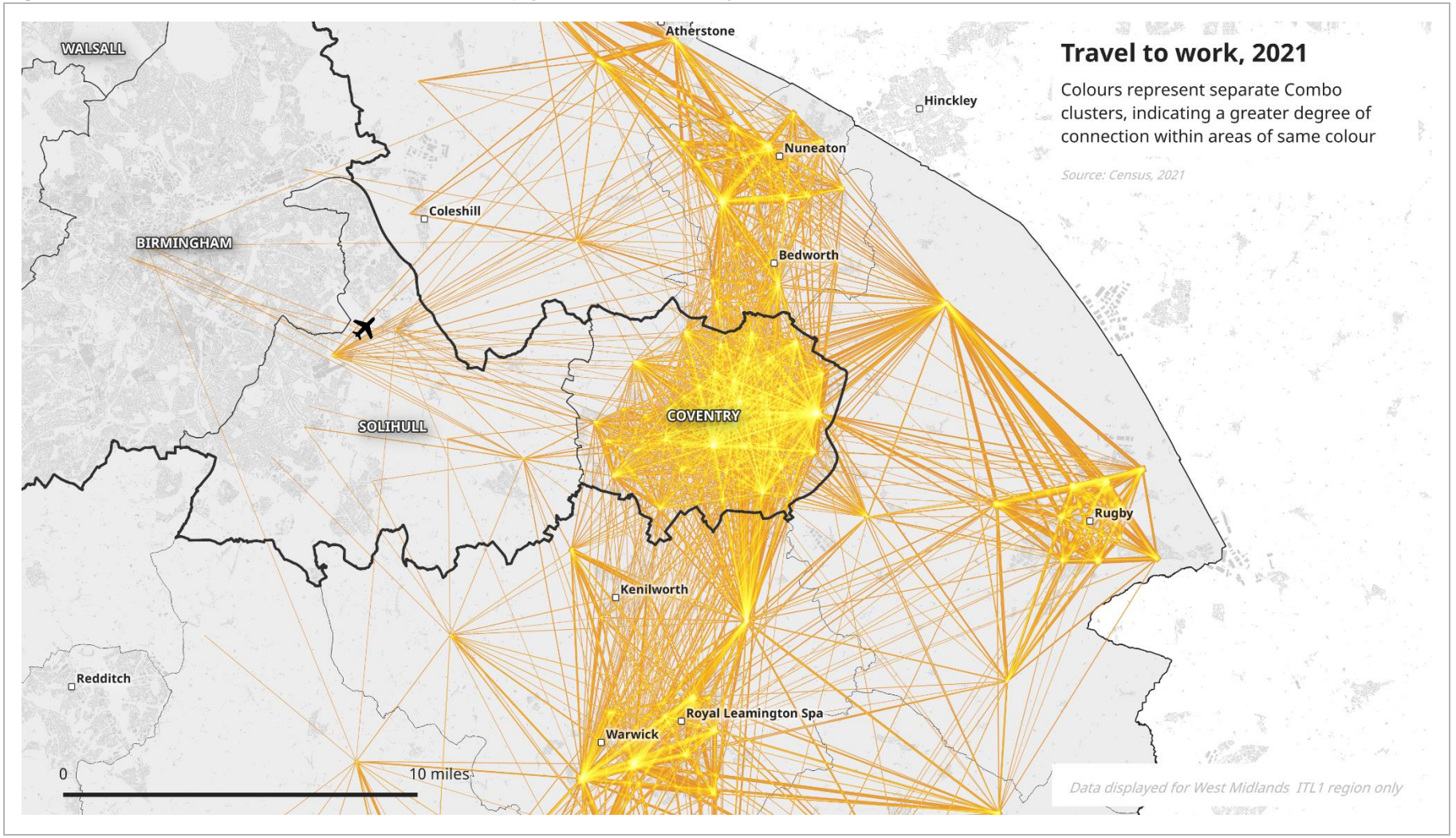

*Source: Automatic Knowledge analysis of travel to work data, Census 2021*

**Figure B-12: Travel to Work Data for the 'Black Country' COMBO area identified, 2021**




*Source: Automatic Knowledge analysis of travel to work data, Census 2021*

**Figure B-13: Travel to Work Data for the 'Coventry (and Warwickshire)' COMBO area identified, 2021**



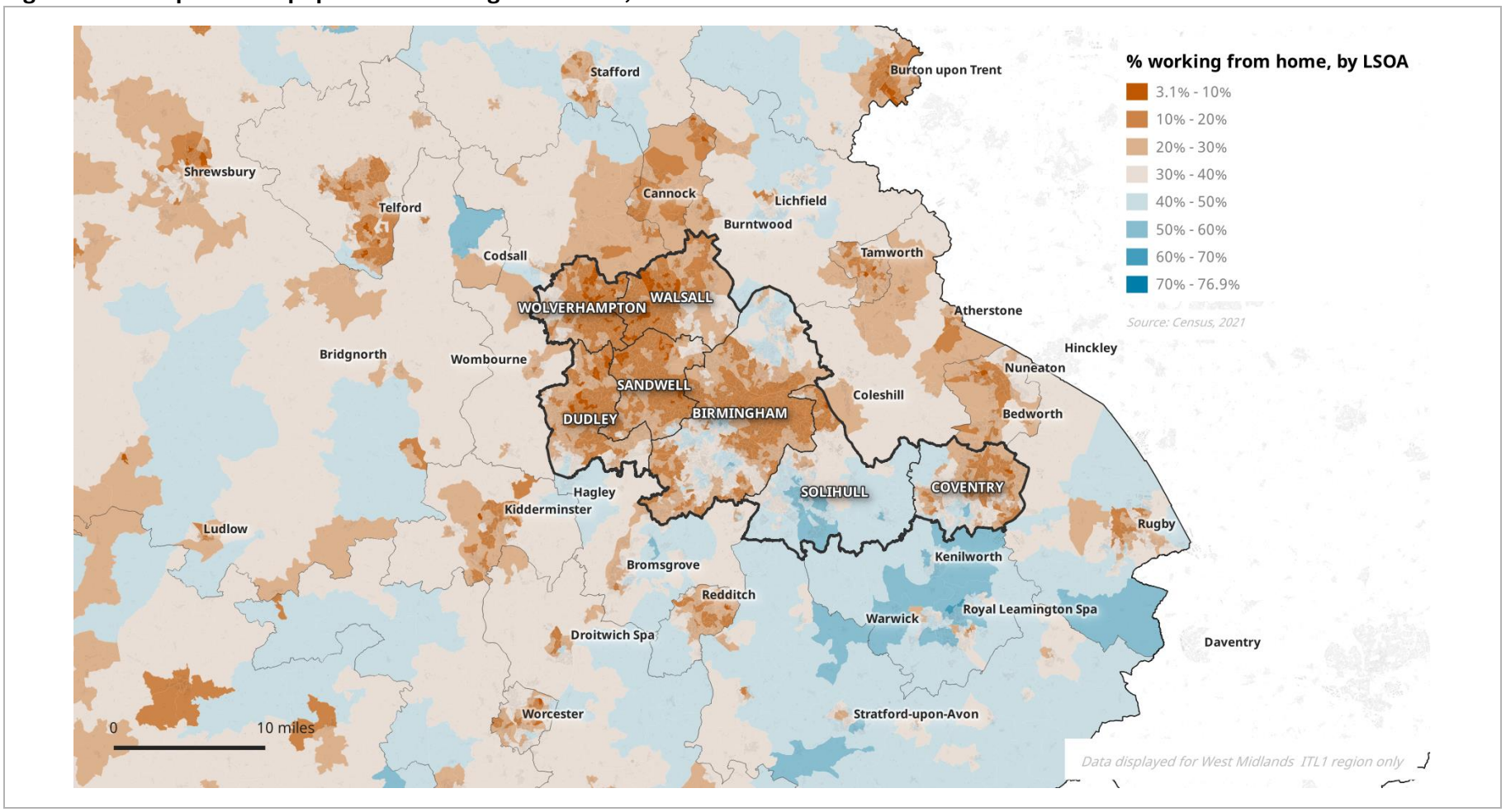

*Source: Automatic Knowledge analysis of travel to work data, Census 2021*

**Table B-5: Travel to Work Flows between the COMBO areas identified, 2021**

| | | | Location of Work Address (by COMBO area identified in maps above) | | | | | Travel to Work Flows that remain in same COMBO area (incl. home working) |
|---|---|---|---|---|---|---|---|---|
| | | | Mainly working at or from home | 'Birmingham / Solihull' | 'Black Country' | 'Coventry (and Warwickshire)' | Rest of UK | |
| Location of Home Address (by COMBO area identified in maps above) | 'Birmingham / Solihull' | % | 41% | 46% | 5% | 2% | 5% | **87%** |
| | | No | 211,013 | 238,173 | 24,964 | 12,599 | 27,884 | **449,186** |
| | 'Black Country' | % | 35% | 10% | 48% | 1% | 7% | **82%** |
| | | No | 163,610 | 47,221 | 226,886 | 2,503 | 33,210 | **210,831** |
| | 'Coventry (and Warwickshire)' | % | 39% | 4% | 0% | 51% | 6% | **90%** |
| | | No | 57,709 | 6,248 | 507 | 76,308 | 8,765 | **63,957** |

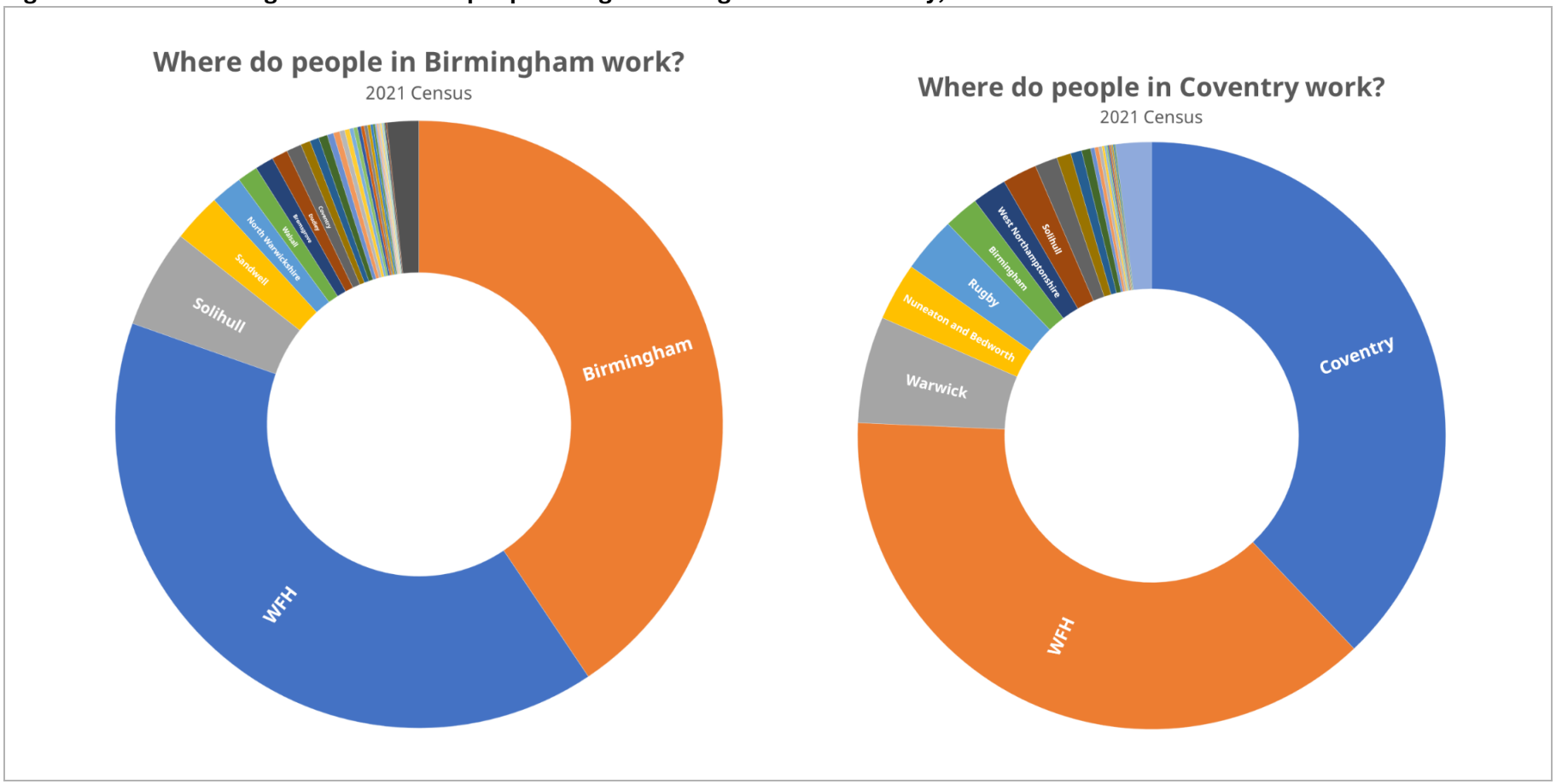
*Source: Census, ONS, 2021*

**Figure B-14: Proportion of population working from home, 2021**



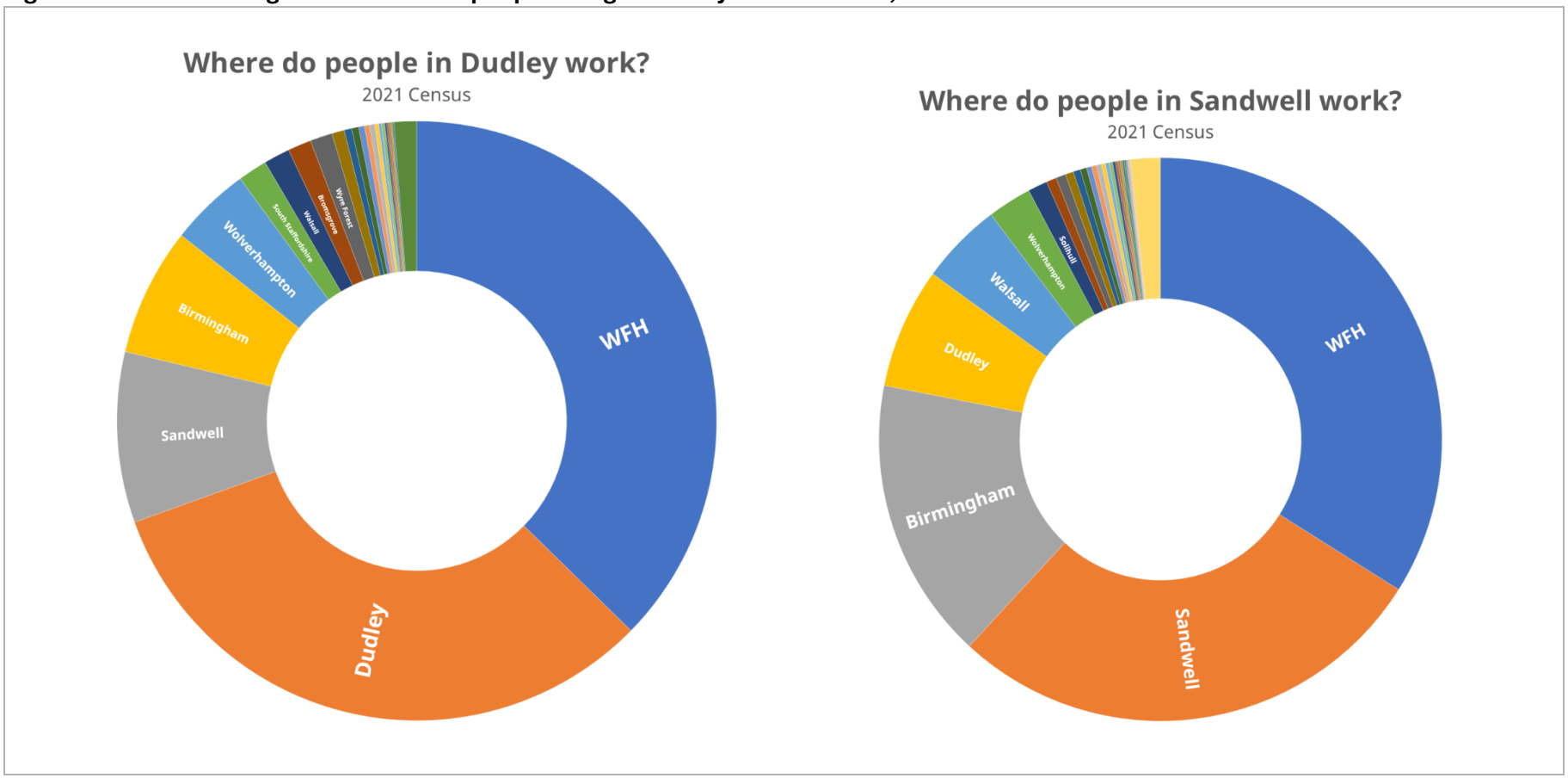

*Source: Census, ONS, 2021*

**Figure B-15: Commuting destinations for people living in Birmingham and Coventry, 2021**




*Source: Census, ONS, 2021*

**Figure B-16: Commuting destinations for people living in Dudley and Sandwell, 2021**




*Source: Census, ONS, 2021*

**Figure B-17: Commuting destinations for people living in Solihull and Walsall, 2021**

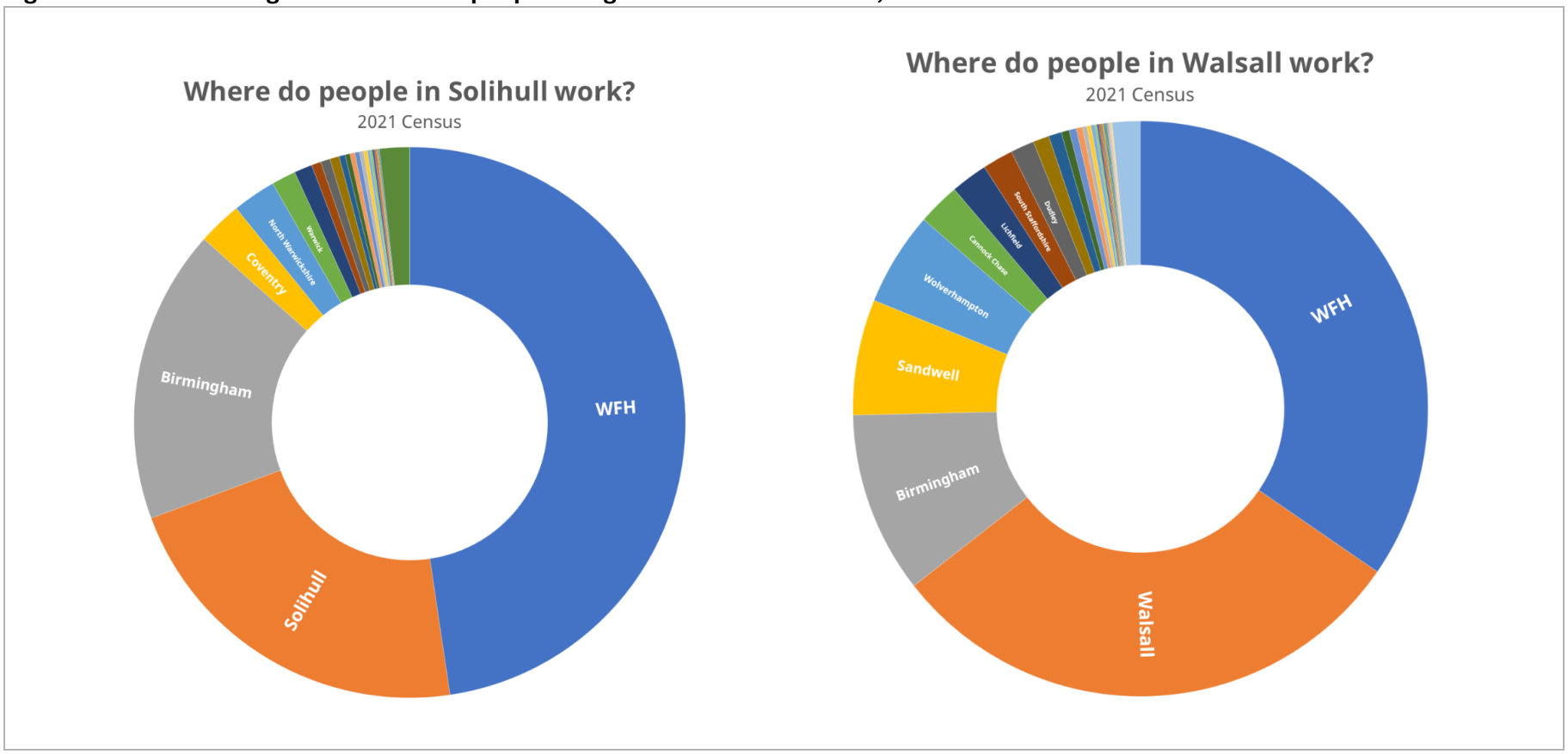
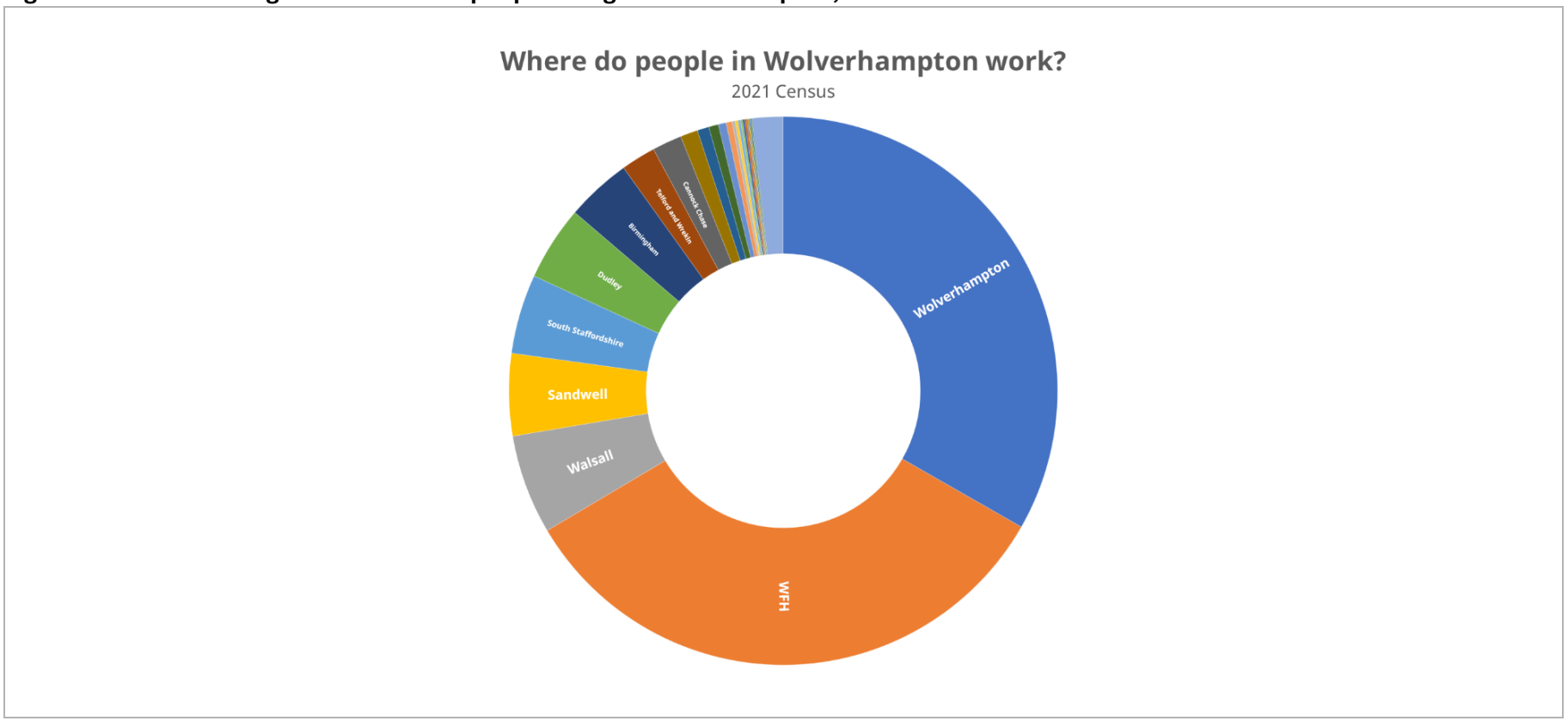


**Figure B-18: Commuting destinations for people living in Wolverhampton, 2021**




*Source: Census, ONS, 2021*

# Annex C: Megatrends workshop

A two-hour megatrends workshop was held in July 2024 to consider long-term trends and drivers of change that could have significant economic consequences and scarring effects for population sub-groups and places as a result of impacts on human, social, physical and natural capital. Although such trends may be ubiquitous they are likely to affect local areas in different ways.

The **objective of the Workshop** was to discuss and gather a range of views from different stakeholder perspectives on what such trends and drivers mean for interdependencies and connections between places within the region, how these might evolve in the future and the implications for economic geographies. Over 20 attendees – encompassing a range of ages and experiences – from WMCA, regional and local organisations and academia attended the Workshop.

Four **megatrends** were introduced: (1) rising global tensions, (2) demographic trends – notably population ageing, (3) technological development and digitisation, and (4) climate change and net zero. All four megatrends can have significant implications (as outlined below) but primary attention in the Megatrends Workshop was on the latter two.

**Rising global tensions** may lead to supply chain disruptions with implications for key industries (such as automotive and aerospace), volatility in financial markets and associated fluctuations in intermediate goods prices, refugees and immigration pressures, and growth opportunities in defence and security industries.

With regard to **demographic trends** major developments include the ageing population associated with falling labour supply and increased demand for healthcare. This may stimulate increasing immigration and changing patterns of internal migration, with implications for housing development. Variations within and between age cohorts may lead to greater income inequality.

In terms of **technology and digitisation**, AI could lead to automation and falling demand for labour, economic disruption and widening inequalities. However, automation of poor quality jobs may be regarded as a positive outcome, especially if accompanied by improving productivity. Developments in technology and digitisation may provide opportunities for advanced manufacturing and industry 4.0 and boost the WMCA's fintech, business services, MedTech and life sciences clusters. From a functional economic geographies perspective technological developments and digitisation facilitate hybrid and remote working and so have potential to further uncouple links between residential location and fixed workplaces.

Extreme weather events may dominate the popular imagination in discussions on **climate change and net zero** but in economic terms considerations include infrastructure vulnerability, the implications of the decarbonisation of manufacturing processes and associated regulatory changes. Clean energy innovation and a focus on energy

storage may improve domestic and industrial energy efficiency, while investments in green infrastructure and nature-based solutions provide new opportunities for the way we live and work. Key issues here for functional economic geographies include how electric vehicles and the associated charging infrastructure develops and whether greater emphasis on the valuing of green infrastructure changes residential preferences and travel patterns.

To stimulate thinking about possible future developments, workshop attendees were invited to **'look back'** to key events and features of popular culture in 2020 (i.e. approximately 25 years ago) and to consider what inklings of change are identifiable from 25 years ago and how life has changed since then. They were then invited to **'look forward'** to consider what inklings of change there are now and how these might evolve over the next 25 years to 2050.

With regard to technology, key features in 2020 were the introduction of Windows 2000, the first camera phone, the expansion of high speed broadband replacing dial up, the UK Online initiative to help address the digital divide E-commerce regulation. On the basis of current developments by 2050 we might see domination of the digital economy and ubiquitous AI integration, personalised learning and advanced healthcare, autonomous transportation, further developments in green technology and smart cities.

In relation to green considerations and net zero, in 2000 there was growing public awareness of climate change and the need to give greater consideration to how to tackle greenhouse gas emissions, including through international governmental agreements. Growing emphasis was being placed on renewable energy. NGOs such as Greenpeace and the World Wildlife Fund raised awareness of environmental issues. By 2050 we might expect to see renewable energy dominance, greater reliance on nuclear power, increased uptake of hydrogen fuel, decentralised energy systems, more energy efficient buildings, adoption of circular economy principles, low carbon production and lifestyles supported by wider sustainable modes of transport and green urban planning, supported by robust climate policies and regulation. The extent to which the transition over the period to 2050 is a just one if a key question, with the answer having implications for the contours of new functional economic geographies.

Workshop attendees were invited to consider individually and in small groups **positive aspects and negative aspects of two megatrends – technology and digitisation, and climate change and net zero** – for the West Midlands. Selected examples of key issues identified are outlined below.

Positive features of technology and digitisation for the West Midlands include: the younger and more diverse than average population is closer to technological frontiers and has international links; quality universities and FE colleges in the region are able to supply a digital skills; an established and growing tech scene in the region; there is scope to grow autonomous vehicles and knowledge-intensive business services where the region has established strengths and

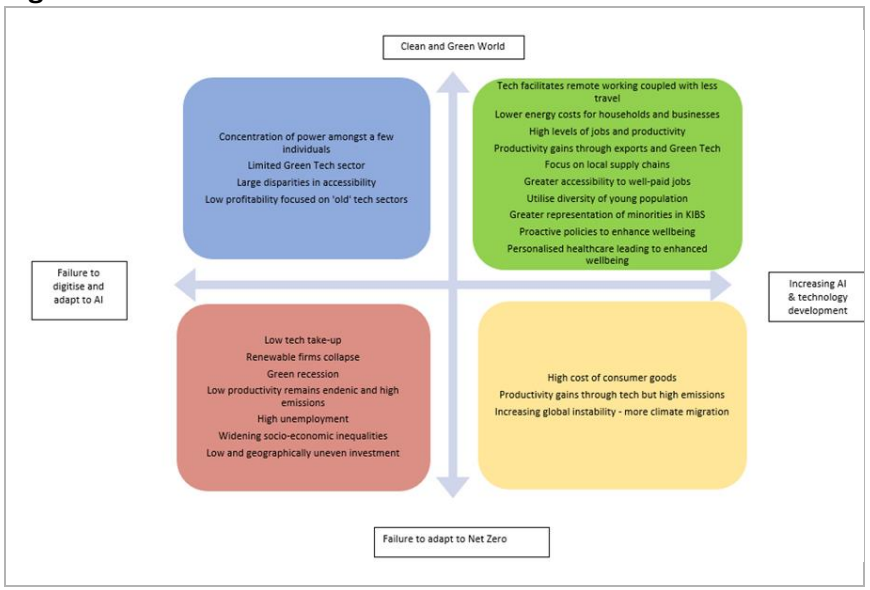
also to exploit cross-collaboration between tech healthcare; and tech opens up work opportunities within and beyond the region.

Negative features of technology and digitisation for the West Midlands include: potential job losses as digitisation replaces some jobs; local variations in technological capabilities may mean existing inequalities are entrenched – spatially and socially; the concentration of venture capital in London and a relative lack of scale up support means that the West Midlands cannot capitalise fully on opportunities; and there are challenges in making the West Midlands an attractive place to do business and to live when fewer people 'have to be in the West Midlands' due to the ability to work remotely.

Positive features of climate change and net zero for the West Midlands include: the West Midlands is an outward looking region and so has access to knowledge on climate change and net zero solutions; there is potential for job creation in green manufacturing sector and more sustainable transport solutions; the West Midlands is an active player in the hydrogen economy and electric vehicles, supported by university expertise in these sectors and in energy; and the largely urban area offers development opportunities associated with population density.

Negative features of climate change and net zero for the West Midlands include: a potential loss of jobs in manufacturing; energy intensive businesses are vulnerable to concerns about energy security; increased severe weather events could lead to interruptions in economic activity; decarbonisation programmes are costly and the green economy may not be profitable; and net zero targets may lead to adverse implications for accessibility in parts of the region.

**Figure C-1: Possible Scenarios**




*Source: City-REDI*

The above chart shows four possible scenarios derived from considering in parallel positive and negative features of adaptation to technology and digitisation and to net zero in parallel. The scenario depicted in the top right quadrant, characterised by positive transitions to new technological developments and AI together with adaptation to net zero, likely presents the most favourable scenario and hence policy interventions to facilitate the transition to this

position would be helpful. Conversely, that in the lower left quadrant is least favourable.

However, **likely futures are complex and difficult to predict** – so it is important to be adaptable. Decisions taken by business leaders, individuals and policy makers will matter. It seems likely that intra-regional inequalities will increase with failure to adapt to technological change and adaptation to Net Zero. In terms of functional economic geographies this means that the most socio-economically disadvantaged and environmentally challenged areas may have fewer links to major centres of economic activity.

On balance, **hybrid/remote working is likely to lead to decentralisation to more attractive environments – with fewer but longer journeys**. This suggests a spatial expansion of associated functional economic geographies. The onus is then on policymakers to consider what makes areas attractive – for living as well as working.

A **'Clean Green World'** would be characterised by **greater localisation and sustainable travel patterns**, with fewer journeys overall. This suggests a shrinking of the spatial extent of functional economic geographies in line with the concept of a 15-minute neighbourhood and has implications for planning in terms of services and infrastructure for active travel.

**Cultural aspects and leisure considerations** are important alongside economic issues. A plausible future is one in which **urban cores become centres for the 'Experience Economy'** – so attracting local visitors. This has implications for public transport infrastructure to serve such a function and investment in the urban realm to make such centres attractive for a mix of uses.

SQW

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