

## Technical Annex 'Heatmap of Exclusion in a Digital UK'

### Metric construction

The highest level overview map shows the likelihood that someone in that area is digitally excluded and/or socially excluded. The actual data indicate whether the area has high or low levels of digital exclusion and/or social exclusion.

The Heatmap uses a relative metric, which means in this case that an area with high digital or social exclusion is defined as an area where the levels of exclusion fall in the highest quintile. That is, 80% of the (local output) areas in the UK has a lower exclusion score than (the average individual in) the area in question. The relative metrics used to construct the indicators are conservative in that at least 20% of the areas should be included in the high exclusion quintiles; therefore, the quintile is the closest number of LOAs that is just above 20% of all areas. The same conservative principle was applied to identify low exclusion areas, based on whether an area falls into the lowest quintile of exclusion (thus at least 80% have higher levels of exclusion).

Data need to be at the area level – for all social exclusion and for the digital infrastructure indicators (see below) this is already the case. For other digital exclusion indicators this needs to be constructed by calculating the average of all the individuals in the area or by calculating the proportion of individuals who have used the internet (for the access and skills questions).

The colours on the map indicates the combined levels of digital and social exclusion.

Table 1 Colouring of the Heatmap of Exclusion in a Digital UK

		Social exclusion		
		Low	Medium	High
Digital exclusion	Low			
	Medium			
	High			

When using this report for reference in future work, please cite it as:

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## Digital Indicator Metrics

The composite digital indicator scale consists of 4 different sub-indicators:

- *Infrastructure* (Ofcom's Percentage of homes with broadband currently not achieving 2Mbit/s speed)
- Individual *access* from the ONS Internet Users Survey – (ONS Internet Access indicator)
- Individual *skill* from the Ipsos Mori Basic Digital Skills measure (Could you do this)
- Individual *use* from the Ipsos Mori Basic Digital Skills measure (Have you done this)

A breakdown of how the indicators were constructed is described below followed by the composite digital indicator scale. All final cut off scores are 'greater than or equal to' and 'less than or equal to'.

### Infrastructure

- ✓ % of homes with broadband less than 2MB in an area

*Composite infrastructure measure* to calculate composite digital exclusion metric (*scale 0 to 100%*):

Originally the intention had been to include 3 indicators, taking an average to arrive at a score. However, work with sample data showed that 4G coverage is too extensive to fit into our scoring system which relies on *relative* levels of deprivation, with a third of all areas reporting 100% reliability resulting in a relatively meaningless 'bottom quintile'. For 3G this is even more pronounced, resulting in a bottom quintile of over 80% of the distribution. Instead, only broadband speed was used to calculate this measure, future iterations should consider including other infrastructure indicators.

Areas with scores higher than 80% of all areas are considered high exclusion (and get a score of 6; those with scores lower than 20% of all areas are considered low exclusion (and get a score of 0); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 3).

Final cut off scores for Infrastructure<sup>1</sup>. High exclusion quintile  $\geq 11.38\%$ . Low exclusion quintile  $\leq 5.40\%$ .

### Access

- ✓ % of people who have never used the internet

*Access measure* to calculate composite (relative) digital exclusion metric (*scale 0 – 100*):

Areas with scores higher than 80% of all areas are considered high exclusion (get a score of 6); those with scores lower than 20% of all areas are considered low exclusion (and get a score of 0); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 3).

Final cut off scores for Access. High exclusion quintile  $\geq 16.60\%$ . Low exclusion quintile  $\leq 10.50\%$ .

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<sup>1</sup> In future iterations this cut off score will change as what constitutes digital inclusion changes in Britain.

## Skill

- ✓ A score from 0 to 11 consisting of an area's average score on the skills scale for answers to 'Could you do this?' questions. A skills scale score for the individual is made up of a count of the number of times a person answers 'I could do this if asked'.

*Skill measure* to calculate composite (relative) digital exclusion metric (scale 0 to 11):

Areas with scores lower than 20% of all areas are considered high exclusion (get a score of 6); those with scores higher than 80% of all areas are considered low exclusion (and get a score of 0); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 3)

Final cut off scores for Skill. High exclusion quintile  $\leq 7.72$  skills. Low exclusion quintile  $\geq 9.56$  skills.

The Go On Exclusion in a Digital UK Heatmap shows the percentage of adults that say they have all five Basic Digital Skills. [The combined measure has been calculated using the 11 survey questions that define these 5 skills categories](#). Basic Digital Skills have been tracked using a survey based on Go ON UK's definition of Basic Digital Skills.

## Use

- ✓ A score from 0 to 11 consisting of an area's average score on the skills scale for answers to 'Have you done this?' questions. A skills scale score for the individual is made up of a count of the number of times a person answers 'I have done this in the last 3 months'.

*Use measure* to calculate composite (relative) digital exclusion metric (scale 0 to 11):

Areas with scores lower than 20% of all areas are considered high exclusion (get a score of 6); those with scores higher than 80% of all areas are considered low exclusion (and get a score of 0); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 3).

Final cut off scores for Use. High exclusion quintile  $\leq 4.17$  uses. Low exclusion quintile  $\geq 6.89$  uses.

The Go On Exclusion in a Digital UK Heatmap shows the percentage of adults that say they have used all five Basic Digital Skills. [The combined measure has been calculated using the 11 survey questions related to the 5 basic skills categories](#). Basic Digital Skills have been tracked using a survey based on Go ON UK's definition of Basic Digital Skills.

## Composite Digital Indicator Scale

The composite (relative) digital indicators scale is based on the infrastructure, access, skill and use indicators. The end user on the map only sees whether exclusion is high, medium or low. Possible scores are 0 for low-exclusion, 3 for medium-exclusion, and 6 for high-exclusion.

For the composite *digital indicators scale* and *compound exclusion metric*: Areas with composite digital indicator scores higher than 80% of all areas are considered high exclusion (get a score of 6); those with scores lower than 20% of all areas are considered low exclusion (and get a score of 0); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 3)

For each area: Sum the scores of the composite infrastructure measure, the access measure, the skill and the use measure (scale 0 to 24).

### Digital Exclusion Text /graphic pop up to go with the maps

In the pop up for each area the maps user sees the % of the infrastructure measure, % of people with access in the area, and the average score of the skill and use scales for the area.

On future maps the aim is to have:

- Detailed information on the answers to different questions for each area

When clicking on the skill or use indicators the % of people answering each individual indicator/question should pop up.

- Filters for separate digital inclusion indicators on the map

When a filter is applied on the top level map it should be possible to see only the composite digital indicators scale, as well as the infrastructure, access, skills or use indicators separately from the composite social indicators scale as described below. For the classification of high, medium and low levels of digital inclusion the scores for the sub indicators should be used (i.e. 0 for low, 3 for medium and 6 for high).

## Social Indicator Metrics

The composite social indicator scale also has 4 sub-indicators roughly corresponding to the income, employment/skills, and health sub-indexes of the IMD (ideas for weighting below are derived from the weighting of the IMD), as well as an indicator of age:

- ✓ Age (from the 2011 census not in IMD): % of people over the age of 65
- ✓ Health (13.5% in IMD): Disability (from the 2011 census) = % of people with a limiting long term illness or disability
- ✓ Employment & skills (22.5% + 13.5% in the IMD): Socio economic status area (Standard occupational code from Nomis) = % of people with a level 1 classification
- ✓ Income(22.5% in the IMD): Median income (from ONS) = Median income for a taxpayer in an area

For the age, health and employment & skills indicators the scores for exclusion in each area to be used for the (relative) composite social exclusion measure are calculated as follows: Areas with scores higher than 80% of all areas are considered high exclusion (get a score of 3); those with scores lower than 20% of all areas are considered low exclusion (and get a score of 1); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 2) .

For the income indicator: Areas with scores lower than 20% of all areas are considered high exclusion (get a score of 3); those with scores higher than 80% of all areas are considered low exclusion (and get a score of 1); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 2).

Final cut off scores for Age. High exclusion quintile  $\geq 21.16\%$ . Low exclusion quintile  $\leq 14.14\%$ .

Final cut off scores for Health. High exclusion quintile  $\geq 22.70\%$ . Low exclusion quintile  $\leq 15.40\%$ .

Final cut off scores for E&S. High exclusion quintile  $\geq 44.78\%$ . Low exclusion quintile  $\leq 32.00\%$ .

Final cut off scores for Income. High exclusion quintile  $\leq \text{£}18,800$ . Low exclusion quintile  $\geq \text{£}22,560$ .

## Composite Social Indicators Scale

Calculate the composite (relative) social exclusion metric for the map based on the age, health, employment & skills and income indicators, using the IMD weightings. Possible scores are 1 for low-exclusion, 2 for medium-exclusion, and 3 for high-exclusion.

For each area: Sum the scores of the composite income measure \*.225, the employment & skill measure \*.36, the health measure \*.135, and the age measure \*.28.

The weights were calculated based on the percentages indicated above for the IMD weights plus a weight for age of 28% that is in between that of employment & skill and income weight and leads to a total of weights of 100% which also makes a neat scale.

For the *social exclusion composite scale* and *compound digital and social inclusion metric*: Areas with composite social exclusion scores in the range higher than 80% of all areas are considered high exclusion (get a score of 3); those with scores lower than 20% of all areas are considered low exclusion (and get a score of 1); those with scores between 20 and 80% of all areas are considered medium exclusion (and get a score of 2)

Social Exclusion Text /graphic pop up to go with the maps

In the pop up for each area the Heatmap user sees the % of those individuals with level 1 in the occupational code, the % of those people aged over 65, the % of those people with a long term illness or disability and the median income for a tax payer in that area.

## Compound (Digital and Social) Exclusion Measure (CoDSEM)

The Compound Digital and Social Exclusion Measure is calculated by summing the scores of the composite digital and social exclusion measures. This gives a scale from 1 to 9. The scores are indicated in the table below.

		Social exclusion		
		Low	Medium	High
Digital exclusion	Low	1	2	3
	Medium	4	5	6
	High	7	8	9