



power to
change

business in
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hands

Research Institute Report No. 22

Empowering Places? Measuring the impact of community businesses at neighbourhood level

Technical appendix

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About this report

This is the technical appendix to the report: *Empowering Places? Measuring the impact of community businesses at a neighbourhood level*, published in 2019 by Power to Change.

This report provides a technical summary of the survey methodology, including the survey design, sampling of addresses, identification of comparison samples, fieldwork procedures and the weighting strategy.

For the findings of the research please see the main report on the Power to Change website at: powertochange.org.uk/research

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1. Survey design

Power to Change commissioned Kantar Public to run hyperlocal versions of the Department for Digital, Culture, Media and Sport (DCMS) Community Life Survey (CLS) in seven specific locations. Each of these locations covered the operational area of one catalyst organisation seeking to increase opportunities to reduce poverty and inequality through community businesses:

- Abram Ward Community Charity in Wigan
- Action for Business in Bradford
- B-inspired in Leicester
- Centre4 in North East Lincolnshire
- Marsh Farm Futures in Luton
- RIO in Plymouth
- The Wharton Trust in Hartlepool

For the purposes of the survey, each organisation's operational area was defined with reference to the Office for National Statistics' (ONS) Census Output Area (OA) geography, and was formed of a contiguous combination of whole OAs (the smallest unit in the ONS hierarchy). Power to Change produced maps of these operational areas in conjunction with Kantar Public.

The number of OAs in an operational area varied from 19 (Wharton Trust, in Hartlepool) to 55 (Marsh Farm Futures, in Luton) and covered populations (as of 2011) ranging from 4,952 (Wharton Trust) to 19,983 (Action for Business, in Bradford). Table A.1 shows the number of OAs and the 2011 Census population for each operational area.

Table A.1: Size of each operational area

Operational area	Number of OAs	2011 Census population
Abram Ward Community Charity, Wigan	42	12,664
Action for Business, Bradford	46	19,983
B-inspired, Leicester	45	15,585
Centre4, NE Lincolnshire	39	11,769
Marsh Farm Futures, Luton	55	17,331
RIO, Plymouth	50	13,478
Wharton Trust, Hartlepool	19	4,952

2. Sampling of addresses

Within each operational area, Kantar Public drew a systematic random sample of addresses from the Royal Mail Postcode Address File, aiming for 300 completed questionnaires and maximal geographical dispersion. The number of addresses sampled in each operational area was calculated via a statistical model of response probability, using data from the 2017–18 Community Life Survey. This number was inflated by 20 per cent to insure against the risk of over-estimating the area’s mean response probability – a genuine risk when applying a general model of response to specific locations.

In the event, a supplementary random sample of addresses was drawn in three operational areas (Abram Ward, Centre4 and Marsh Farm) following an analysis of interim fieldwork data. Table A.2 shows the details.

Table A.2: Address samples in each operational area

Operational area	Original sample of addresses	Supplementary sample of addresses	Total sample of addresses
Abram Ward Community Charity, Wigan	1,127	423	1,550
Action for Business, Bradford	1,044	0	1,044
B-inspired, Leicester	1,121	0	1,121
Centre4, NE Lincolnshire	985	77	1,062
Marsh Farm Futures, Luton	968	135	1,103
RIO, Plymouth	1,135	0	1,135
Wharton Trust, Hartlepool	1,069	0	1,069

2.1 Sampling within addresses

At each address, all adults aged 16 plus were invited to complete the questionnaire, either online or on paper. A small minority of the sampled addresses will have contained more than one household (probably <3% although this share will have varied in an unknown fashion between operational areas). Multi-household addresses like this cannot be reliably identified in advance. Consequently, the ‘sampled’ household at each of these addresses was the household of whoever picked up the letter. This is unlikely to have caused meaningful sample bias.

2.2 Identification of comparison samples

Each of the operational areas has a national comparison sample identified from within the 2017–18 CLS dataset. With one exception, the comparison sample is the subset of 2017–18 CLS respondents who live in the 10 per cent of English neighbourhoods that are most similar to the operational area.

Kantar Public used lower level Super Output Areas (LSOAs) as a proxy for neighbourhoods. There are 32,844 LSOAs in England and each contains an average of six OAs. They are smaller than the operational areas (which ranged in size from 19 to 55 OAs) and somewhat more homogeneous. However, the use of LSOAs as proxy neighbourhoods – rather than larger aggregations – ensures that the 10 per cent most similar neighbourhoods to each operational area are genuinely similar in absolute, not just relative, terms. A similarity score was computed for each LSOA in England with reference to each operational area.

The profile of each LSOA was represented by a set of six Census-derived ‘principal component’ scores, each reflecting a different aspect of that LSOA. One of these principal components is strongly correlated with the neighbourhood’s index of multiple deprivation, one is correlated with the proportion of accommodation units that are flats, one with the presence of students, one with the share of the population aged 65 plus, and two are correlated with different aspects of the ethnic mix.¹

These ‘principal component’ scores were also computed for each operational area as a population-weighted combination of the relevant LSOA scores. Kantar Public then calculated – for each LSOA in England – a Euclidean distance score relative to each operational area. The lower this score is, the more similar that LSOA is to the particular operational area.

$$\text{Euclidean distance score} = \sqrt{[(PC1_x - PC1_t)^2 + (PC2_x - PC2_t)^2 + (PC3_x - PC3_t)^2 + (PC4_x - PC4_t)^2 + (PC5_x - PC5_t)^2 + (PC6_x - PC6_t)^2]}$$

... where $PC1_x$ is the principal component score 1 for LSOA x and $PC1_t$ is the principal component score 1 for operational area t (etc.).

From this, a rank order of similarity was constructed, and the 10% most similar LSOAs for each operational area were identified.

¹ A statistical technique called Principal Component Analysis was used to form uncorrelated linear combinations (‘principal components’) of 42 LSOA-level Census proportions (e.g. % of 16–24s with degree-level qualifications). The first principal component accounts for as much variance as possible across the 42 input variables. Successive components explain the – progressively smaller – residual variance and are all (by design) uncorrelated with each other. These principal components were then ‘rotated’ using the *varimax* algorithm, which seeks to minimise the number of input variables that have high correlations with each of the first f factors (f is user-specified but should explain a high percentage of the total variance; $f = 6$ in this case, explaining 77% of the total variance). The varimax rotation method simplifies interpretation compared to other rotation methods and compared to the initial (un-rotated) principal components.

The one exception was the Action for Business operational area in Bradford. This area is majority Asian (77% in the 2011 Census) – predominantly of Pakistani ethnic heritage – and has few natural partners within a national sample (see Chart A.1). Consequently, Kantar Public identified the most similar 300 LSOAs in England (approximately 1% of the total, instead of 10%) and drew a supplementary bespoke comparison sample of 1,006 addresses from across these LSOAs, treating them in the same way as the addresses drawn from the seven operational areas.

Chart A.1: Distribution of Euclidean distance scores for each operational area

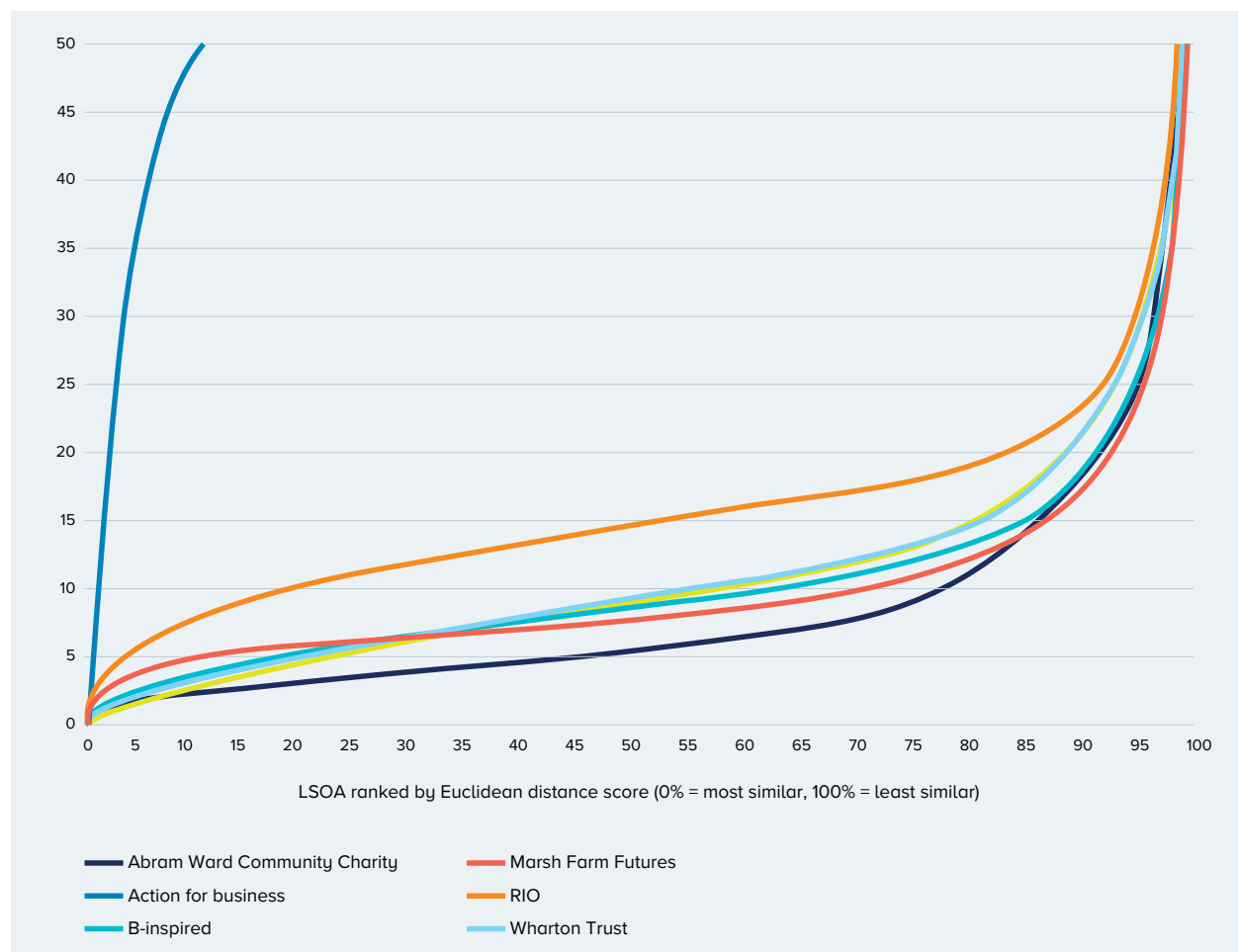


Table A.3 shows the size of each comparison sample (number of respondents) within the 2017–18 CLS. Due to the latter’s disproportionate sample design, the size of each comparison sample varies somewhat between operational areas.

Table A.3: Comparison samples within the 2017–18 Community Life Survey sample

Operational area	Respondents in comparison sample	Effective sample size due to weighting = $n/(1+s_w^2)$, where $\text{mean}(w) = 1$
Abram Ward Community Charity, Wigan	645	542
Action for Business, Bradford*	205 + bespoke sample n	n/a
B-Inspired, Leicester	781	624
Centre4, NE Lincolnshire	686	570
Marsh Farm Futures, Luton	1,141	889
RIO, Plymouth	1,017	787
Wharton Trust, Hartlepool	692	575

*Comparison sample based on most similar 300 LSOAs, not 10% most similar

3. Fieldwork

The standard model for the Community Life Survey is to send two reminders, each a fortnight apart, but with a third reminder in reserve. In the second reminder, two paper questionnaires are included for a targeted subset of addresses. The probability that the second reminder will contain the paper questionnaires is a function of the address's (expected) online response rate:

In the 40% of England with the lowest expected online response, *all* second reminders include two paper questionnaires.

In the 20% of England with mid-level expected online response, approximately *half* of second reminders include two paper questionnaires.

In the 40% of England with the highest expected online response, *no* second reminders include two paper questionnaires.

In total, 89% of the sampled addresses in the operational areas were designated to have paper questionnaires included in the second reminder, with this share varying from 62% (Abram Ward in Wigan) to 100% (Action for Business in Bradford, and B-inspired in Leicester).

Table A.4: The use of paper questionnaires in each operational area

Operational area	Addresses designated to receive no paper questionnaires with second reminder	Addresses designated to receive two paper questionnaires with second reminder	Total sample of addresses
Abram Ward Community Charity, Wigan	586	964	1,550
Action for Business, Bradford	0	1,044	1,044
B-inspired, Leicester	0	1,121	1,121
Centre4, NE Lincolnshire	99	963	1,062
Marsh Farm Futures, Luton	184	919	1,103
RIO, Plymouth	73	1,062	1,135
Wharton Trust, Hartlepool	35	1,034	1,069
Comparison sample for Action for Business (300 LSOAs)	8	998	1,006

Based on interim fieldwork analysis, third reminders were sent to all non-responding addresses in Abram Ward (Wigan), Action for Business (Bradford), Centre4 (NE Lincolnshire) and Marsh Farm Futures (Luton) *with the exception of the additional sample addresses* (see Table A.2) that were drawn for three of these four operational areas (not Action for Business, in Bradford).

The number of completed questionnaires (online and paper, after editing) is shown in Table A.5. Only in one operational area (Action for Business, in Bradford) was the total below the target of 300. Some totals are well above 300 and suggest that the issuing of supplementary addresses in Abram Ward (Wigan), Centre4 (North East Lincolnshire), and Marsh Farm Futures (Luton) was not necessary. The use of third reminders in Abram Ward was also not necessary, but this was a useful tactic in the three other operational areas subject to third reminders.

Table A.5: Number of completed questionnaires

Operational area	Online completions	Paper completions	Total completions
Abram Ward Community Charity, Wigan*	305	139	444
Action for Business, Bradford*	186	89	275
B-inspired, Leicester	190	152	342
Centre4, NE Lincolnshire*	174	151	325
Marsh Farm Futures, Luton*	236	106	342
RIO, Plymouth	247	138	385
Wharton Trust, Hartlepool	186	122	308
Bespoke comparison sample for Action for Business (300 LSOAs)	211	117	328

*Third reminders sent to random subset of addresses (73% in Abram Ward, Wigan; 100% in Action for Business, Bradford; 93% in Centre4, NE Lincolnshire; and 88% in Marsh Farm, Luton)

4. Weighting

For analysis purposes, the respondents within each of the comparison samples identified within the national 2017–18 Community Life Survey retain their weights as computed for that survey.

Respondents to the Power to Change survey have been weighted in an aligned fashion. To do this, Kantar Public used a regression model to estimate the calibration weight that would have been applied to each case *if it had been part of the national (Community Life Survey) sample*. This gets around the problem of no contemporary population data for each operational area (as well as the relatively small samples obtained in each one). The same approach was used to generate a weight specific to the online subset of each sample.

The weighted sample profiles (see Table A.6) were compared with relevant Census 2011 profiles and no clear distributional problems were apparent.

205 respondents (128 online, 77 on paper) within the national 2017–18 Community Life Survey were found to live in one of the 300 LSOAs used for the bespoke comparison sample for the Action for Business operational area in Bradford (see Table A.3). Although not strictly a systematic sample from these 300 LSOAs, there is no reason to think that this subset of respondents is systematically different from the bespoke sample obtained for the Power to Change survey. Consequently, Kantar Public added these cases to the 328 from the bespoke sample, so that this comparison sample comprised 533 respondents in total (339 online and 194 on paper).

The weighted distributions for the operational area samples and their comparison group samples are shown in Table A.6 in four parts. Naturally, there are differences between the operational area samples and their comparison group samples with respect to their demographic profiles. However, they are similar enough for it to be reasonable to expect a similar trajectory-over-time for Community Life Survey variables (if the operational area and its comparison areas were subject to broadly the same set of interventions and social pressures). This is the pre-condition for carrying out a difference-in-difference analysis in a few years' time.

Although the comparison samples are drawn from the national 2017-18 CLS sample, each is – by design – an *unrepresentative* subset of that national sample. Please refer to the 2017-18 CLS² statistical release for full national population estimates.

² The 2017-18 Community Life Survey statistical release can be found at <https://www.gov.uk/government/statistics/community-life-survey-2017-18>. For any queries about the Community Life national data, please contact evidence@culture.gov.uk

4.1 Effective sample sizes

Table A.6 includes the effective sample size for each operational area and its' comparison group. However, this only accounts for weighting the data – and, even then, only in a general sense (the effect of weights will differ between questionnaire variables). Sample clustering (by household) also has an impact on the effective sample size and, again, this differs between questionnaire variables.

In this report, Kantar Public has used specialist statistical software (the Complex Samples module within SPSS) to estimate sampling errors that account properly for the survey design and the weighting of the data.

Table A.6: Weighted demographic profiles of operational areas and their comparison groups (spread over four tables)

		Abram Ward Community Charity, Wigan		Action for Business, Bradford	
		Area	Comparison	Area	Comparison
Sample size	Actual n	444	645	275	533
	Effective n (due to weighting)	395	542	248	469
Age	16–24	15%	12%	31%	23%
	25–34	20%	21%	22%	25%
	35–44	14%	13%	17%	21%
	45–54	13%	21%	13%	10%
	55–64	14%	12%	9%	10%
	65–74	16%	9%	5%	4%
	75+	7%	11%	3%	6%
Sex	Male	47%	49%	46%	51%
	Female	53%	51%	54%	49%
Household size	Mean	2.75	2.49	5.15	3.98
Live with U16s?	U16(s) in household	37%	26%	64%	51%
	No U16s in household	63%	74%	36%	49%

		Abram Ward Community Charity, Wigan		Action for Business, Bradford	
		Area	Comparison	Area	Comparison
Housing tenure	Owned	30%	29%	31%	28%
	Mortgaged	34%	37%	24%	29%
	Other (mainly rented)	36%	33%	45%	42%
Education	Degree educated 25–64	11%	14%	11%	13%
	Other 25–64	50%	53%	50%	53%
	16–24	15%	12%	31%	23%
	65+	24%	20%	8%	10%
Ethnic group	White	98%	95%	12%	23%
	Indian/Pakistani/Bangladeshi	0%	1%	69%	54%
	Black	2%	1%	2%	4%
	Other	1%	3%	17%	19%
Internet use	16–64	76%	80%	92%	90%
	65+ uses internet	14%	11%	6%	3%
	65+ does not use internet	9%	9%	3%	7%

		B-inspired, Leicester		Centre4, NE Lincolnshire	
		Area	Comparison	Area	Comparison
Sample size	Actual n	342	781	325	686
	Effective n (due to weighting)	311	624	284	570
Age	16–24	16%	12%	9%	13%
	25–34	20%	24%	19%	23%
	35–44	19%	15%	14%	14%
	45–54	16%	18%	18%	17%
	55–64	16%	12%	13%	14%
	65–74	7%	8%	13%	10%
	75+	6%	11%	14%	9%
Sex	Male	46%	46%	49%	46%
	Female	54%	54%	51%	54%
Household size	Mean	3.31	2.54	2.59	2.47
Live with U16s?	U16(s) in household	42%	32%	30%	28%
	No U16s in household	58%	68%	70%	72%
Housing tenure	Owned	16%	19%	29%	20%
	Mortgaged	29%	33%	31%	31%
	Other (mainly rented)	55%	48%	40%	49%

		B-inspired, Leicester		Centre4, NE Lincolnshire	
		Area	Comparison	Area	Comparison
Education	Degree educated 25-64	10%	12%	9%	12%
	Other 25-64	60%	57%	56%	56%
	16-24	16%	12%	9%	13%
	65+	13%	19%	27%	19%
Ethnic group	White	82%	93%	97%	95%
	Indian/Pakistani/ Bangladeshi	5%	1%	1%	0%
	Black	10%	3%	1%	2%
	Other	3%	3%	1%	2%
Internet use	16-64	87%	81%	73%	81%
	65+ uses internet	6%	9%	13%	10%
	65+ does not use internet	7%	9%	14%	9%

		Marsh Farm Futures, Luton		RIO, Plymouth	
		Area	Comparison	Area	Comparison
Sample size	Actual n	342	1,141	385	1,017
	Effective n (due to weighting)	299	889	325	787
Age	16–24	17%	11%	16%	14%
	25–34	14%	17%	17%	21%
	35–44	18%	19%	15%	13%
	45–54	17%	17%	19%	18%
	55–64	13%	16%	12%	14%
	65–74	9%	10%	10%	11%
	75+	13%	10%	11%	10%
Sex	Male	46%	47%	54%	48%
	Female	54%	53%	46%	52%
Household size	Mean	3.09	2.66	2.61	2.30
Live with U16s?	U16(s) in household	39%	29%	30%	21%
	No U16s in household	61%	71%	70%	79%
Housing tenure	Owned	38%	28%	14%	25%
	Mortgaged	33%	39%	18%	25%
	Other (mainly rented)	29%	33%	67%	49%
Education	Degree educated 25–64	17%	20%	15%	17%
	Other 25–64	45%	49%	48%	48%
	16–24	17%	11%	16%	14%
	65+	22%	20%	21%	21%

		Marsh Farm Futures, Luton		RIO, Plymouth	
		Area	Comparison	Area	Comparison
Ethnic group	White	66%	83%	96%	90%
	Indian/Pakistani/ Bangladeshi	13%	6%	0%	3%
	Black	17%	6%	3%	3%
	Other	5%	6%	1%	5%
Internet use	16–64	78%	80%	79%	79%
	65+ uses internet	12%	12%	10%	11%
	65+ does not use internet	10%	8%	11%	10%

		Wharton Trust, Hartlepool	
		Area	Comparison
Sample size	Actual n	308	692
	Effective n (due to weighting)	279	575
Age	16–24	19%	14%
	25–34	21%	20%
	35–44	11%	16%
	45–54	13%	18%
	55–64	13%	13%
	65–74	15%	10%
	75+	8%	9%
Sex	Male	43%	46%
	Female	57%	54%
Household size	Mean	2.79	2.42
Live with U16s?	U16(s) in household	34%	26%
	No U16s in household	66%	74%

		Wharton Trust, Hartlepool	
		Area	Comparison
Housing tenure	Owned	24%	21%
	Mortgaged	17%	31%
	Other (mainly rented)	58%	48%
Education	Degree educated 25–64	7%	11%
	Other 25–64	51%	56%
	16–24	19%	14%
	65+	23%	20%
Ethnic group	White	97%	95%
	Indian/Pakistani/Bangladeshi	2%	1%
	Black	0%	2%
	Other	1%	2%
Internet use	16–64	77%	80%
	65+ uses internet	10%	11%
	65+ does not use internet	13%	9%

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