

Mixed Mode Surveys in Business Research: A 'Natural Experiment'

Dr Andrew Engeli
March 14th 2018

Structure of today's presentation

The general
context

The natural
experiment

Coverage

Sampling

Response

Measurement

Resources

Conclusion

Push to web as a
(persistently)
emerging mode

The General Context

The uphill battle for surveys

- Increasingly embedded in all areas of life
- Survey fatigue
- The four challenges
 - Coverage
 - sampling
 - nonresponse
 - measurement
- The new normal: send a lot, get a few...
- “A cultural misfit is someone who answers the phone”
- Multiple challengers

Push to web

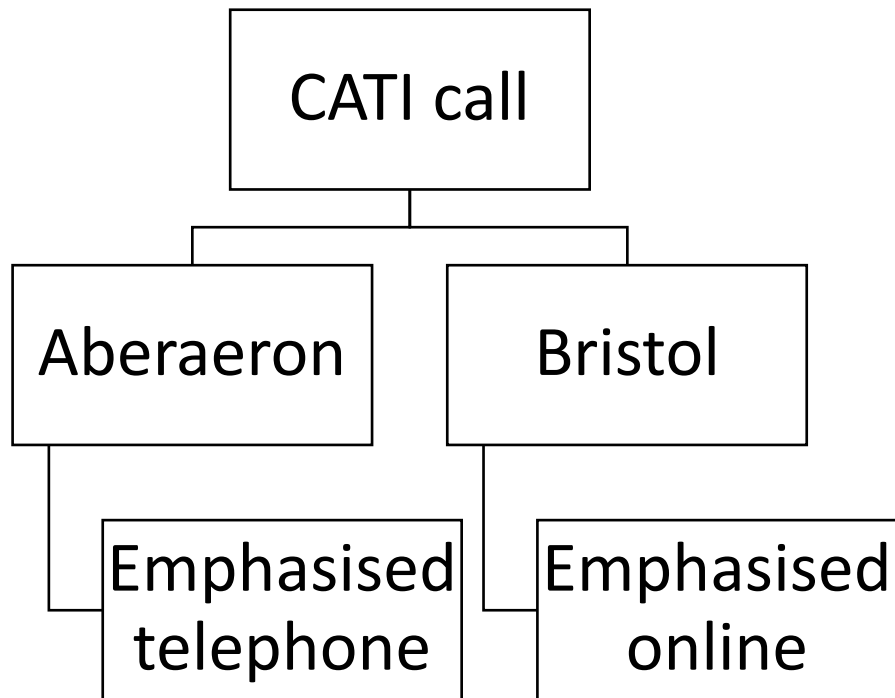
- Long held view that online surveys are 'the future' (e.g. Couper 2000)
- To date, online surveys still not replaced 'traditional' telephone, F2F engagement
- In principle, address based sampling (ABS) provides greatest coverage
- Experiments have shown that mixed mode/partial online surveys:
 - yield lower response rates for PTW versus telephone or postal
 - PTW produces faster response rates than telephone or postal
 - *PTW has significant demographic biases*

The promised land

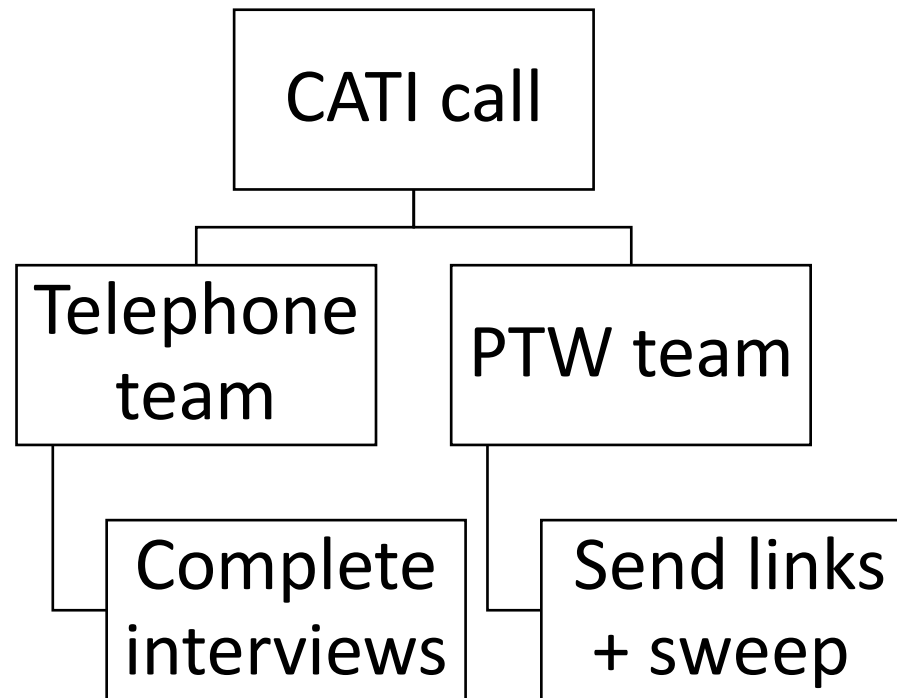
- ONS (UK government) data collection transformation programme (DCTP)
- Push all surveys online by 2020
 - Cheaper
 - Efficient
 - Data joining with admin datasets
- What does this mean for the rest of us?

Push to web
in the private
sector: a
natural
experiment

- Wavehill's interest – cheaper and more efficient sounds good, but what about our USP?
- Sink or swim?
- Two large scale business surveys in 2017 and 2018:
 - Liverpool City Region Combined Authority Employer Skills Survey (1,856 completes)
 - First Gloucester Countywide Skills Survey (899 completes)



LCRCA



GFirst

The mixed mixed modes

Obtaining sample

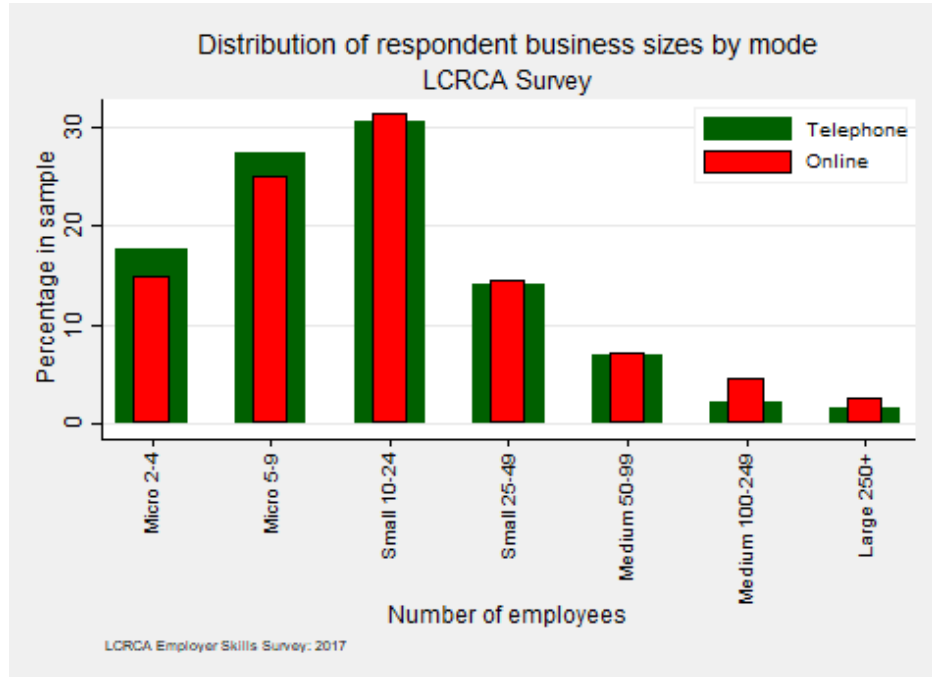
1. Coverage

Coverage challenges

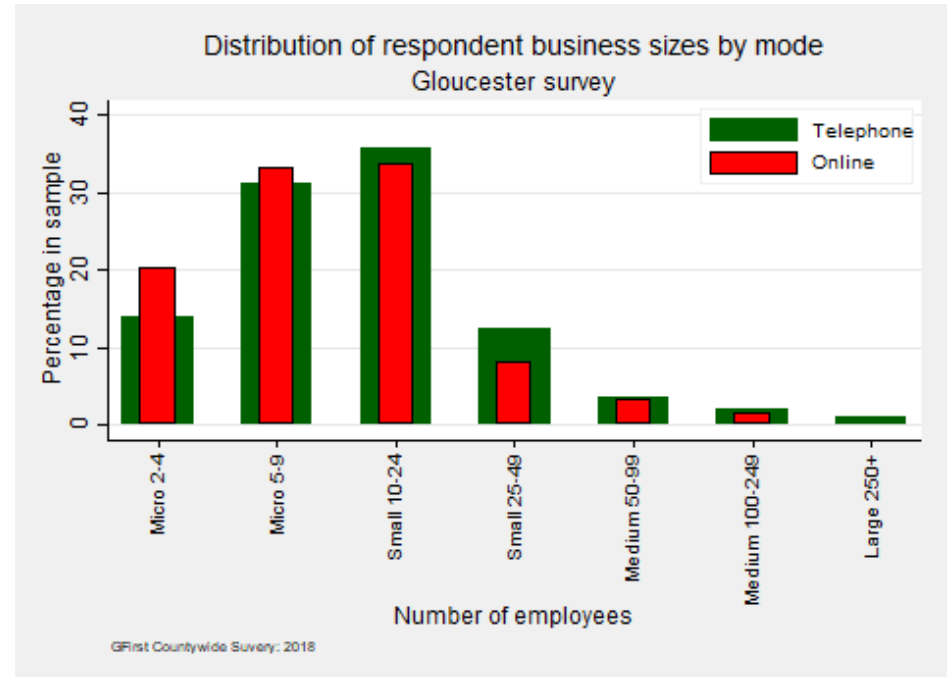
- IDBR –fabulous but obviously off limits
- HMRC – fabulous but off limits
- Companies House – extensive but poor data quality, limited variables
- CRM data – great, but strong coverage bias
- Commercial sample – Coverage is less good, bias ‘random’, data quality better

Do telephone and
online yield equal
samples?

2. Sampling



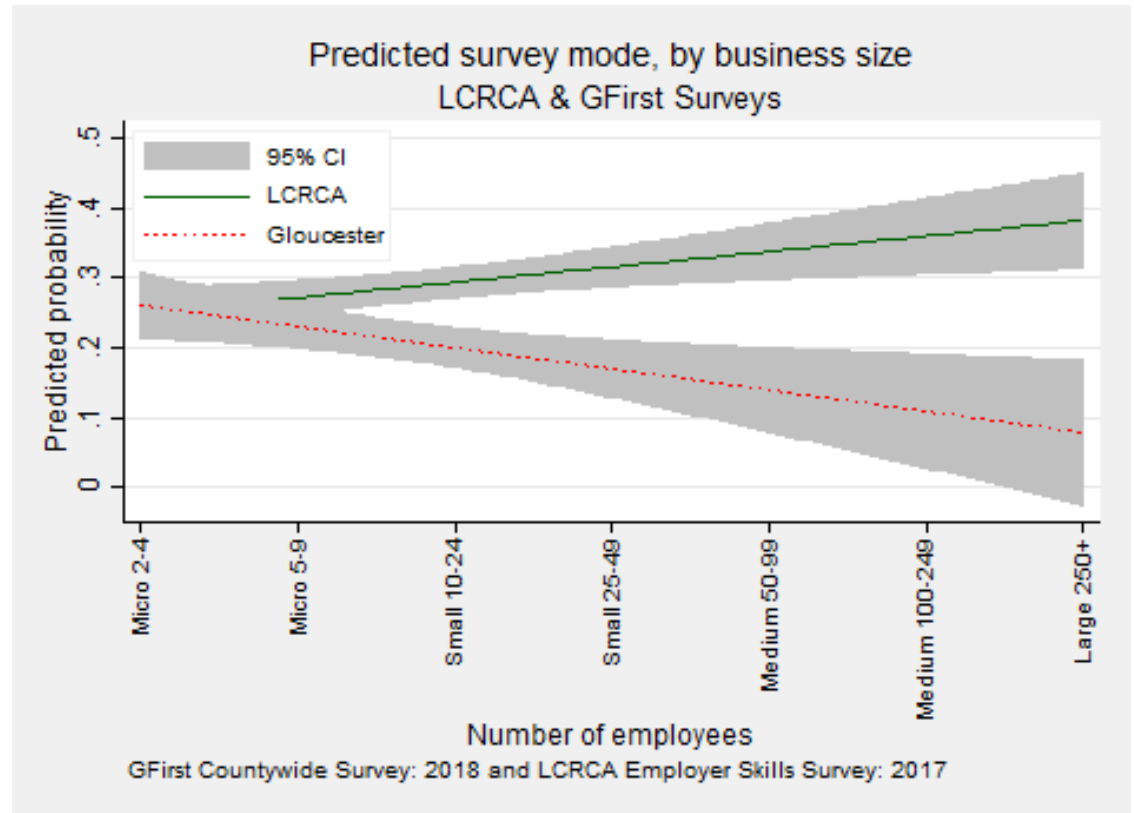
(IDBR Chi-square: $p=0.68$)



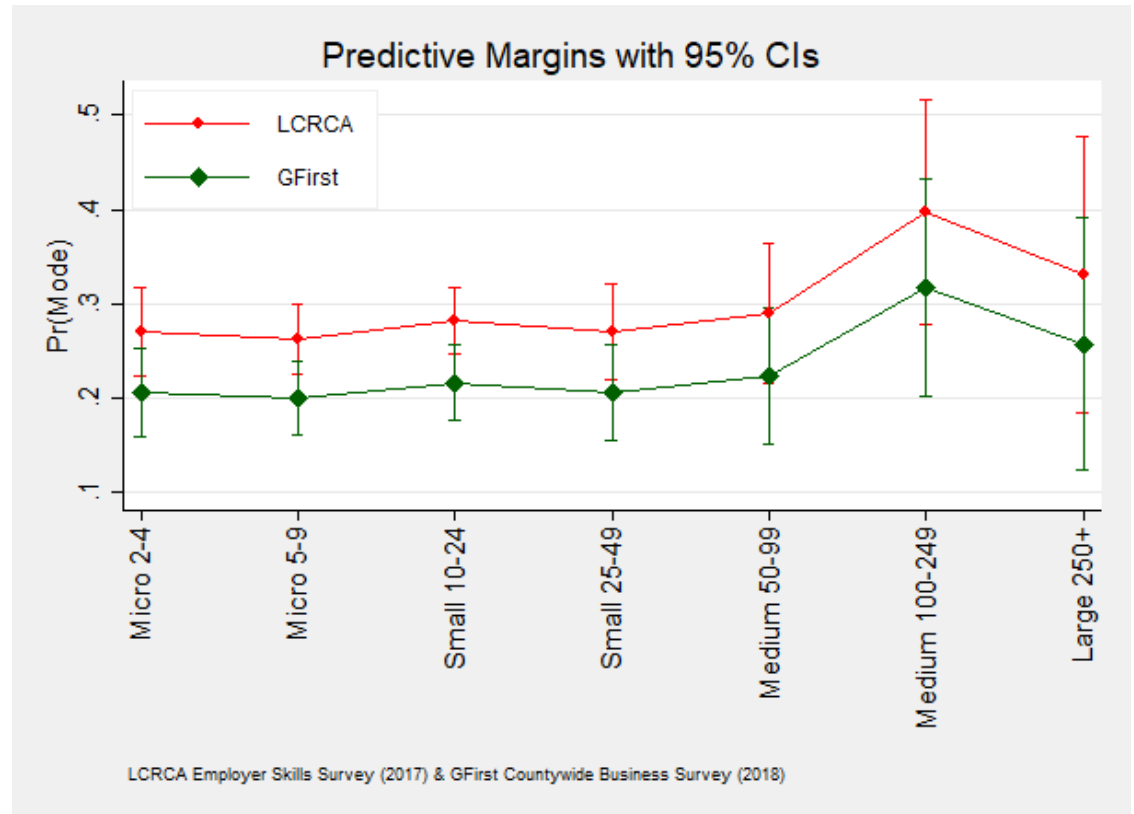
(IDBR Chi-square: $p=0.32$)

Survey demographics

Predicted probabilities by size



Predicted
mode,
controlling for
other
firmographics



Survey mode, comparing LCRCA and GFirst

```

Logistic regression      Number of obs   =    2,589
                        LR chi2(14)                =    84.58
                        Prob > chi2                 =    0.0000
Log likelihood = -1429.5767  Pseudo R2       =    0.0287
  
```

	mode	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
size						
Micro 2-4		1.283159	.5410741	0.59	0.554	.5615018 2.932308
Micro 5-9		1.232347	.5115778	0.50	0.615	.5462336 2.780276
Small 10-24		1.365728	.5651461	0.75	0.451	.6069209 3.073239
Small 25-49		1.281954	.5458082	0.58	0.560	.556497 2.953128
Medium 50-99		1.417883	.6346092	0.78	0.435	.589744 3.408922
Medium 100-249		2.316645	1.114217	1.75	0.081	.9025356 5.946408
Large 250+		1.724045	.9198458	1.02	0.307	.6058974 4.905667
single		1.227093	.1306653	1.92	0.055	.9959518 1.511877
markets						
Locally <input type="checkbox"/> within an individual town or local area		.8236794	.1320362	-1.21	0.226	.6016032 1.127733
Nationally <input type="checkbox"/> within England		1.922534	.3480506	3.61	0.000	1.348264 2.741407
Regionally <input type="checkbox"/> within the Liverpool City Region [if prompted lis..		1.203147	.1917921	1.16	0.246	.8802984 1.644401
Within the EU		1.282045	.3085556	1.03	0.302	.7999091 2.054782
Within the UK		1.898257	.35231	3.45	0.001	1.319123 2.731649
dataset		.6965733	.0922537	-2.73	0.006	.5373216 .9030242
_cons		.1825407	.0855642	-3.63	0.000	.0728395 .4574591

Mode comparison

3. Response

Survey completion rates

- Direct comparison of mode effects on response rates not possible for LCRCA
 - 0.28 completes & 7.6 calls/hr, response rate 11.1%
- Gfirst:

	Telephone	Push to Web
Hours	395.75	285.75
Number of interviews	316	195
Engagement no of calls made	2831	3194
“Response rate”	22.3%	30.1%*
Completes per hour	0.80	0.68
Calls per hour	7.2	16.4

Single item measures

4a. Measurement

Vacancies reported	Survey dataset		Total
	LCRCA	GFirst	
None	594 31.90	283 31.58	877 31.80
Vacancies	1,268 68.10	613 68.42	1,881 68.20
Total	1,862 100.00	896 100.00	2,758 100.00

Pearson chi2(1) = 0.0279 Pr = 0.867

Vacancies reported	Survey mode		Total
	Telephone	Online	
None	646 32.74	215 30.58	861 32.17
Vacancies	1,327 67.26	488 69.42	1,815 67.83
Total	1,973 100.00	703 100.00	2,676 100.00

Pearson chi2(1) = 1.1069 Pr = 0.293

Vacancies reported over 12 months

recruit	Survey dataset		Total
	LCRCA	GFirst	
Recruited	1,215	591	1,806
Did not recruit	53	22	75
Total	1,268	613	1,881

Pearson chi2(1) = 0.3769 Pr = 0.539

recruit	Survey mode		Total
	Telephone	Online	
Recruited	1,282	464	1,746
Did not recruit	45	24	69
Total	1,327	488	1,815

Pearson chi2(1) = 2.2746 Pr = 0.132

Recruitment in the last 12 months?

Hard to Fill Vacancies (HTV)	Survey dataset		Total
	LCRCA	GFirst	
Yes	497	286	783
No	756	303	1,059
Total	1,253	589	1,842

Pearson chi2(1) = 12.9630 Pr = 0.000

Hard to Fill Vacancies (HTV)	Survey mode		Total
	Telephone	Online	
Yes	554	191	745
No	761	276	1,037
Total	1,315	467	1,782

Pearson chi2(1) = 0.2143 Pr = 0.643

Hard to fill vacancies

train	Survey dataset		Total
	LCRCA	GFirst	
Don't know	23	10	33
No	272	285	557
Yes	1,555	604	2,159
Total	1,850	899	2,749

Pearson chi2(2) = 108.2898 Pr = 0.000

train	Survey mode		Total
	Telephone	Online	
Don't know	12	20	32
No	424	125	549
Yes	1,536	557	2,093
Total	1,972	702	2,674

Pearson chi2(2) = 25.2980 Pr = 0.000

Train

Survey mode, comparing LCRCA and GFirst

Logistic regression
Log likelihood = -1058.6441

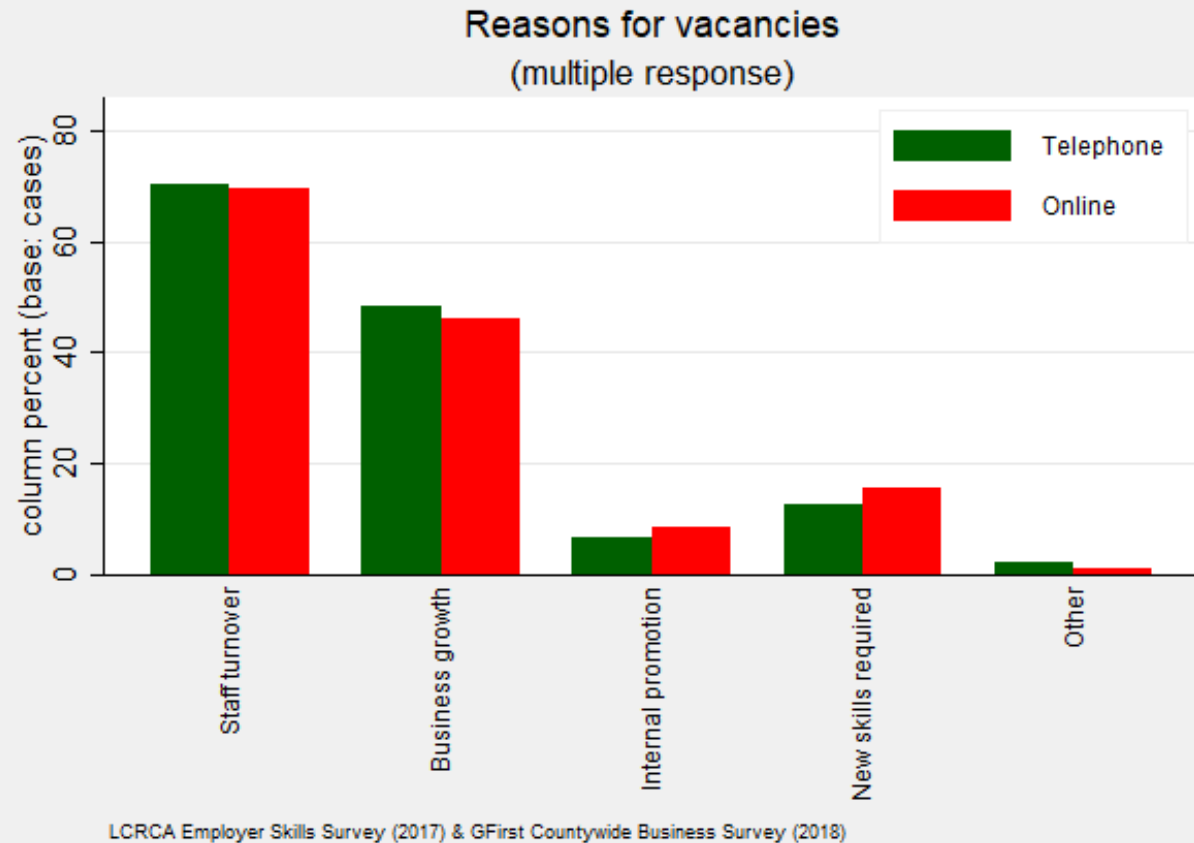
Number of obs = 2,491
LR chi2(14) = 448.24
Prob > chi2 = 0.0000
Pseudo R2 = 0.1747

	train	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
mode		.2026699	.1319923	1.54	0.125	-.0360302	.46137
size							
Micro 2-4		.4790453	.3567512	1.34	0.179	-.2201742	1.178265
Micro 5-9		1.440055	.3533829	4.08	0.000	.7474377	2.132673
Small 10-24		2.354725	.3593131	6.55	0.000	1.650484	3.058966
Small 25-49		3.40215	.4300877	7.91	0.000	2.559194	4.245107
Medium 50-99		4.606232	.7932769	5.81	0.000	3.051438	6.161026
Medium 100-249		0 (empty)					
Large 250+		4.001913	1.083086	3.69	0.000	1.879104	6.124723
markets							
Locally <input type="checkbox"/> within an individual town or ..		.1148141	.17685	0.65	0.516	-.2318055	.4614336
Nationally <input type="checkbox"/> within England		-.3197743	.2085894	-1.53	0.125	-.728602	.0890533
Regionally <input type="checkbox"/> within the Liverpool City ..		.2135672	.1748753	1.22	0.222	-.1291822	.5563165
Within the EU		-.5004833	.2477262	-2.02	0.043	-.9860177	-.0149489
Within the UK		-.1300603	.2282666	-0.57	0.569	-.5774545	.317334
single							
Multi		-.3309681	.1409099	-2.35	0.019	-.6071464	-.0547898
dataset		-1.248642	.1633256	-7.65	0.000	-1.568755	-.9285301
_cons		.2368102	.3909999	0.61	0.545	-.5295354	1.003156

Multiple response
items

4b. Measurement

Multiple response variables



Reasons for vacancies

		Survey mode		Total
		Telephone	Online	
rr1	Staff turnover	919	325	1244
rr2	Business growth	634	215	849
rr3	Internal promotion	88	41	129
rr4	New skills required	167	73	240
rr5	Other	28	6	34
Total		1836	660	2496
Cases		1311	467	1778

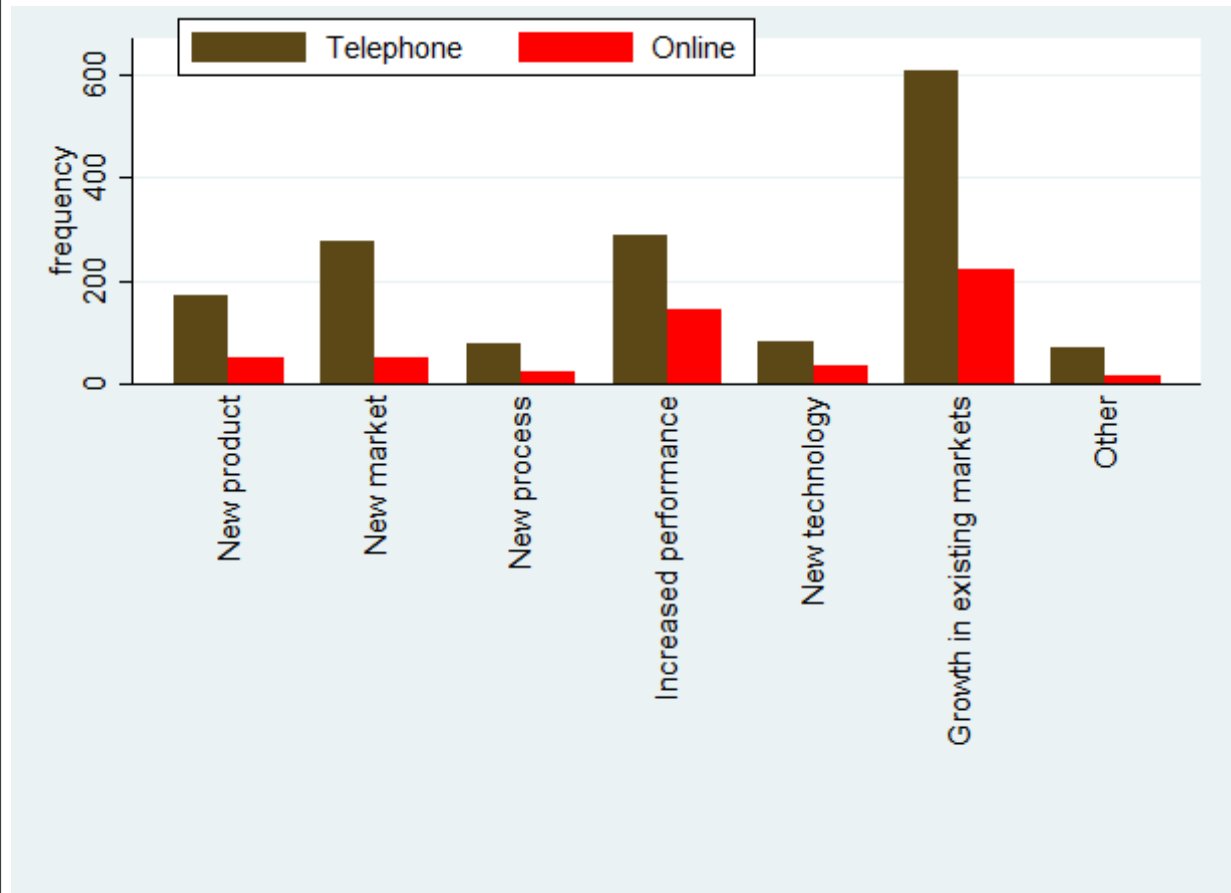
Valid cases: 1778

Missing cases: 901

Overall Test(s) of Significance:

Pearson chi2(20) = 24.0752 Pr = 0.239

Reasons for new skills demands



Reasons for new skills demands

		Survey mode		Total	chi2/p*
		Telephone	Online		
inct1	New product	171 20.36	50 16.67	221 19.39	1.926 1.000
inct2	New market	278 33.10	52 17.33	330 28.95	26.701 0.000
inct3	New process	78 9.29	24 8.00	102 8.95	0.449 1.000
inct4	Increased performance	286 34.05	143 47.67	429 37.63	17.469 0.000
inct5	New technology	83 9.88	34 11.33	117 10.26	0.506 1.000
inct6	Growth in existing markets	607 72.26	220 73.33	827 72.54	0.127 1.000
inct7	Other	71 8.45	15 5.00	86 7.54	3.777 0.364
Total		1574 187.38	538 179.33	2112 185.26	
Cases		840	300	1140	

* Pearson chi2(1) / Bonferroni-adjusted p-values

Valid cases: 1140

Missing cases: 1539

Overall Test(s) of Significance:

Pearson chi2(62) = 99.1571 Pr = 0.002

Logistic regression Number of obs = 1,116
 LR chi2(14) = 37.08
 Prob > chi2 = 0.0007
 Log likelihood = -720.01966 Pseudo R2 = 0.0251

inct4	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
mode	1.739063	.247144	3.89	0.000	1.31628	2.297642
size						
Micro 2-4	1.039526	.4707313	0.09	0.932	.427941	2.52515
Micro 5-9	.9950349	.438165	-0.01	0.991	.4197692	2.358664
Small 10-24	1.007481	.4429445	0.02	0.986	.4256002	2.384911
Small 25-49	.8920485	.4203812	-0.24	0.808	.3542065	2.246572
Medium 50-99	.4971269	.2586053	-1.34	0.179	.179338	1.378041
Medium 100-249	.7502483	.4585585	-0.47	0.638	.2264347	2.485805
Large 250+	4.659668	3.782216	1.90	0.058	.9493825	22.87013
markets						
Locally <input type="checkbox"/> wi..	1.166342	.2344973	0.77	0.444	.7864824	1.72967
Nationally <input type="checkbox"/> ..	1.559159	.3707254	1.87	0.062	.9783579	2.484751
Regionally <input type="checkbox"/> ..	1.222923	.2521175	0.98	0.329	.8164234	1.831819
Within the EU	.8624908	.249818	-0.51	0.610	.4888846	1.521607
Within the UK	1.468367	.3448579	1.64	0.102	.9266658	2.326731
single	.9469804	.1259986	-0.41	0.682	.7296021	1.229125
_cons	.4821599	.2305342	-1.53	0.127	.1888895	1.230763

New markets

Logistic regression Number of obs = 1,116
 LR chi2(14) = 75.95
 Prob > chi2 = 0.0000
 Log likelihood = -636.12684 Pseudo R2 = 0.0563

inct2	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]	
mode	.3846277	.0682883	-5.38	0.000	.2715907	.544711
size						
Micro 2-4	.6942967	.3238244	-0.78	0.434	.2783167	1.732012
Micro 5-9	.6932969	.3127641	-0.81	0.417	.2863652	1.678488
Small 10-24	.593352	.2677568	-1.16	0.247	.2450181	1.4369
Small 25-49	.6872384	.3331889	-0.77	0.439	.2657207	1.777417
Medium 50-99	.4247596	.2271998	-1.60	0.109	.1488825	1.211833
Medium 100-249	.7468296	.4671	-0.47	0.641	.2192011	2.544488
Large 250+	2.001807	1.559823	0.89	0.373	.4346701	9.219021
markets						
Locally <input type="checkbox"/> wi..	.5812245	.1313893	-2.40	0.016	.3731854	.9052387
Nationally <input type="checkbox"/> ..	1.447132	.3666087	1.46	0.145	.8807834	2.377645
Regionally <input type="checkbox"/> ..	1.30445	.2802022	1.24	0.216	.8562195	1.987329
Within the EU	2.06741	.5774395	2.60	0.009	1.195862	3.574144
Within the UK	1.716594	.4247161	2.18	0.029	1.056976	2.787855
single	.8670544	.124205	-1.00	0.319	.6548054	1.148102
_cons	.865538	.4277775	-0.29	0.770	.3285445	2.280227

Increased performance

Reasons for new skills

Focus group recruitment

Q137	Survey mode		Total
	Telephone	Online	
Yes	514	75	589
	40.70	15.50	33.71
No	749	409	1,158
	59.30	84.50	66.29
Total	1,263	484	1,747
	100.00	100.00	100.00

Pearson chi2 (1) = 99.4373 Pr = 0.000

Focus group recruitment

Logistic regression

Log likelihood = -958.92816

Number of obs = 1,665

LR chi2(13) = 196.15

Prob > chi2 = 0.0000

Pseudo R2 = 0.0928

	Q137	Odds Ratio	Std. Err.	z	P> z	[95% Conf. Interval]
	mode	.2109455	.0317993	-10.32	0.000	.1569836 .2834563
	size					
	Micro 5-9	1.088761	.1943867	0.48	0.634	.7672902 1.544918
	Small 10-24	1.423115	.2468827	2.03	0.042	1.012915 1.999433
	Small 25-49	1.675981	.3420345	2.53	0.011	1.123455 2.500244
	Medium 50-99	2.092246	.5206869	2.97	0.003	1.284631 3.407588
	Medium 100-249	3.422517	1.213095	3.47	0.001	1.708604 6.855671
	Large 250+	6.570357	2.894837	4.27	0.000	2.770496 15.5819
	markets					
Locally	within an individual town or ..	.7192931	.1718578	-1.38	0.168	.4503308 1.148894
	Nationally within England	1.293917	.3642908	0.92	0.360	.7451753 2.24675
Regionally	within the Liverpool City ..	1.94584	.4894981	2.65	0.008	1.188441 3.185932
	Within the EU	2.170097	.9143299	1.84	0.066	.9502572 4.955837
	Within the UK	1.318765	.3496876	1.04	0.297	.7842603 2.217555
	single	1.004871	.126647	0.04	0.969	.7849299 1.286441
	_cons	.4601475	.1587669	-2.25	0.024	.233993 .9048805

Number of survey items showing significant Chi-square

	Significant items		
	Both	LCRCA	GFirst
Firmographics	1 (9)		
Single response	11 (21)	1 (2)	4 (8)
Multiple response	34 (112)	14 (18)	8 (14)

Total = 73 of 184 (39.6%)

After “treatment”

	Significant items		
	Both	LCRCA	GFirst
Firmographics	0 (1)		
Single response	2 (11)	0 (1)	1 (4)
Multiple response	5 (34)	0 (18)	1 (8)

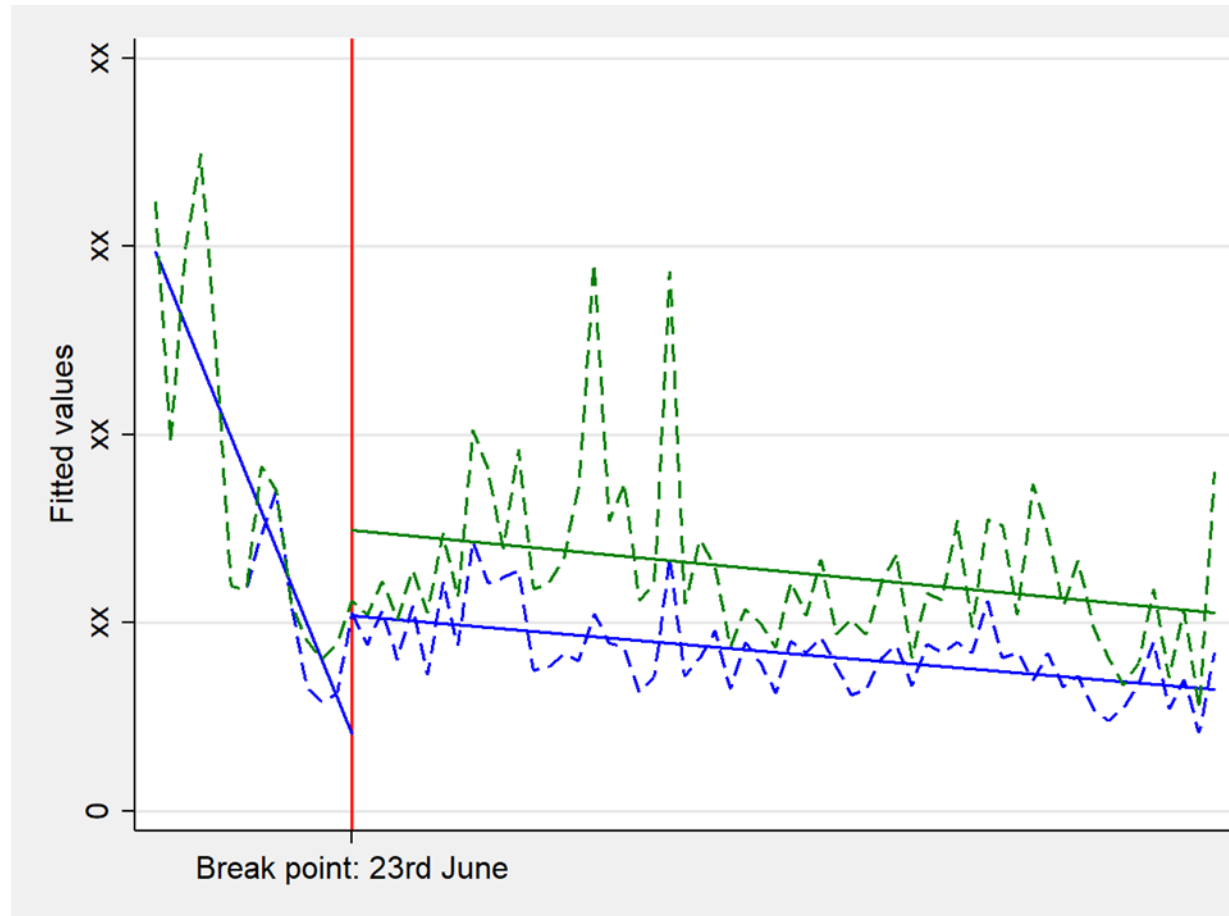
Total = 9 of 184 (4.9%)

Summary

Costs and completion
rates

Resources

Survey costs



Push to web: a viable
commercial strategy?

Conclusions

The case for push to web

- For business surveys, push to web offer a number of advantages
- Good value for money, though not as much as hoped
- Will require ongoing measurement validation
- Uses different engagement skills, different kind of caller

Issues with push to web

- Can we trust fully automated follow-up?
- Will it work outside of targeted business populations?
- Individual level surveys:
 - Different populations, different challenges
 - We do not have the imprimatur of ONS/UK/Welsh Government
 - Preference for mobile devices
 - Studies show consistent demographic biases
- Wavehill conducting a pilot for National Institutes of Health Research in conjunction with University of East Anglia

Thank you

For more information about Wavehill and the services that we provide please visit our website or follow us on Twitter:

www.wavehill.com
twitter.com/wavehilltweets

Size by mode

Size band	Survey mode		Total
	Telephone	Online	
Micro 2-4	317 16.33	114 16.40	431 16.35
Micro 5-9	558 28.75	189 27.19	747 28.34
Small 10-24	629 32.41	222 31.94	851 32.28
Small 25-49	261 13.45	89 12.81	350 13.28
Medium 50-99	110 5.67	42 6.04	152 5.77
Medium 100-249	40 2.06	26 3.74	66 2.50
Large 250+	26 1.34	13 1.87	39 1.48
Total	1,941 100.00	695 100.00	2,636 100.00

Pearson chi2(6) = 7.5009 Pr = 0.277