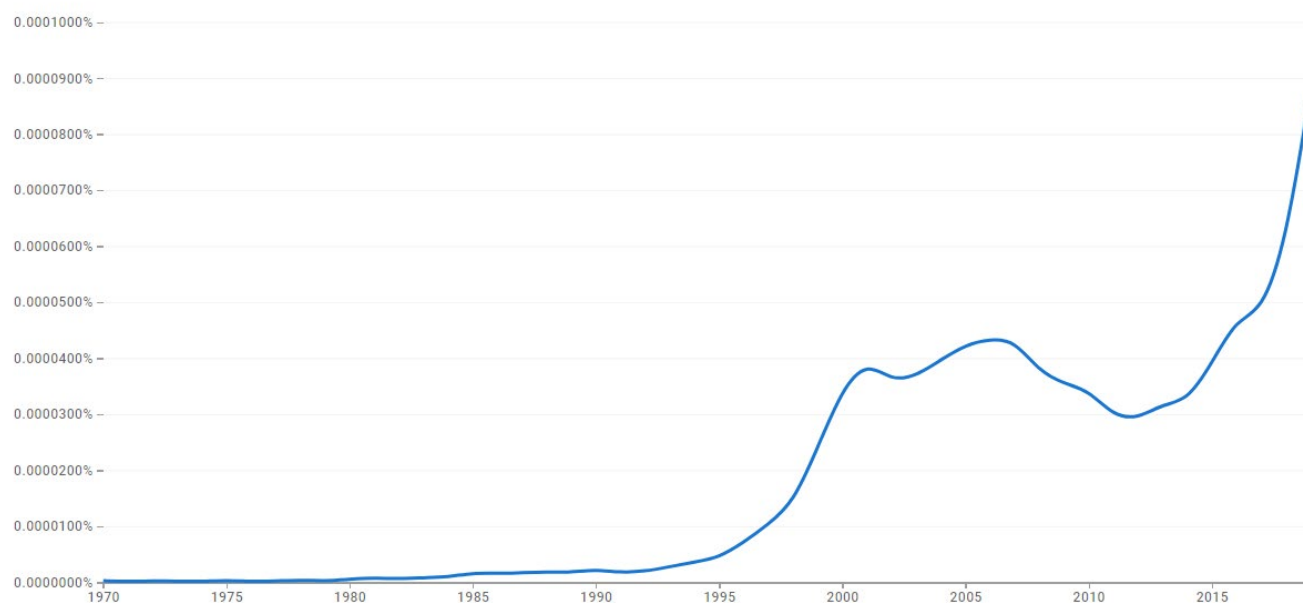


“Digital Stoke” Report 1: Appendices

Appendix A. ngram for *digital industry*, *digital industries*, *digital economy* and *information and communication technology*

The speed with which the digital economy is coming upon us is reflected in English-language books. Figure A1 shows the frequency with which the phrases (ngrams) *digital industry*, *digital industries*, *digital economy* and *information and communication technology* appear in a case insensitive search of titles published anywhere in the years 1970 to 2019 and scanned into Google Books. Following slight change over the first 20 years, appearances rise to a new level between roughly 2000 and 2010 and, since then, have displayed unprecedented and accelerating increase. Considering the impact of the pandemic on, for example, online shopping and working from home, it is reasonable to assume that this increase has continued in the years since 2019.

Figure A1. Frequency of appearance of phrases digital industry/industries/economy plus information and communication technology in the Google Books database, 1970-2019



Source. Google Books Ngram Viewer: [Google Ngram Viewer](https://books.google.com/ngram/), based on Michel et al. (2010). Preferred citation: Jean-Baptiste Michel, Yuan Kui Shen, Aviva Presser Aiden, Adrian Veres, Matthew K. Gray, William Brockman, The Google Books Team, Joseph P. Pickett, Dale Hoiberg, Dan Clancy, Peter Norvig, Jon Orwant, Steven Pinker, Martin A. Nowak, and Erez Lieberman Aiden. *Quantitative Analysis of Culture Using Millions of Digitized Books*. *Science* (Published online ahead of print: 12/16/2010).

Appendix B. ECI for cities in Great Britain, 1981 and 2019

Table 4: ECI at urban level (PUA) 1981 and 2019. Large cities highlighted

PUA	ECI (2019)	Rank (2019)	ECI (1981)	Rank (1981)	Rank change: 1981-2019
London	3.7	1	1.7	2	1
Edinburgh	2.7	2	1.6	3	1
Oxford	2.4	3	1.5	4	1
Cambridge	2.3	4	1.8	1	-3
Reading	2.3	5	1.3	8	3
Brighton	2.1	6	1.1	9	3
Glasgow	1.8	7	-0.3	38	31
Crawley	1.4	8	1.3	7	-1
Bristol	1.3	9	0.7	17	8
Cardiff	1.2	10	0.4	27	17
York	1.1	11	0.7	16	5
Aldershot	1.1	12	1.5	5	-7
Leeds	1.1	13	-0.5	40	27
Slough	1.0	14	1.0	11	-3

Swindon	0.8	15	0.6	20	5
Exeter	0.6	16	0.8	14	-2
Liverpool	0.5	17	-0.3	36	19
Manchester	0.5	18	-1.1	52	34
Peterborough	0.5	19	0.6	22	3
Worthing	0.4	20	1.4	6	-14
Ipswich	0.4	21	0.7	19	-2
Bournemouth	0.4	22	0.6	23	1
Dundee	0.4	23	-0.7	47	24
Portsmouth	0.3	24	0.2	30	6
Southampton	0.2	25	0.9	12	-13
Warrington	0.2	26	-0.6	43	17
Milton Keynes	0.2	27	0.4	26	-1
Norwich	0.2	28	1.0	10	-18
Nottingham	0.0	29	-1.0	50	21
Southend	0.0	30	0.9	13	-17
Luton	0.0	31	0.5	24	-7
Aberdeen	-0.2	32	0.7	18	-14
Basildon	-0.5	33	0.4	28	-5
Northampton	-0.5	34	0.2	29	-5
Plymouth	-0.5	35	0.6	21	-14
Gloucester	-0.5	36	0.7	15	-21
Newcastle	-0.5	37	-0.7	46	9
Birkenhead	-0.5	38	-0.3	37	-1
Blackburn	-0.8	39	-0.9	49	10
Preston	-0.8	40	-0.6	41	1
Leicester	-0.9	41	0.0	33	-8
Coventry	-0.9	42	-1.1	53	11
Sheffield	-0.9	43	-0.7	45	2
Birmingham	-1.0	44	-0.4	39	-5
Blackpool	-1.0	45	0.5	25	-20
Hull	-1.1	46	-0.2	35	-11

Newport	-1.1	47	-0.2	34	-13
Mansfield	-1.2	48	-1.9	60	12
Bradford	-1.2	49	-1.0	51	2
Sunderland	-1.2	50	-0.7	44	-6
Wigan	-1.2	51	-1.7	57	6
Burnley	-1.3	52	-1.7	58	6
Doncaster	-1.3	53	-1.4	55	2
Derby	-1.3	54	-0.8	48	-6
Telford	-1.4	55	0.0	32	-23
Swansea	-1.4	56	0.2	31	-25
Middlesbrough	-1.5	57	-0.6	42	-15
Wakefield	-1.5	58	-2.2	61	3
Huddersfield	-1.6	59	-1.6	56	-3
Stoke	-1.7	60	-1.3	54	-6
Barnsley	-1.7	61	-1.8	59	-2

Source: Rodrigues and Breach (2021: Appendix 1 reproduced in entirety)

Appendix C. Current Price (unsmoothed) GVA (B) per hour worked (£): ITL3 subregions, 2004 and 2021.

2004		2021	
Region name	£	Region name	£
Tower Hamlets	53.3	Tower Hamlets	79.2
Camden and City of London	42.8	Camden and City of London	67.5
East Surrey	37.4	North Hampshire	58.6
Hounslow and Richmond upon Thames	36.5	Westminster	57.6
Westminster	34.7	Hounslow and Richmond upon Thames	57.5
Berkshire	34.0	Berkshire	54.8
Bexley and Greenwich	33.3	Croydon	53.7
Harrow and Hillingdon	32.7	West Surrey	53.5
North Hampshire	32.6	Orkney Islands	51.3
Enfield	31.4	Swindon	50.8
Haringey and Islington	31.3	Lambeth	49.0
Milton Keynes	31.2	Brent	48.3
West Surrey	31.0	Milton Keynes	47.5
Swindon	30.8	Cheshire East	46.9
Mid and East Antrim	30.2	Enfield	45.9
Bromley	29.8	Haringey and Islington	45.6
Cheshire East	29.5	Kensington & Chelsea and Hammersmith & Fulham	45.4
Solihull	29.1	Cheshire West and Chester	44.7
Barnet	28.9	East Surrey	43.9
Merton, Kingston upon Thames and Sutton	28.6	City of Edinburgh	43.8
York	28.2	Bromley	43.6
Hertfordshire CC	28.2	Bexley and Greenwich	42.4
Ealing	28.1	South Hampshire	41.1
Barking & Dagenham and Havering	28.1	Ealing	40.9
West Essex	27.9	Lewisham and Southwark	40.6
Lambeth	27.8	Central Hampshire	40.3
City of Edinburgh	27.6	Solihull	40.2
Croydon	27.5	Harrow and Hillingdon	40.0
Mid Lancashire	27.0	Coventry	40.0
West Kent	27.0	South and West Derbyshire	39.9
Derby	26.9	West Lothian	39.7
Brent	26.7	Cambridgeshire CC	39.6
Redbridge and Waltham Forest	26.7	Brighton and Hove	39.5
Peterborough	26.7	Redbridge and Waltham Forest	39.4
Darlington	26.6	Mid Lancashire	39.3
Buckinghamshire CC	26.4	Bath and North East Somerset, North Somerset and South Gloucestershire	39.1
Mid Ulster	26.15	Mid Ulster	39.06
Falkirk	26.1	East Derbyshire	39.0
Central Hampshire	26.1	Oxfordshire CC	39.0
Orkney Islands	26.0	West Kent	39.0
East Riding of Yorkshire	26.0	Gloucestershire CC	38.9
		South Nottinghamshire	38.8

Warrington	25.9	Heart of Essex	38.7
Lewisham and Southwark	25.8	Essex Thames Gateway	38.6
Thurrock	25.7	Buckinghamshire CC	38.6
Perth and Kinross, and Stirling	25.7	Merton, Kingston upon Thames and Sutton	38.4
Cambridgeshire CC	25.7	Medway	38.4
South Hampshire	25.7	West Sussex (North East)	38.4
Kensington & Chelsea and Hammersmith & Fulham	25.4	Portsmouth	38.3
Bath and North East Somerset, North Somerset and South Gloucestershire	25.4	Inverness and Nairn, Moray, Badenoch and Strathspey	38.3
Hackney and Newham	25.2	Hertfordshire CC	37.9
Coventry	25.2	North Lanarkshire	37.8
Essex Thames Gateway	25.1	Clackmannanshire and Fife	37.7
Sunderland	25.1	Barnet	37.7
Kent Thames Gateway	25.1	Aberdeen City and Aberdeenshire	37.7
Oxfordshire CC	25.0	Fermanagh and Omagh	37.61
East Merseyside	24.9	Mid and East Antrim	37.52
Heart of Essex	24.8	Flintshire and Wrexham	37.5
Dumfries and Galloway	24.8	Falkirk	37.4
Wiltshire	24.7	Kent Thames Gateway	37.4
Leeds	24.6	Manchester	37.3
Warwickshire CC	24.6	Essex Haven Gateway	37.2
West Sussex (South West)	24.6	Norwich and East Norfolk	37.2
West Lothian	24.6	Perth and Kinross, and Stirling	37.1
Cheshire West and Chester	24.5	Wiltshire	37.0
Greater Manchester South West	24.4	Caithness and Sutherland, and Ross and Cromarty	37.0
Leicestershire CC and Rutland	24.4	Warwickshire CC	37.0
Gloucestershire CC	24.3	South Lanarkshire	37.0
Liverpool	24.3	Wirral	36.9
Luton	24.3	Shetland Islands	36.8
North Yorkshire CC	24.2	Belfast	36.78
Newry, Mourne and Down	24	East Riding of Yorkshire	36.7
Aberdeen City and Aberdeenshire	24.0	Antrim and Newtownabbey	36.71
Dorset	23.9	Greater Manchester South West	36.7
West Sussex (North East)	23.7	Hartlepool and Stockton-on-Tees	36.7
Shetland Islands	23.6	Derry City and Strabane	36.37
Hartlepool and Stockton-on- Tees	23.6	West Sussex (South West)	36.1
Fermanagh and Omagh	23.54	Hackney and Newham	36.1
South Nottinghamshire	23.5	Warrington	36.1
Central Bedfordshire	23.4	North Yorkshire CC	35.8
North Lanarkshire	23.4	Bournemouth, Christchurch and Poole	35.7
Inverness and Nairn, Moray, Badenoch and Strathspey	23.3	Leicester	35.5
Bournemouth, Christchurch and Poole	23.2	West Essex	35.5
Suffolk CC	23.2	Lochaber, Skye and Lochalsh, Arran and Cumbrae, and Argyll and Bute	35.4
Manchester	23.1	Ards and North Down	35.07
Medway	23.0	Bedford	35.1
Southampton	22.9	Breckland and South Norfolk	35.0
Caithness and Sutherland, and Ross and Cromarty	22.9	Thurrock	35.0
East Kent	22.9	Suffolk CC	35.0
Wirral	22.8	Leeds	35.0
		Cardiff and Vale of Glamorgan	34.8
		Barking & Dagenham and Havering	34.8

Wakefield	22.8	Glasgow City	34.6
South Ayrshire	22.7	Peterborough	34.5
Lochaber, Skye and Lochalsh, Arran and Cumbrae, and Argyll and Bute	22.7	Southampton	34.5
Antrim and Newtownabbey	22.62	Wolverhampton	34.3
Breckland and South Norfolk	22.5	Birmingham	34.2
Sandwell	22.5	Wakefield	34.2
Lancaster and Wyre	22.5	Dumfries and Galloway	34.1
North and North East Lincolnshire	22.5	Lisburn and Castlereagh	34.11
Inverclyde, East Renfrewshire, and Renfrewshire	22.4	Sunderland	34.1
Portsmouth	22.4	East Merseyside	34.0
Flintshire and Wrexham	22.3	Lancaster and Wyre	34.0
East Dunbartonshire, West Dunbartonshire, and Helensburgh and Lomond	22.3	Bristol, City of	34.0
Cardiff and Vale of Glamorgan	22.3	Worcestershire CC	33.9
Clackmannanshire and Fife	22.3	Liverpool	33.9
Bristol, City of	22.2	Central Valleys	33.9
Isle of Anglesey	22.1	Causeway Coast and Glens	33.72
North and West Norfolk	22.0	North and North East Lincolnshire	33.6
Staffordshire CC	22.0	Angus and Dundee City	33.5
Tyneside	22.0	Swansea	33.5
Bridgend and Neath Port Talbot	22.0	Scottish Borders	33.5
Devon CC	21.9	Chorley and West Lancashire	33.5
Lincolnshire CC	21.9	York	33.4
North Nottinghamshire	21.8	Mid Kent	33.4
Telford and Wrekin	21.8	West Cumbria	33.3
East Ayrshire and North Ayrshire mainland	21.7	East Lothian and Midlothian	33.2
East Derbyshire	21.6	East Ayrshire and North Ayrshire mainland	33.2
Wolverhampton	21.6	Wandsworth	33.2
West Northamptonshire	21.6	Central Bedfordshire	33.2
Wandsworth	21.5	Monmouthshire and Newport	33.0
South Lanarkshire	21.5	Lincolnshire CC	33.0
Sheffield	21.5	Sheffield	33.0
West Cumbria	21.4	West Northamptonshire	33.0
Plymouth	21.4	East Kent	32.9
Somerset CC	21.3	Derby	32.9
Durham CC	21.3	South Ayrshire	32.9
Scottish Borders	21.2	East Dunbartonshire, West Dunbartonshire, and Helensburgh and Lomond	32.8
Worcestershire CC	21.1	Tyneside	32.7
Birmingham	21.1	Leicestershire CC and Rutland	32.6
Glasgow City	21.1	Newry, Mourne and Down	32.52
Swansea	21.1	East Lancashire	32.4
Bedford	21.1	North and West Norfolk	32.2
Shropshire CC	21.1	Bridgend and Neath Port Talbot	32.2
South and West Derbyshire	21.0	Shropshire CC	32.1
Monmouthshire and Newport	21.0	Devon CC	32.1
Greater Manchester North West	21.0	Telford and Wrekin	32.0
Mid Kent	21.0	South West Wales	31.7
Causeway Coast and Glens	20.96	Inverclyde, East Renfrewshire, and Renfrewshire	31.7
Isle of Wight	21.0	Somerset CC	31.6
		Walsall	31.5
		Nottingham	31.5

East Lothian and Midlothian	20.9	Calderdale and Kirklees	31.3
Angus and Dundee City	20.9	Sefton	31.3
South West Wales	20.8	Greater Manchester North West	31.2
Lisburn and Castlereagh	20.77	East Sussex CC	31.1
Belfast	20.75	Northumberland	31.0
Brighton and Hove	20.7	Gwent Valleys	30.9
Gwent Valleys	20.7	Armagh City, Banbridge and Craigavon	30.82
Greater Manchester South East	20.6	Isle of Wight	30.7
East Cumbria	20.6	North Nottinghamshire	30.6
Essex Haven Gateway	20.5	Luton	30.6
East Lancashire	20.4	Plymouth	30.5
Chorley and West Lancashire	20.3	Staffordshire CC	30.5
Greater Manchester North East	20.2	Greater Manchester South East	30.5
East Sussex CC	20.1	Sandwell	30.4
North Northamptonshire	20.0	Bradford	30.4
Northumberland	20.0	North Northamptonshire	30.3
Cornwall and Isles of Scilly	20.0	Kingston upon Hull, City of	30.3
Bradford	19.9	Stoke-on-Trent	30.2
Ards and North Down	19.85	Greater Manchester North East	30.2
Central Valleys	19.8	Dorset	30.2
Dudley	19.7	Durham CC	30.0
Nottingham	19.6	Dudley	29.7
Gwynedd	19.5	East Cumbria	29.5
Herefordshire, County of	19.3	Gwynedd	29.0
Southend-on-Sea	19.3	Blackpool	28.6
Stoke-on-Trent	19.2	Cornwall and Isles of Scilly	28.5
South Teesside	19.2	Herefordshire, County of	28.5
Barnsley, Doncaster and Rotherham	19.1	Darlington	28.4
Norwich and East Norfolk	19.1	Na h-Eileanan Siar	28.4
Torbay	19.0	Barnsley, Doncaster and Rotherham	28.4
Leicester	18.9	Blackburn with Darwen	28.2
Blackpool	18.6	Isle of Anglesey	28.1
Conwy and Denbighshire	18.4	South Teesside	28.0
Kingston upon Hull, City of	18.4	Conwy and Denbighshire	27.5
Calderdale and Kirklees	18.2	Southend-on-Sea	27.4
Blackburn with Darwen	18.1	Torbay	24.6
Sefton	18.0	Powys	23.8
Derry City and Strabane	17.97		
Na h-Eileanan Siar	17.8		
Armagh City, Banbridge and Craigavon	17.57		
Walsall	17.5		
Powys	15.9		

Source: Extracted from Table A4 –Source: ONS Subregional Productivity data, June 2023 release.
[Subregional productivity: labour productivity indices by UK ITL2 and ITL3 subregions - Office for National Statistics](#)

Appendix D. Consistency of ONS Industry and Occupational categories

Industry categories (SIC 2007)

Industry breakdowns used in tables

Description	SIC07 section letter	Division
Agriculture, forestry & fishing	A	01/03
Production	B, C, D and E	05/39
Mining, quarrying & utilities	B, D and E	05/09, 35/39
Manufacturing	C	10/33
Construction	F	41/43
Wholesale and retail; repair of motor vehicles	G	45/47
Motor trades	G	45
Wholesale	G	46
Retail	G	47
Transport & storage (inc postal)	H	49/53
Accommodation & food services	I	55/56
Information & communication	J	58/63
Finance & insurance	K	64/66
Property	L	68
Professional, scientific & technical	M	69/75
Business administration and support services	N	77/82
Public administration & defence	O	84
Education	P	85
Health	Q	86/88
Arts, entertainment, recreation and other services	R, S, T and U	90/99

Source: ONS, Inter Departmental Business Register

Occupational categories (NOMIS)

Extract from Table 2. From ONS, Labour Market Profile data for Stoke-

	On-Trent
Total Employee Jobs	121000
Employee Jobs by Industry	
B : Mining And Quarrying	10
C : Manufacturing	14000
D : Electricity, Gas, Steam And Air Conditioning Supply	300
E : Water Supply; Sewerage, Waste Management And R	1250
F : Construction	4500
G : Wholesale And Retail Trade; Repair Of Motor Vehicle	18000
H : Transportation And Storage	12000
I : Accommodation And Food Service Activities	5000
J : Information And Communication	5000
K : Financial And Insurance Activities	1250
L : Real Estate Activities	1000
M : Professional, Scientific And Technical Activities	4000
N : Administrative And Support Service Activities	8000
O : Public Administration And Defence; Compulsory Soc	6000
P : Education	9000
Q : Human Health And Social Work Activities	25000
R : Arts, Entertainment And Recreation	4500
S : Other Service Activities	1750

[Source: Nomis - Official Census and Labour Market Statistics \(nomisweb.co.uk\)](https://nomisweb.co.uk)

From >Text on complexity ... Etc<, Table 2 - occupational categories

Appendix E. Debating the adjustment of location quotients to take account of bet365

We are grateful to Trevor Fenton (Head of Regional Accounts, Office for National Statistics) for a critique of our adjustment methodology. For interested readers, this Section reproduces Trevor's critique in full together with the authors' rejoinder, which elaborates on the existing explanation. It may be of interest to other local economy researchers.

The critique

My principal concern with the methodology relates to the attempts to include the online gambling and betting enterprise 'bet365' in the ICT industry in Stoke-on-Trent. Throughout the report, figures for GVA and employment, labour productivity, and location quotients are adjusted. As a result of these adjustments, alternative rankings are presented showing Stoke-on-Trent to be far more advanced compared with other areas at the same (ITL3) level of geography.

However, this methodology is misguided, and the conclusions drawn are misleading.

Enterprises and local units are types of statistical units held on the IDBR [Inter-Departmental Business Register].

- An enterprise carries out one or more activities at one or more locations.
- A local unit is an enterprise or part thereof (e.g. a workshop, factory, warehouse, office, mine or depot) situated in a geographically identified place.

The allocation of a classification to an enterprise will be based on its reporting structure. Where an enterprise has one or more local units the classification will be calculated from the dominant activity of the attached local units based on employees. i.e. the activity carried out by the greater number of employees.

The use of IDBR classification has to be considered carefully depending on the level of information required. Enterprise level will provide the activity of most of the employees within the enterprise, i.e. the dominant activity of the local units. Local Unit level will provide the activity from the dominant activity of the employees at the associated site. The local units that form part of an enterprise will not necessarily all share the same classification, and this is already captured in ONS regional statistics relating to employment, GVA and productivity. Adding in additional data for an enterprise effectively 'double counts' its activity and artificially inflates the results. Furthermore, as no attempt is made to duplicate this methodology for other businesses across other parts of the UK, the comparison and ranking alongside other areas is doubly biased in favour of Stoke-on-Trent.

I strongly recommend that the authors revise their methodology to remove any adjustment to the data, which already show the effect of Stoke-on-Trent's ICT companies and their advanced labour productivity.

In subsequent correspondence, this critique was succinctly summarised as follows.

... my point is that all ICT activity is already captured in our regional statistics, due to the way we break things down by individual site rather than by global industry classification. Therefore, your attempt to add in more activity is duplicating what is already there and skewing the results.

Authors' rejoinder

For good reasons, we do not have access to the deepest levels of ONS data at regional let alone local level. Consequently, we cannot calculate the precise extent to which (if any) the global industry classifications of bet365 companies located in Stoke-on-Trent are broken down by individual local sites ("units") according to their employees' activities and then allocated to ICT. However, one advantage of conducting analysis at the local level is that ONS data can be "sense checked" and adjusted – albeit crudely – in the light of local knowledge.

The following elaborates the rationale for adjustments, which although imprecise may bring us closer to the weight of the ICT sector in Stoke than is suggested by the ONS data reported in Table 8.

According to the latest Companies House filings, BET365 GROUP LIMITED together with four other companies within the group are located in Stoke-on-Trent.

1. **HILLSIDE (SHARED SERVICES) LIMITED:** Company number 03958393; Incorporated on 28 March 2000; Company status Active; Registered office address Bet365 House Media Way, Stoke-On-Trent, United Kingdom, ST1 5SZ; Nature of business (SIC) 82990 - Other business support service activities not elsewhere classified
2. **HILLSIDE (LEISURE) LIMITED:** Company number 03218880; Registered office address Bet365 House Media Way, Stoke-On-Trent, United Kingdom, ST1 5SZ; Company status: Active; Incorporated on 1 July 1996; Nature of business (SIC) 74990 - Non-trading company
3. **BET365 GROUP LIMITED:** Company number 04241161; Registered office address: Bet365 House Media Way, Stoke-On-Trent, United Kingdom, ST1 5SZ; Company status Active; Nature of business (SIC); 70100 - Activities of head offices
 - The company that publishes the group "Report and Financial Statements"
4. **DENISE COATES FOUNDATION:** Company number 08191619; Registered office address Bet365 House Media Way, Stoke-On-Trent, United Kingdom, ST1 5SZ; Company status Active; Nature of business (SIC) 96090 - Other service activities not elsewhere classified.
 - Tiny in terms of staff.
5. **HILLSIDE (NEW MEDIA HOLDINGS) LIMITED:** Company number 04130869; Registered office address Bet365 House Media Way, Stoke-On-Trent, United Kingdom, ST1 5SZ; Company status: Active; Nature of business (SIC) 74990 - Non-trading company.

A further two bet365 companies were located in Leek, in Staffordshire Moorlands. However, neither of these is currently active.

6. **BET365 LTD:** Company number 14254302; Dissolved on 31 December 2024; 4 Wardle Gardens, Leek, England, ST13 7AR; Nature of business (SIC) 92000 - Gambling and betting activities.

7. BETVIP365 LTD: Company number 14251908; Registered office address: 4 Wardle Gardens, Leek, England, ST13 7AR; Company status Dissolved (24 December 2024); Nature of business (SIC): 59113 - Television programme production activities; 92000 - Gambling and betting activities.

Of the bet365 companies located in Stoke, their SIC codes give no hint as to the nature of their activities: 82990 - Other business support service activities not elsewhere classified; 74990 - Non-trading company; 70100 - Activities of head offices; 96090 - Other service activities not elsewhere classified; and 74990 - Non-trading company. So, given the large scale of employment by bet365 in Stoke, where do the employees of these companies appear in the Labour Market Profile data used to calculate the location quotients in Table 8?

Three of the five bet365 companies listed above fall within SIC Section M – Professional, Scientific and Technical Activities (encompassing Divisions 69 – 75). Yet these activities are severely under-represented in Stoke (Location Quotient = 0.37). The same goes for Section N (which includes Division 82 – Office administrative, office support and other business support activities) and Section S (which includes Division 96 encompassing 96.09, Other Personal Services Not Elsewhere Classified), both of which have a Location Quotient of 0.74. (For the complete ONS taxonomy, see: [UK Standard Industrial Classification \(SIC\) Hierarchy](#).)

Conversely, Section R – Arts, Entertainment and Recreation – is hugely over-represented in Stoke's Labour Market Profile data, which yields a Location Quotient of 1.61. In the light of local knowledge, this is strange. Stoke is not notable for arts, entertainment and recreation. (Compare the online adverts for jobs located in Stoke, of which 0.83% are accounted for by "Arts, Culture and Media" and 6.07% by ICT; see Figure 10 below.) However, the mystery is resolved once it is realised that Section R includes Division 92, "Gambling and betting" activities. Although the data do not permit any precise calculations, local knowledge suggests that bet365 activities are most likely reallocated to Division 92. However, this reallocation or adjustment clearly overstates the contribution of arts and entertainment and so does not produce an accurate picture of the local economy.

In terms of the SIC (2007) taxonomy, reallocation of bet365 activities to Division 92, "Gambling and betting", is sensible, because bet365 is a one activity business. Yet, categorising bet365 with traditional gambling and betting businesses is misleading: bet365 was funded by the Coates family exiting traditional retail gambling, and employment locally in bricks and mortar betting shops – there are perhaps 20 across the city – and a couple of casinos would account for employment unlikely to exceed 200 full-time jobs. Instead, bet365 is not only a major presence in the local economy (since 2011, Stoke's largest private-sector employer) but also a digital or "tech" company. Primary research – conducted via questionnaire and extensive interviewing – by the Digital Stoke project reveals that bet365 impacts the local ICT sector directly – e.g., via the local labour market for ICT talent – and hence its classification should reflect this. Although the *outcome* of bet365's business activities might be classified along with local high-street bookies as "gambling and betting" services, the *form* in which it delivers its services is global and digital. Accordingly, a high proportion of its local employees are producers of digital services utilising general-purpose digital technologies: for example: the Internet (the fundamental technology that enables online gambling); Cloud Computing (to host websites and databases, enabling high levels of traffic during peak betting times); Big Data and Analytics (to track user behaviour, monitor betting patterns, and identify potential issues like fraud or problem gambling); Cybersecurity (to protect user data, financial transactions, and the integrity of their platform); Mobile Technologies (to allow users to place bets and access the

platform on their smartphones and tablets); and Digital Payment Systems (to fund accounts and receive winnings). Many of these activities are not well represented by the SIC (2007) taxonomy yet fit well within the broad ambit of the digital economy or ICT. Hence, we adjust our location quotients to better represent the composition of Stoke's current economy, which has the effect of down weighting "Arts, Entertainment and Recreation" and correspondingly up weighting the "Information and Communication" sector.

For these reasons, adjusting Stoke's ICT employment by adding in bet365 employees (either in part or in total) does not obviously involve significant "double counting" and excessive inflation of Stoke's ICT employment. However, we readily admit that we have made "no attempt ... to duplicate this methodology for other businesses across other parts of the UK". As the critique argues, this may bias "the comparison and ranking alongside other areas ... in favour of Stoke-on-Trent". However, there is reason to think that the risk of overstating the ICT sector comparison to other places with betting companies is minimal. Bet365 is unique in having limited its use of tax havens and, hence, is concentrated in the UK. By comparison, Paddy Power operates out of Dublin and Malta, Ladbrokes out of London and Malta, and William Hill, London and Gibraltar. Even SkyBet, which started in Leeds, is now owned by an Irish holding company. The only place with a significant online gambling workforce other than Stoke-on-Trent is London. Of course, it is possible that in other areas there are large firms in other industries whose activities could be reallocated to ICT. However, it is beyond the scope of the present Report to investigate the rationale and potential consequences of making such adjustments for other industries in other areas.

Although we conclude that bias arising from adjusting Stoke's ICT employment for bet365 Stoke is likely to be a second-order consideration, our response to this critique is to qualify our ranking of Stoke's ICT sector in relation to other areas. Accordingly, we add that the unadjusted position (40th) represents the lowest reasonable ranking, while the highest adjusted position (31st) should be regarded as the highest reasonable ranking. We observe further that both the lowest and the highest reasonable rankings place Stoke in the first quartile of the UK's ILT3 regions. Adjustment is thus not decisive for our substantive point about the largely unrecognised size of Stoke's ICT sector.

Appendix F. Concordance table: Mapping themes from secondary data analysis and theoretical discussion onto (i) research questions and (ii) corresponding interview and survey questions

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
1. Demographics (suggested by secondary data availability and analysis)	
ICT as a strongly emergent sector (p.14)	Emergent sector. Age and growth of businesses in Stoke's digital sector.
Registered or Unregistered for VAT (p.10)	Turnover? Registered or Unregistered for VAT? • Or just: above or below the VAT threshold?
Job creation – quantity: ICT as an emerging sector is not only increasing its weight as a source a source of wealth creation but is doing so while increasing employment. (p15) (pp.15/16)	Job creation – quantity: Current number of employees (FT and PT) and recent growth of employment.
Job creation – quality: the type of jobs created are not of all types but are similar to those in the broader "creative sector" (pp.15/16)	Job creation – quality: Current composition of employment by level of education (e.g., graduate/non-graduate).
Is ICT in Stoke is a strongly exporting sector (contrasting with local businesses serving a local – and stagnant/declining market)? (Comment, p.25)	Markets: Where does the business sell its products?
2. Firm characteristics and market structure (suggested by theoretical analysis)	
Worse, because new entrants will have been attracted by the initially high profits of the first mover, firms in such an industry tend to suffer from chronic over-capacity (i.e. typically, there are	Monopolistic competition (chronic excess-capacity) (1): Do the free-lancers, micro-, small, and medium-size firms in Stoke operate at full capacity? Or considerably below capacity?

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
insufficient new orders to keep their resources – labour and capital – fully occupied). (pp.49-50)	<ul style="list-style-type: none"> To what extent are they constrained by competition?
<p>In the long run, therefore, the small firms in such an industry may typically just about cover costs, including just sufficient profit to stay in business but not to invest and grow. (p.50)</p> <p>Moreover, given that cognitive ability cannot be collateralised for bank loans, high profitability and corresponding retained earnings are likely to be particularly important for firm growth in the creative sector. (p.50)</p>	<p>Monopolistic competition (normal profit only in the long run) (2): Do the free-lancers, micro-, small, and medium-size firms in Stoke generate sufficient profit to fund investment and growth from retained earnings?</p>
<h3>3. Innovation (suggested by theoretical analysis)</h3>	
<p>Accordingly, given that entrepreneurs do not set up businesses to be content with covering costs, the imperative to innovate continuously is particularly strong in the creative sector (p.50)</p> <ul style="list-style-type: none"> However, some findings do suggest that financial gains might not be the most important goal for all firms in the creative industries. The location choices of creative firms can be based on the lifestyle preferences of the entrepreneurs (i.e. locating firms in rural areas) (Chaston, 2008). Chaston (2008) finds that, in the small firms operating in the creative industries, the importance of other factors (i.e. self-expression, work-life balance) can be greater than that of financial gain. Looking at different subgroups, the author concludes that for some small creative industry firms' financial performance is indeed important, while for other subgroups less so. 	<p>Monopolistic competition (imperative to innovate <i>continuously</i> to sustain competitiveness and profitability) (3):</p> <p>How important is innovation for digital sector businesses on Stoke?</p> <ul style="list-style-type: none"> Product Process Organisational Marketing <p>Occasionally or continuously?</p> <p>New to the firm or new to the market?</p> <p>Incremental or radical?</p> <p>To what extent are lifestyle factors (i.e. self-expression, work-life balance) important for location in Stoke?</p>

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
	<p>What is the relative importance of business success (financial gain, business growth, etc.) and lifestyle considerations?</p> <p>Is there a tradeoff between business success and lifestyle considerations, or do they go together?</p>
Consequently, policy makers concerned with firm growth and employment in the creative sector need to understand (i) the nature of innovation in the creative sector and (ii) what public policy can do to promote it. (p.50)	What can local policy makers do to promote innovation in the digital sector?
4. Business models and business support (suggested by theoretical analysis)	
<p>An alternative business model to continuous innovation for a creative firm may be to do one big “radical” innovation and then sell-out to a larger company. This model may be particularly feasible for digital firms (e.g., software engineers). However, from the perspective of policy makers – especially at the regional or local level – takeover may effectively sever whatever links there are between the creative firm and the local economy. The local innovation ecosystem may suffer damage from the removal of a particularly innovative firm, while employment opportunities and potential tax revenue may be lost. (p.50)</p>	<p>An alternative business model to <i>continuous</i> innovation for a creative firm may be to do one big “radical” innovation and then sell-out to a larger company. This model may be particularly feasible for digital firms (e.g., software engineers). However, from the perspective of policy makers – especially at the regional or local level – takeover may effectively sever whatever links there are between the creative firm and the local economy.</p> <p>What can local policy makers do to help innovative digital firms to “scale up” rather than selling out to a larger firm located elsewhere, thereby severing links with the local economy?</p>
Mark's comment on Draft 1: SOT has arguably benefited in skills terms from the situation in surrounding districts (especially Newcastle under Lyme) for schools and housing for skilled workers. However, this has benefitted the private sector but not local public finances. Also likely Staffs Uni has helped the digital skills pipeline.	<p>What is the appropriate scale of local authority to deliver policy support for the digital sector?</p> <ul style="list-style-type: none"> To what extent has SOT benefited from provision in surrounding districts (especially Newcastle under Lyme and Staffordshire Moorlands) with respect to

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
Question now is how to sustain and grow and politically, what about a Combined Authority? (p.50)	<ul style="list-style-type: none"> ○ skills (e.g. schools) and ○ housing for skilled workers? • The role of Staffordshire and Keele Universities in the digital skills pipeline. <p>Politically, how best to combine the contributions of all local stakeholders to sustain and grow the digital sector?</p>
Larger firms also make room for SMEs by influencing their business models. Rather than grow itself, the aim of the business is to pioneer a new product and sell out to a large company (Haskel and Westlake 2022: 227).	<p>Larger firms also make room for SMEs by influencing their business models.</p> <p>What is the firm's business model: (i) to stay at the present scale as an independent firm; (ii) to scale up as an independent firm; (iii) to sell out to a larger company?</p>
In addition, large firms create room for freelancers , who may be employed on a project basis without incurring the costs of permanent employment. (p.43)	<p>Do Stoke's digital freelancers work for large firms located elsewhere?</p> <p>Do Stoke's digital businesses employ freelancers on a project basis?</p>
Business support (government, including local government)	To investigate the use of government business support measures in the ICT sector.
5. bet365 effect (suggested by local knowledge, initial data analysis, and theoretical considerations)	
<p>To what extent might bet365 be functioning as an "anchor" firm? (p.28) Alternatively, could Bet365 be a "negative" anchor, distorting the labour market given its relatively high wage levels? (Mark's comment)</p> <p>Lines of enquiry will ask whether there is a bet365 effect, e.g., via the local labour market: e.g., by attracting ICT employees to the area and, if so, might some of these eventually leave to start up new businesses? (Although the incentive to do so might be limited to the extent that bet365 employees derive their value from its proprietary</p>	<p>Role of bet365 in Stoke's digital sector/ecosystem.</p> <p>What effects does the presence of bet365 have on the local ecosystem? For example.</p> <ul style="list-style-type: none"> • Is bet365 a very "closed" institution in the ICT space, perhaps reflecting its family control and governance, with correspondingly little external influence on the digital sector? • What are the implications of the bet365 policy of local procurement? Is this more important for local digital businesses or local non-digital businesses (e.g., accounting and law)?

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
<p>synergies; Haskel and Westlake 2018: 86). Alternatively, could the presence of bet365 drive up wages and thereby have a dampening effect on business formation? Could there be an “anchor institution” effect, creating conditions for start-ups and inward investment?</p> <ul style="list-style-type: none"> Mark's comment on Draft 1: From the outside Bet365 appears to be a very “closed” institution in the ICT space, this may reflect its governance with the family control. However, it does have a policy of buying locally wherever it can - accounting and law for example hence it may be an anchor outside of ICT. 	<ul style="list-style-type: none"> Does bet365 create a positive “anchor institution” effect, creating conditions for start-ups and inward investment? <ul style="list-style-type: none"> Does bet365 attract ICT employees to the area and, if so, do some of these eventually leave to start up new businesses? Or is their expertise too limited to bet365 proprietary synergies? Or a negative one? Does bet365 drive up wages in the digital sector, thereby having a dampening effect on local business formation and growth? Are there knowledge spillovers from bet365 to other digital businesses locally?
<p align="center">6. Business assets (inputs) (I): People (suggested by theoretical analysis)</p>	
<p>The DCMS in its <i>Creative Industries Mapping Document</i> defines creative industries as “those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property” (DCMS, 2001, p. 5). Does this description fit the ICT/digital sector? (p.36) Theme. Similar to intangibles assets (HW, 2018: 28). Dependence on heterogeneous labour, heterogenous products, monopolistic competition etc.</p>	<p>To assess the extent to which ICT businesses in Stoke depend on (i) the individual creativity of their employees and (ii) the IP that they create or exploit.</p> <p>Is this in line with the broader “creative sector”?</p>
<p>Dependence on heterogeneous labour and heterogenous products. Is this also the case for the ICT/digital sector? (p.36: Comment)</p> <p>ICT firms like creative industry firms more generally have their origin in individual creativity and skill (for ICT firms, see Haskel and Westlake 2018: 28; for the creative sector, see Section 8 above). (p.49)</p>	<p>Do digital businesses in Stoke typically employ with similar skills or a wide range of skills?</p> <p>Are products standard or customised?</p>

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
<p>On the other hand, Bakhshi et al. (2013: 17-19) demonstrate that ICT labour plays a special role within the creative industries "when it is deployed in combination with other types of creative labour", "because of the structural changes to the creative industries brought about by digitization, and more generally the impact of ICT". In general, "creative talent has great economic impact when working in tandem with ICT". And the same with intangible assets. (pp.39/40 and Comment)</p> <p>Because the economic functioning of these industries is grounded in the characteristics of their workforce (as detailed above), the responses of the creative industries have been conditioned by their intensive employment of people in creative occupations. (p.40)</p>	<p>Assess the extent to which ICT firms combine their creative labour with the creative labour of (i) suppliers and (ii) customers.</p>
7. Business assets (inputs) (II): the mix of tangible and non-tangible assets (suggested by theoretical analysis)	
	To invest and grow, are your financing needs greater for tangible assets or intangible assets?
8. The ecosystem (I): virtual (i.e. not tied to any particular location) (suggested by theoretical analysis)	
Indeed, a successful platform can provide low-cost infrastructure for digital ecosystems (Choudary et al. 2013): (p.43)	Platforms as low-cost infrastructure for digital ecosystems: To what extent and how do Stoke's digital businesses depend on digital platforms created by larger firms?
9. The ecosystem (II): local (suggested by theoretical analysis)	
An innovation and/or entrepreneurial ecosystem embraces institutions that co-evolve , so that each one co-determines the conditions in which the others develop. Accordingly, businesses are embedded in a dynamic system – i.e. one with multiple connections	An innovation and/or entrepreneurial ecosystem embraces institutions that co-evolve, so that each one co-determines the conditions in which the others develop.

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
<p>and feedback mechanisms – embracing other businesses (suppliers, customers, competitors), knowledge providers and brokers (e.g., universities, consultants, and professional services), the availability of human capital (e.g., schools, colleges and universities), financial institutions (e.g., banks and venture capital), and institutions – both private (e.g., media) and public (e.g., politics and government) – that shape the cultural and political environment (which, in turn, influence public attitudes – e.g., towards immigrants and business – the regulatory environment, business taxation, and the degree of policy support for business). (On the importance of culture and political legitimacy for an intangibles-rich economy, see Haskel and Westlake 2022: 253-60.) From this perspective, the success of an individual business is the outcome not only of its own internal capabilities but also is conditioned by the other businesses and institutions within the ecosystem. (p.45)</p>	<p>To what extent is the success of digital businesses in Stoke dependent on not only on internal capabilities but also on a wider ecosystem, embracing:</p> <ul style="list-style-type: none"> • other businesses (suppliers, customers, competitors); • knowledge providers and brokers (e.g., universities, consultants, and professional services); • the availability of human capital (e.g., schools, colleges, and universities), • financial institutions (e.g., banks and venture capital); and • institutions – both private (e.g., media) and public (e.g., politics and government) – that shape the cultural and political environment and public attitudes? <p>And, in each case, are the elements of this ecosystem local or non-local?</p> <p>Is there such an ecosystem around bet365? If so, to what extent if any is it localised in Stoke? (p.43)</p>
<p>Science Parks providing location-specific tangible assets such as facilities “as well as intangible assets such as networks, know-how, and expert human resources” (pp.45/46)</p>	<p>Do science parks, business villages, incubation units etc. promote digital businesses by way of either location-specific tangible assets and/or intangible assets such as networks, know-how, and expert human resources?</p>
<p>Adequate labour supply depends on schools, colleges, and universities. However, in the case of the ICT sector, perhaps more than any other, the importance of local labour supply may have been reduced by remote working (Haskel and Westlake 2022: 259); indeed, at the extreme, working from home may mean that some ICT firms do not require a local workforce (p.46)</p> <ul style="list-style-type: none"> • Comment: Themes. Importance of education policy/strategy) and the implications of WFH. 	<p>For access to skilled labour, how important are local schools, colleges, and universities?</p> <p>Has the importance of local labour supply been reduced by remote working? And, if so, to what extent?</p>

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
To underpin consistent policy priorities, local authority leaders will most likely need to work to create a business-friendly culture and corresponding political consensus (Haskel and Westlake 2022: 257-58). (p.48)	To underpin consistent policy priorities, what can the local authority do to create a business-friendly culture and corresponding political consensus? For example, via the curriculum in local schools, via traditional and social media, etc.?
10. Access to finance (suggested by theoretical analysis)	
The dependence of small firms on asset-based collateral makes it difficult to finance expansion (because intangible assets are difficult to offer as security for a loan: (i) only are they hard to value but also (ii) they are typically sunk costs, meaning that they are difficult or impossible to liquidate in the event of default) (p.43)	Intangible assets such as cognitive ability cannot be collateralised for bank loans. Do businesses find it difficult to offer asset-based collateral? Does this make it difficult to finance investment? Is this an obstacle to expansion?
11. Open innovation (suggested by theoretical analysis)	
Because intellectual property is hard to protect (Haskel and Westlake 2018: 74-77), "at least some knowledge comes into the firm by no investment at all " (Haskel and Westlake 2018: 53). (p.43)	Acquisition of IP from outside the firm: How important is open innovation? What can be done to promote open innovation? • Especially at local level.
Open innovation allows smaller companies to identify and exploit knowledge "spillovers" and thus more easily achieve unique synergies – by combining ideas and technologies – and correspondingly differentiated products. (p.44)	Sources of knowledge obtained free (or at low cost): How is knowledge gained from open innovation used? Absorptive capacity. Does the current number and mix of employees enable sufficient new ideas to be accessed, be=valuated and exploited?
12. Networks (suggested by theoretical analysis)	

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
Open innovation is promoted by strategically important networks involving other businesses (customers, suppliers, competitors), external knowledge suppliers (consultants and other suppliers of professional services, research organisations, colleges, and universities), and public institutions: (p.44)	Is open innovation promoted by networks involving <ul style="list-style-type: none"> • other businesses (customers, suppliers, competitors), • external knowledge suppliers (consultants and other suppliers of professional services, research organisations, colleges, and universities), and • public institutions?
Correspondingly, SMEs tend to be less involved in formal networks , defined by contractual relationships to prevents network partners from engaging in opportunistic behaviour, and more dependent on informal networks (p.44)	What is the relative importance of formal and informal business networks?
The importance of cooperation within networks for SME innovation generally identified in the research literature ... (p.44) (Radicic et al., 2019 on this - see conclusion).	To investigate (i) the presence of cooperative ties between firms, (ii) the breadth (number) of such ties, (iii) the intensity and (iv) the duration of such ties.
A standard characteristics of innovation networks is geographical proximity (similar to clusters), allowing face-to-face exchange of often tacit knowledge (Haskel and Westlake 2022: 60) (p.45)	For each of the above: The relative importance of geographical proximity, allowing face-to-face contact, and digital communication and networking.
Social capital as an enabler of knowledge transfers and business arrangements. Above all, the key success factor of innovation networks is trust between network partners (p.45)	How important is trust between network partners? Is trust greater in virtual (online) networks or in face-to-face physical networks?
... a theme less explored – to the best of our knowledge – is whether local networks are still important or whether they have been supplanted by – and, if so, to what extent, virtual or online networks? (p.45) <ul style="list-style-type: none"> • And comment: Some text needed here to provide a preliminary assessment of the use of virtual networks by ICT businesses. In the case of Stroke, are there virtual substitutes for the Chamber of Commerce and the Potters' Club? 	For digital businesses, are local networks still important or have they been supplanted by – and, if so, to what extent – virtual or online networks?
13.Infrastructure (suggested by theoretical analysis)	

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
<p>A range of possibilities may also apply to infrastructure. A successful cluster will force up house prices, yet affordable housing matters to the retention of key workers and thus the sustainability of clusters (Haskel and Westlake 2028: 148). Moreover, affordable housing might attract workers to one location who work for ICT firms based in other locations but who are able to work remotely (or at least flexibly). If a location offers in addition to affordable housing affordable workspace, and local planning regulations promote both (Haskel and Westlake 2018: 149), then locally based ICT firms may additionally benefit from an enlarged pool of locally available labour. (p.46) Comment: Themes. Importance of planning policy and local infrastructure. E.g., provision of broadband in Stoke.</p>	<p>How important is affordable housing in attracting digital businesses to locate in Stoke? And why? Attracting employees with the right skills?</p> <p>How important is affordable workspace in attracting digital businesses to locate in Stoke?</p> <p>Conversely, does working from home increase competition from businesses located elsewhere for workers located in Stoke?</p> <p>How important is tangible infrastructure to location in Stoke?</p> <ul style="list-style-type: none"> • Broadband • Transport links • ... Other <p>How important is local planning policy to location in Stoke?</p>
<p>Even in the presence of global connectedness and virtual networks, cities may present additional – and potentially more intense – opportunities for interaction and collaboration (Haskel and Westlake 2018: 79). (p.46)</p> <p>... an important feature of cities intending to promote their ICT ecosystems is to promote the provision of attractive places and convenient transport for people to come together to exchange ideas and find ways to cooperate (Haskel and Westlake, 2018: 149 and 155-56). (p.46)</p>	<p>How important are opportunities for interaction and collaboration for businesses to locate in Stoke?</p> <p>How important are (i) attractive places and (ii) convenient transport for enabling people to come together to exchange ideas and find ways to cooperate in Stoke?</p> <p>How important are opportunities arising from geographic proximity compared to virtual connectedness?</p>
<p>14. Inward investment (suggested by initial data analysis and theoretical considerations)</p>	

Themes from secondary data analysis and theoretical discussion	Research themes/questions/objectives
<p>ICT clusters may be leveraged by attracting large private- and public-sector intangible investments (HW, 2018: 222-23). (p.46)</p>	<p>How can Stoke leverage its digital sector by attracting large private- and public-sector intangible investments?</p> <p>What are the threats and opportunities for local firms potentially arising from large private- and public-sector intangible investments?</p>
<p>Because, in the UK, many of the policy levers for attracting inward investments are in the hands of central government, local authorities may need to promote promising ecosystems by making them “readable” (Haskel and Westlake 2018: 156), particularly when these are emergent and as yet not strongly associated with the location. (p.47) Comment: Theme. May apply to Stoke.</p>	<p>What can local government do to attract inward investment?</p> <ul style="list-style-type: none"> • For example, by making the local ecosystem better known and more “readable”?
<p>Together with inward investment into the local ICT ecosystem, local authorities have a role to play in attracting the interest of financial institutions and human resources. (p.47)</p> <p>Whereas local authorities have some policy levers with which to influence the supply of skilled workers and managerial talent – e.g., planning regulations to shape the provision of attractive housing and workspace, education and training policy – attracting and embedding finance into an ecosystem cannot be quickly achieved (Haskel and Westlake 2018: 87). (p.48)</p>	<p>What can the local authority do to attract human capital? For example,</p> <ul style="list-style-type: none"> • Planning regulations to shape the provision of <ul style="list-style-type: none"> ○ attractive housing (especially for skilled workers and management) and ○ workspace. • Education and training policy and provision, <ul style="list-style-type: none"> ○ including for management. <p>What can the local authority do to embed finance into the local ecosystem? Is there a policy for the short term? Does Stoke have a long-term strategy for attracting the interest of financial institutions, especially venture capital?</p>

Appendix G. Research themes, questions, and objectives (numbered) plus corresponding draft survey and interview questions (grey shaded).

<p>(I) Demographics</p>
<p>1. The nature of the business (i.e., the digital/ICT subsector).</p> <p>(Crucial for exploring heterogeneities within the sector and potentially different policy needs.)</p>
<p>Please chose (i) the LinkedIn category and (ii) the Standard Industrial Classification (SIC) category that best describes your main business activities.</p> <ul style="list-style-type: none"> ○ Provide dropdown lists of LinkedIn and SIC categories/codes. ○ Add "Other" and then a supplementary question: "If other, please specify".
<p>Emergent sector.</p> <p>2. Was the business founded in Stoke or elsewhere in North Staffordshire (i.e., was Stoke/North Staffordshire the first location)?</p> <ul style="list-style-type: none"> • If not, why did it relocate? (For interview.) • Or set up a branch in Stoke? (For interview.) <p>3. Age of businesses in Stoke's digital sector.</p>
<p>Was Stoke the first location for your business? Yes/No/Don't know</p>

If no, was elsewhere in North Staffordshire (i.e., Stoke, Newcastle-under-Lyme and Staffordshire Moorlands) the first location for your business? Yes/No/Don't know

In what year was your business founded? (If unsure, please give your best estimate.)

- Provide dropdown list of years (up to, say, 25+ ?).

4. Turnover?

5. Registered or Unregistered for VAT?

- Or just: above or below the VAT threshold?

Please estimate your enterprise's total turnover for 2019 and 2023?

Turnover is defined as the market sales of goods and services.

2019 2023

£ £

Or would it better to give bands, corresponding to standard size categories (micro, SME, etc.)?

Are 2019 and 2023 the best years? A three-year span might be better, but the pandemic is a complicating factor.

We can calculate whether the business was liable for VAT ourselves.

6. Job creation – quantity: Current number of employees (FT and PT and by gender)

7. Recent growth of employment.

What was your enterprise's total number of employees in 2019 and 2023?

2019 2023

Total number of employees

If unsure, then did your business employment fewer or more people in 2023 than in 2019?

What is the total number of employees in your enterprise expected in five years' time?

Or: Do you expect to employ (i) fewer or (ii) more people in five years' time than now?

For 2023 only, please give your best estimate of:

- The proportion of females?
 - Add ranges: e.g., 0-25%; 26-50%; 51-75%; 76-100%; Don't know
- The proportion of full-time employees?
 - Add ranges: e.g., 0-25%; 26-50%; 51-75%; 76-100%; Don't know

What proportion of your employees are recruited locally?

- Add ranges: e.g., 0-25%; 26-50%; 51-75%; 76-100%; Don't know

Does your firm experience any skills shortages or other recruitment difficulties?

- Yes/No

(Give dropdown menus in each case. Or would ranges be better?)

8. Job creation – quality: Current composition of employment by level of education (e.g., graduate/non-graduate).

What percentage of your employees are graduates?

- Dropdown menu. Or would ranges be better?

9. Job creation – local economic impact: Where do employees live?

Where do you live: (i) in Stoke; (ii) elsewhere in North Staffordshire; (iii) elsewhere?

If applicable:

Where do most of your graduate employees live: (i) in Stoke; (ii) elsewhere in North Staffordshire; (iii) elsewhere in the UK; (iv) abroad?

Where do most of your non-graduate employees live: (i) in Stoke; (ii) elsewhere in North Staffordshire; (iii) elsewhere in the UK; (iv) abroad?

10. Markets: Where does the business sell its products?

What was the estimated share of total sales of your firm in 2023 sold to ...?

	% of sales
North Staffordshire	...
West Midlands	...
Rest of the UK	...
Other European countries	...
Rest of the world	...
	Total 100 %

(II) Firm characteristics suggested by market structure conjectures

11. Monopolistic competition (chronic excess-capacity) (1):

Do the free-lancers, micro-, small, and medium-size firms in Stoke operate at full capacity? Or considerably below capacity?

- To what extent are they constrained by competition?

Capacity utilisation is the relationship between the actual output produced with the given resources and the potential output that could be produced if capacity were to be fully used. Capacity Utilization in the United Kingdom averaged 72.83 percent from 1958 until 2020 ([United](#)

[Kingdom Capacity Utilization \(tradingeconomics.com\)](http://tradingeconomics.com)). The target utilisation rate for professional services organisations is typically 75% ([Utilisation rates and billable work - the key to unlocking growth \(consultancy.uk\)](http://consultancy.uk)). A rate of 85% is considered the optimal rate for most companies (although this benchmark refers to manufacturing more than to services: [Capacity Utilization - Definition, Formula, Example \(corporatefinanceinstitute.com\)](http://corporatefinanceinstitute.com)). Given these guidelines, we could ask:

Would you estimate your capacity utilisation to be: Less than 50%; 50-60%; 60-70%; 70-80%, 80-90%; 90%-100%

Alternatively: Using your existing resource, if customer demand was sufficient could your business: (1) sell more with ease; (2) sell more but only by putting everyone under strain; (3) not sustainably sell more; (4) Don't know; (5) Don't want to answer.

How would you judge the competition in your main market(s)?

1 Very weak; 2 Weak; 3 Moderate; 4 Strong; 5 Very strong

12. Monopolistic competition (normal profit only in the long run) (2):

Do the free-lancers, micro-, small, and medium-size firms in Stoke generate sufficient profit to fund investment and growth from retained earnings?

Does your business finance investment and growth from (i) retained earnings, (ii) borrowing, (iii) both retained earnings and borrowing, or (iv) other sources of finance?

If your business finances investment and growth mainly or entirely from retained earnings, is your profit sufficient for this purpose in most years?

- Yes/No/Don't know

(I do not think that it will be useful to ask directly about profit, as in any particular year it is too malleable, even if we could get reliable responses. Hence, we need indirect ways to get some insight as to whether ICT businesses are earning normal or super-normal profit in most years. We will need to discuss alternative lines of questioning.)

(III) Innovation

Monopolistic competition (imperative to innovate continuously to sustain competitiveness and profitability) (3):

13. How important is innovation for digital sector businesses on Stoke?

- Product
- Process
- Organisational
- Marketing

14. Occasionally or continuously?

15. New to the firm or new to the market?

16. Incremental or radical?

17. To what extent are lifestyle factors (i.e. self-expression, work-life balance) important for location in Stoke?

18. What is the relative importance of business success (financial gain, business growth, etc.) and lifestyle considerations?

Does your business compete mainly on (i) price, (ii) quality, or (iii) both?

Does your business innovate (i) occasionally or (ii) continuously?

(Is this too vague? Does the question need to be more precise?)

Are the most important products of your business towards the standard or customised end of the spectrum?

Are the most important products of your business (i) new to the firm or (ii) new to the market?

Does your firm employ people with very similar/ similar/ different/ very different skills?

What proportion of your employees contribute towards creating the Intellectual Property of your business?

- Give ranges to choose from.

Types of innovation are often categorised as:

- Product (by creating new products or improving the existing ones)
- Process (by improving the way products or services are produced, delivered, or distributed)
- Organisational (by implementing a new organizational structure, management systems, or business models).
- Marketing (by developing new marketing strategies or usage of new channels of communication and engaging with customers)
- Exporting

The following two questions are from the GPrix (project on traditional manufacturing SMEs) questionnaire. Should we add exporting?

How important are the following innovation capabilities for your firm's survival and performance?

	Of no importance	Slightly important	Important	Highly important	Essential
Product innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketing innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisational innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify

How would you judge your firm's innovation capabilities within your industry in the past and now, regarding?

In the past (2019)	Lagging	Average	Above average	Leading
Product innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketing innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisational innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify

Now (2023)	Lagging	Average	Above average	Leading
Product innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Process innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketing innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Organisational innovation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other, please specify

Five years ago, did you devote ...?

Fewer resources to innovation	About the same resources to innovation	More resources to innovation
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The two questions above are from the GPrix Survey. As well as being informative, they were designed to provide subsequent econometric analysis with “quasi fixed effects” – i.e. firm-specific controls to capture otherwise unobservable attitudes of owners and managers towards innovation, assuming that these would be manifested in differential resource priorities between firms (see Radicic et al., 2015).

We should think of potential econometric lines of enquiry and the implications of these for the corresponding variables we need to generate.

What proportion of your current sales by value comes from new or substantially improved products or processes introduced since 2019? (Maybe “in the past year” would be better?)

0%	1-5%	6-10%	11-15%	16-25%	26-50%	>50%
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> This question replicates a question from a previous project on traditional manufacturing SMEs. For creative/ICT firms the following ranges might be better: 0-10%, 11-25%, 26-50%, 51-75%, 76-90%, more than 90% <p>To what extent are lifestyle factors (i.e. self-expression, work-life balance, etc.) important for location in Stoke?</p> <ul style="list-style-type: none"> 5-point Likert scale: Very important ... Not at all important plus "Don't know" and "Don't want to answer". 						
<p>(IV) Business models and business support</p>						
<p>Larger firms also make room for SMEs by influencing their business models.</p> <p>19. What is the firm's business model: (i) to stay at the present scale as an independent firm; (ii) to scale up as an independent firm; (iii) to sell out to a larger company?</p>						
<p>According to your business model, do you intend (i) to stay at the present scale as an independent firm; (ii) to scale up as an independent firm; (iii) to sell out to a larger company; (iv) Don't know; (v) Don't want to say?</p> <ul style="list-style-type: none"> Rephrase? Add other options? 						
<p>20. Do Stoke's digital freelancers work for large firms located elsewhere?</p> <p>21. Do Stoke's digital businesses employ freelancers on a project or otherwise temporary basis?</p> <p>(More on freelancers?)</p>						
Does your firm employ freelancers for temporary periods?				Yes/No/Don't know		

If yes, are these freelancers usually based locally?

Yes/No/Don't know

22. To investigate the use of government business support measures in the ICT sector.

Did your enterprise during the five years 2019 to 2023 receive any public support for your business activities?

Public innovation support measures include any support that is wholly or partly financed by government at any level(s). Examples include research and development (R&D) support (e.g. via tax credits or subsidies/grants), support via information, knowledge transfer and/or expert advice (e.g. via Innovation Vouchers, Knowledge Transfer Partnerships, Designing Demand, Proof of Concept, Innovation Networks and other such programmes), and training and advice to enter new export markets (e.g. Passport to Export and other such programmes).

Yes ☐

No ☐

(Modified from the GPrix survey.)

If you know, please tick the source(s) of this funding?

Local authorities (including the Local Enterprise Partnership)	<input type="checkbox"/>
Central government (including central government agencies or ministries)	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

Would you have undertaken the same or similar business activities without this public support?

Yes – and as quickly	<input type="checkbox"/>
Yes – but more slowly and less effectively	<input type="checkbox"/>
No – not at all	<input type="checkbox"/>

(Modified from the GPrix survey.)

23. What is the appropriate scale of local authority to deliver policy support for the digital sector?

In your opinion, what is the appropriate scale of government authority to deliver policy support for businesses in the digital sector?

- Provide options: National Government; Existing local authority (City Council); Combined authority (e.g. Stoke/Newcastle/Staffordshire Moorlands); Other.
- If "Other", please specify.

(V) **bet365 effect:** Maybe leave this to interview, as we have only a few guidelines for enquiry. This would leave just the one closed question on bet365, under RO/RQ 31 (under the Ecosystem section).

(VI) **Business assets (inputs) (I): People**

24. To assess the extent to which ICT businesses in Stoke depend on (i) the individual creativity of their employees and (ii) the IP that they create or exploit.

25. Is this in line with the broader "creative sector"?

26. Intensity of links with the broader creative sector.

(Definition of "creative sector".)

Research objectives/questions 24 and 25 have corresponding closed questions in the Innovation Section (above). Hence the following question is designed to operationalised Q.26.

Maybe better to explore by an open question at interview. With a closed question, it would be easier to get at the links between ICT businesses and other creative sector businesses with a question such as the following.

What proportion of your customers are in the creative sector?

- Provide respondents with a printed list to explain what we mean by the "creative sector"; the industries comprising the creative sector as defined by the UK's DCMS are: (i) Advertising and marketing; (ii) Architecture; (iii) Crafts potteries (NB. The DCMS and NESTA uses Jewellery as a proxy for the craft sector; in Stoke it make more sense to use craft pottery); (iv) Design (product, graphic and fashion design); (v) Film, TV, video, radio and photography; (vi) IT, software and computer services; (vii) Publishing; (viii) Museums, galleries and libraries; and (ix) Music, performing and visual arts.

What proportion of your customers are in the manufacturing sector?

What proportion of your customers are in the retail sector?

If respondents have difficulties estimating exact proportions, then ask for responses in ranges: e.g.,

0-20%, 21-40%, 41-60%, 61-80%, 81-100%, don't know.

(VII) Business assets (inputs) (II): the mix of tangible and non-tangible assets

27. To invest and grow, are your financing needs greater for tangible assets or intangible assets?

(Give examples of tangible and intangible assets.)

To invest and grow, are your financing needs greater for tangible assets or for intangible assets?

(VIII) The ecosystem (I): virtual (i.e. not tied to any particular location)

Platforms as low-cost infrastructure for digital ecosystems:

28. To what extent and how do Stoke's digital businesses depend on digital platforms created by larger firms?

To what extent does your business depend on digital platforms created by larger firms?

- Likert scale: e.g., Not at all; A little; Somewhat; A lot; Completely; "Don't know"; "Don't want to say".
- "How" can be left for interview.

(IX) The ecosystem (II): local

An innovation and/or entrepreneurial ecosystem embraces institutions that co-evolve, so that each one co-determines the conditions in which the others develop. We can think of a continuum from a well-integrated ecosystem, with local and/or non-local businesses and institutions each creating favourable conditions for the evolution of all the others, to – at the other extreme – a collection of unrelated firms and institutions (as might exist in an export enclave).

29. To what extent is the success of digital businesses in Stoke dependent not only on internal capabilities but also on a wider ecosystem, embracing:

- other businesses (suppliers, customers, competitors);
- knowledge providers and brokers (e.g., universities, consultants, and professional services);

- the availability of human capital (e.g., schools, colleges, and universities),
- financial institutions (e.g., banks and venture capital); and
- institutions – both private (e.g., media) and public (e.g., politics and government) – that shape the cultural and political environment and public attitudes?

30. And, in each case, are the elements of this ecosystem local (i.e., North Staffordshire) or non-local (i.e., elsewhere in the region, country or world)?

31. Is there such an ecosystem around bet365? If so, to what extent if any is it localised in Stoke?

An innovation and/or entrepreneurial **ecosystem** embraces businesses and other institutions (both private such as finance and public such as education) that co-evolve, so that each one co-determines the conditions in which the others develop. Parts of an ecosystem may be **local** (i.e., North Staffordshire) or **non-local** (i.e., elsewhere in the region, country, or world).

To what extent is the success of your businesses in Stoke dependent not only on your own internal capabilities but also on a wider ecosystem, embracing:

- Other businesses
 - Suppliers
 - Local
 - Likert scale: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say
 - Non-local
 - Customers
 - Local

- Non-local
- Competitors
 - Local
 - Non-local
- Other firms (i.e., not suppliers, customers, or competitors)
 - Local
 - Non-local
- Knowledge providers and brokers
 - Universities
 - Local
 - Non-local
 - Consultants
 - Local
 - Non-local
 - Professional services
 - Local
 - Non-local
- The availability of employees with the right skills (human capital)
 - Schools
 - Local
 - Non-local

- Colleges
 - Local
 - Non-local
- Universities
 - Local
 - Non-local
- Financial institutions
- Banks
 - Local
 - Non-local
- Venture capital
 - Local
 - Non-local
- Other institutions – both private (e.g., media) and public (e.g., politics and government) – that shape the cultural and political environment and public attitudes.
 - Government
 - Local
 - Non-local
 - Private
 - Traditional media: Press, TV, and Radio
 - Social media

Do we need to provide more options?

Or ask an open question:

Are there other institutions important for your business? Yes/No

If yes, please specify:

If so, should we add this option for each category or just once?

Insofar as businesses benefit from a local digital ecosystem, how significant is the role of bet365?

- Likert scale: Completely unimportant; Unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say

32. Do science parks, business villages, incubation units etc. promote digital businesses by way of either location-specific tangible assets and/or intangible assets such as networks, know-how, and expert human resources?

Is your business located in a science park, business village, incubation unit, etc.?

- Yes/No

If yes, does co-location with other businesses bring benefits to your business by way of

- location-specific tangible assets
- intangible assets such as
 - networks
 - know-how
 - expert human resources?

Likert scales in each case: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say
33. For access to skilled labour, how important are local schools, colleges, and universities? 34. Has the importance of local labour supply been reduced by remote working? 35. And, if so, to what extent?
For access to skilled labour, how important are local <ul style="list-style-type: none">• schools,• colleges, and• universities? Likert scales in each case: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say Has the importance of local labour supply been reduced by remote working (working from home)? <ul style="list-style-type: none">• Likert scale: Not at all; A little; Somewhat; A lot; Completely or almost completely; Don't know; Don't want to say
36. To assess the Normative/cultural dimension of the local entrepreneurial ecosystem
Do you feel that the attitudes of local people are supportive of small businesses and entrepreneurship?

(X) Access to finance

Intangible assets such as cognitive ability typically cannot be collateralized for bank loans.

37. Do businesses find it difficult to offer asset-based collateral? Does this make it difficult to finance investment?

38. Is this an obstacle to expansion?

If your business finances investment mainly or entirely by borrowing, are you able to borrow as much as you need for this purpose?

If your answer is No, is this because (i) loans are not available at any price, (ii) loans are available but at too high a price, (iii) your business cannot offer asset-based collateral, or (iv) some other reason?

If "Some other reason", please specify

Is your business' ability to borrow an obstacle to expansion?

- Likert scale: Not at all; A little; Somewhat; A lot; Completely or almost completely; Don't know; Don't want to say

(XI) Open innovation

Acquisition of IP from outside the firm.

39. How important is open innovation?

40. Is open innovation promoted by networks involving

- other businesses (customers, suppliers, competitors),
- external knowledge suppliers (consultants and other suppliers of professional services, research organisations, colleges, and universities), and
- public institutions?

Is overlap with the ecosystem questions a problem? Or a way of extending previous information (and internal validity check)?

What are your main sources of information/knowledge/know-how for business development (including innovation)?

Internal – e.g. from R&D; colleagues' ideas

- Likert scale (and in each case below):
Extremely important; Somewhat important; A little important; Unimportant; Not at all important; Don't know; Don't want to say.

External sources of information

Hiring new talent

- Local: Likert Scale
- Non-local: Likert scale

Channels for acquiring information and knowledge (I): Formal

- Other firms, through the supply chain

- Customers
- Suppliers
- Competitors
- Cooperating with other firms (i.e., beyond routine supply-chain relationships)
- Business networks: e.g., Chamber of Commerce; trade associations, etc.
- Online media and networks
- Consultancies
- Universities and colleges

Channels for acquiring information and knowledge (II): Informal: direct, personal contact (either face-to-face or online)

- In person (face-to-face) networking
 - local
 - national
 - international
- Social/personal:
 - friends
 - business acquaintances

For your business, what is the relative importance of internal and external sources of information/knowledge/know-how for business development (including innovation)?

- Internal more important than external; Internal and external about the same; External more important than internal; Don't know; Don't want to say

Sources of knowledge obtained free (or at low cost):

41. Absorptive capacity. Does the current number and mix of employees enable sufficient new ideas to be accessed, evaluated and exploited?

Does the current number and mix of your employees enable sufficient new ideas to be accessed, evaluated, and commercially exploited?

- Yes; No; Don't know; Don't want to say

(XII) **Networks**

42. What is the relative importance of formal and informal business networks?

- Give examples of each.

43. For each of the above: The relative importance of geographical proximity, allowing face-to-face contact, and digital communication and networking.

Formal networks: Ask for responses in ranges: e.g., 0-20%, 21-40%, 41-60%, 61-80%, 81-100%, don't know

What proportion of your business links are with customers?

- What proportion of your customers are local?
- What proportion of your customers are regional or national?
- What proportion of your business links with customers are overseas?

What proportion of your business links are with suppliers?

- What proportion of your suppliers are local?
- What proportion of your suppliers are regional or national?
- What proportion of your suppliers are overseas?

What proportion of your business links are with competitors?

- What proportion of your competitors are local?
- What proportion of your competitors are regional or national?
- What proportion of your competitors are overseas?

What proportion of your business links are with businesses that are not customers, suppliers, or direct competitors?

- Local?
- Regional or national?
- Overseas?

Approximately how many other businesses are there in your network? (Where your network includes all those businesses – whether customers, suppliers, competitors, or other businesses – that are important connections or links for your business)?

Is there an established formal **local** network (e.g., business association) for your type of business/organization?

- Yes/No/Don't know

If Yes, please specify (one or more):

Does your business/organization belong to such a **local** business network?

- Yes/No

If Yes, please specify (one or more):

To what extent does this **local** network help to improve your business?

- Likert scale: Not at all; A little; Somewhat; A great deal; Don't know' Don't want to say

Is there an established formal **non-local** network (e.g., business association) for your type of business/organization?

- Yes/No/Don't know

If Yes, please specify (one or more):

Does your business/organization belong to such a **non-local** business network?

- Yes/No/Don't know

If Yes, please specify (one or more):

To what extent does this non-**local** network help to improve your business?

- Likert scale: Not at all; A little; Somewhat; A great deal; Don't know; Don't want to say

Informal networks

In addition to formal business networks, do you have social contacts who add value to your business?

- Yes/No/Don't know/Don't want to say

If your answer is Yes:

- What proportion are family and close friends?
 - More than half / Less than half (or a more differentiated scale?)
 - Of these, what proportion are local?
 - More than half / Less than half (or a more differentiated scale?)
- What proportion are colleagues and acquaintances?
 - More than half / Less than half (or a more differentiated scale?)

- Of these, what proportion are local?
 - More than half / Less than half (or a more differentiated scale?)

To what extent does your **local** informal network help to improve your business?

- Likert scale: Not at all; A little; Somewhat; A great deal; Don't know; Don't want to say

To what extent does your **non-local** informal network help to improve your business?

- Likert scale: Not at all; A little; Somewhat; A great deal; Don't know; Don't want to say

For your business, what is the relative importance of formal and informal networks for business development (including innovation)?

- Formal more important than informal; Formal and Informal about the same; Informal more important than formal; Don't know; Don't want to say

44. To investigate (i) the presence of cooperative ties between firms, (ii) the breadth (number) of such ties, (iii) the intensity and (iv) the duration of such ties.

In the past five years, did your enterprise co-operate with other enterprises or institutions?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

If yes, please indicate the types of co-operation partner(s) with whom you have collaborated.

Other enterprises within your enterprise group	<input type="checkbox"/>
Suppliers of equipment, materials, components, or software	<input type="checkbox"/>
Clients or customers	<input type="checkbox"/>
Competitors or other enterprises in your sector	<input type="checkbox"/>
Consultants, commercial labs, or private R&D institutes	<input type="checkbox"/>

	Universities or other higher education institutions		<input type="checkbox"/>	
	Colleges		<input type="checkbox"/>	
	Government research institutes		<input type="checkbox"/>	
	Public sector research institutes		<input type="checkbox"/>	
	Other, please specify		

Was the purpose of your cooperation typically to bring about innovation of any kind?

- Yes/ No Don't know

Of these types of cooperation, which one are you least/most likely to develop in future?

	Least	Most
Other enterprises within your enterprise group	<input type="checkbox"/>	<input type="checkbox"/>
Suppliers of equipment, materials, components, or software	<input type="checkbox"/>	<input type="checkbox"/>
Clients or customers	<input type="checkbox"/>	<input type="checkbox"/>
Competitors or other enterprises in your sector	<input type="checkbox"/>	<input type="checkbox"/>
Consultants, commercial labs, or private R&D institutes	<input type="checkbox"/>	<input type="checkbox"/>
Universities or other higher education institutions	<input type="checkbox"/>	<input type="checkbox"/>
Colleges	<input type="checkbox"/>	<input type="checkbox"/>
Government research institutes	<input type="checkbox"/>	<input type="checkbox"/>
Public sector research institutes	<input type="checkbox"/>	<input type="checkbox"/>

Other, please specify	
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(This question attempts to get at the intensity or relative importance of types of cooperation. Any suggestions for a better form of question?)

Questions adapted from the GPrix questionnaire.

45. How important is trust between network partners?

46. Is trust greater in virtual (online) networks or in face-to-face physical networks?

How important is trust between cooperating partners?

- Likert scale: Not important; A little important; Somewhat important; Very important; Of crucial importance; Don't know

Is trust greater in virtual (online) networks or in face-to-face physical networks?

- Yes/No/Don't know

47. For digital businesses, are local networks still important or have they been supplanted by – and, if so, to what extent – virtual or online networks?

For your business, are local networks (i) more or (ii) less important than virtual or online networks?

(XIII) Infrastructure

48. How important is affordable housing in attracting digital businesses to locate in Stoke?

- And why? Attracting employees with the right skills?

49. How important is affordable workspace in attracting digital businesses to locate in Stoke?

50. Conversely, does working from home increase competition from businesses located elsewhere for workers located in Stoke?

51. How important is tangible infrastructure to location in Stoke?

- Broadband
- Transport links
- ... Other

52. How important is local planning policy to location in Stoke?

How important is affordable housing for locating your business in Stoke or North Staffordshire?

How important is affordable housing in Stoke or North Staffordshire for attracting employees with the right skills?

- Likert scale: e.g., Completely unimportant; Fairly unimportant; Neither important nor unimportant; Important; Very Important; Don't know; Don't want to say
- Do we need "Don't want to say" in this case?

How important is affordable workspace for locating your business in Stoke or North Staffordshire?

- Likert scale: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say
- Do we need "Don't want to say" in this case?

Does working from home increase competition from businesses located elsewhere for skilled labour?

- Likert scale: Not at all; A little; Somewhat; A lot; Don't know; Don't want to say

How important is tangible infrastructure to location in Stoke?

- Broadband
 - Likert scale: Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say
- Transport links
 - Likert scale: Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say

... Other

Do we need to provide a longer list of options?

How important is local planning policy for locating in Stoke or North Staffordshire?

- Likert scale: e.g., Severely negative; Negative; Neither negative nor positive; positive; Very positive; Don't know; Don't want to say

53. How important are opportunities for interaction and collaboration for businesses to locate in Stoke?

54. How important are (i) attractive places and (ii) convenient transport for enabling people to come together to exchange ideas and find ways to cooperate in Stoke?

55. How important are opportunities arising from geographic proximity compared to virtual connectedness?

How important are opportunities for interaction and collaboration for location in Stoke?

- Likert scale: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say

How important are (i) attractive places and (ii) convenient transport for enabling people to come together to exchange ideas and find ways to cooperate in Stoke?

- Attractive places
 - Likert scale: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say
- Convenient transport
 - Likert scale: e.g., Completely unimportant; Fairly unimportant; Neither important not unimportant; Important; Very Important; Don't know; Don't want to say

How important are business opportunities arising from geographic proximity compared to virtual connectedness?

- Geographic proximity **less** important than virtual connectedness; Geographic proximity and virtual connectedness **about the same** importance; Geographic proximity **more** important than virtual connectedness; Don't know; Don't want to say

(XIV) **Inward investment:** open questions for policy makers as well as for businesses; probably best left to interviews.

(XV) **Productivity** – level, growth and dispersion. Because productivity is not a usual business metric – although, for this reason, particularly useful for economic analysis – our main evidence base will be the secondary data analysis reported in Section 5.1 of the present document. Nonetheless, the following questions may be revealing with respect to productivity dispersion.

- How would you judge your firm's AI capability in relation to the norm for your industry: "Leading"; "Lagging"; "About average"
- This question will be asked for (i) five years ago and (ii) now.