

TECH NATION



POWERING THE
DIGITAL ECONOMY

2015



TECH
CITY



THE RT. HON. DAVID CAMERON MP
PRIME MINISTER

Backing the industries of the future is a key part of our long-term economic plan to support business, create more jobs and build a more resilient economy. The digital economy has become an integral part of our country and the rapid growth of many digital businesses has confirmed Britain's position as a global hub of technology excellence.

Through Tech City UK, this Government has supported digital entrepreneurs in London, creating one of the capital's great success stories. We also committed to supporting the growth of our digital industry nationwide and Tech Nation shows the great innovation and thriving entrepreneurial spirit that is driving the sector forward across the country.

Over 1.46 million jobs and flourishing digital businesses up and down the country is a huge national achievement. The Government will do all it can to ensure digital growth for years to come.

FOREWORD



BARONESS JOANNA SHIELDS
CHAIR, TECH CITY UK

In 2013, we created the Tech City UK Cluster Alliance to engage digital businesses across the country. We brought together leading figures from thriving digital clusters with the specific purpose of using their collective expertise to accelerate digital growth.

It became clear that great digital companies spring from collaborative communities of entrepreneurs, supported by established businesses, universities and Government all working toward common goals. This report showcases 21 digital clusters across the UK where talent and great ideas have come together to fuel innovation and success.

For the digital landscape is far greater than the capital alone – 74% of the digital businesses we analysed are actually based outside Inner London. Our aim is to bring these success stories to life and show how digital clusters are working together to create a 'Tech Nation'.

What does this mean for the UK? The digital sector is growing and creating jobs, economic growth and national prestige. The UK has the fastest growing economy in the G7 and the digital industry is at the heart of our growth story.

The insights provided in this report are vital to inform policy making and ensure digital entrepreneurs, investors and policy makers work in partnership to make the UK the world leader in digital innovation.



GERARD GRECH
CEO, TECH CITY UK

Welcome to the first Tech Nation report, a journey through the UK's digital clusters.

From East London's Tech City up to Edinburgh and beyond, digital businesses increasingly choose to work near each other, creating dynamic tech clusters up and down the country.

Each cluster has its own unique DNA and assets. Every digital company is on its own trajectory. But nearly everyone we spoke to during the Tech Nation project said they work best when they're near other like-minded businesses: sharing resources, ideas and expertise.

The UK's digital economy is thriving. Venture capital investment in London's tech companies alone is 20 times what it was five years ago. Cities as diverse as Cardiff and Newcastle now boast growing digital tech economies. Now is the right time to shine the spotlight on this exciting network of digital clusters, and map out the prospects for professionals and investors.

I would like to thank our research partners, DueDil, MTM, Crunchbase, CareerBuilder, AngelList, f6s, Adzuna and all 2000+ digital companies that participated in the research.

Tech City has become one of the UK's greatest success stories. Now it's time for Tech Nation.

ABOUT US

We started life in 2010, with a mission to support the emerging Silicon Roundabout digital cluster in East London. Anchored in Shoreditch, we've grown into an organisation that accelerates the growth of digital businesses at all stages of their development, in London and cities across the UK. Examples of our programmes include Future Fifty, Digital Business Academy, the Internet of Things Launchpad, Tech Nation and HQUK.

A publicly funded organisation with a private sector mentality, we advocate for the digital entrepreneur. We inform policy-makers on how to foster the right conditions to start, grow and scale a digital business in the UK. We aim to make life better for digital entrepreneurs.

We work in collaboration with various community partners across all our projects and it is in this spirit we have created Tech Nation.

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 @TechCityUK

CORE PROJECT PARTNERS



ACKNOWLEDGMENTS

We'd like to extend our gratitude to the 2000+ companies who completed our survey. Thanks to our partners for their research assistance: Richard Ellis and James Key at MTM; Damian Kimmelman, Ahmed Medhat, Namman Tammuz at DueDil; Andy Chung at AngelList; Mark Lennon at Crunchbase; Andrew Hunter and Doug Monro at Adzuna; Sanja Licina and Stephen Klesel at CareerBuilder; and Sean Kane at f6s. Thanks to Daniel Korski and Chris Hopkins at No.10 Downing Street; Andrea Young, Department for Business, Innovation and Skills; Boris Johnson, the Mayor of London, and The Hon. Ed Vaizey, MP, HM Minister for Culture, Communications and Creative Industries, for their support for the Tech Nation project. Also thanks to those who helped promote the survey and provided additional oversight and content for the report: the Tech City UK Cluster Alliance, Louile Clarke, Fiona Lettice, John Fagan, Huw Sawyer, Emile

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TECH CITY UK CLUSTER ALLIANCE PARTNERS



INTRODUCTION

DIGITAL CLUSTERS
ARE ECONOMIC PHENOMENA
THAT OCCUR WHEN A
CRITICAL MASS OF DIGITAL
COMPANIES FORM IN A
SPECIFIC REGION

Digital technology companies* are pivotal to the UK economy. The diverse digital industries that make up our nationwide technological DNA have grown over the past five years, despite a challenging economic climate. They are disrupting traditional industries, forging new innovative sectors and creating new ways of doing business. These developments are now inextricably bound to our national economic story and global competitiveness, interwoven so closely that we can no longer view sectors and industries in strict isolation.

Tech Nation is the first community-driven report of this scale in the UK. It has three broad objectives:

- To understand the geographical spread, and nature, of the UK's digital industry
- To assess the technology capabilities, sector expertise and benefits of each of the UK's digital technology clusters
- To inform policy, investment, and collaboration efforts

No project can claim to offer definitive, complete coverage of the above. The digital economy is, quite simply, evolving too rapidly. Indeed we came across a number of challenges, from the complex to the very basic, such as defining a digital technology company (see Methodology on page 80 for more information) to analysing Government data. Our aim is to be

data-driven and complement existing research in this space (e.g. BVCA's Tech Country, Silicon Cities by Policy Exchange, Tech Britain and various reports by Nesta) to help inform future debate and policy implementation across the UK.

Tech Nation seeks to decipher the UK's digital DNA using the following methods:

- Quantitative and innovative Big Data techniques (with DueDil, Crunchbase, AngelList, f6s, Adzuna and CareerBuilder)
- Survey of 2,000+ digital businesses from across the UK
- One-to-one interviews with 40+ representatives from across the UK's tech community

There are many smaller communities operating across the country, which are not included in this report. We have highlighted clusters based on their size and the response from the community during our research; our aim is that more clusters will participate in future iterated versions.

Clusters develop organically and are entrepreneur-led. But the evidence we present here shows that support from local and national stakeholders can accelerate the growth of technology clusters. If more established clusters generate their own momentum, smaller clusters need to be nurtured with tailored growth strategies.

Tech Nation provides the level of insight into the individual clusters, their strengths, and the opportunities for growth to make this a reality.

With 74% of digital companies based outside of London, Tech Nation uncovers a national success story; from the highest concentrations in London and the Southeast, to the fast growing cities of Leeds, Cardiff and Manchester. Tech Nation looks at established clusters such as Bristol & Bath, Cambridge and Edinburgh, and emerging clusters like Bournemouth and Liverpool. The report reveals:

- The UK's digital technology industry is diverse in sector and capability
- Digital technology companies are thriving right across the nation
- The digital sector is growing in terms of revenue, number of companies and employment

This is the beginning of an evolving project, which we hope to improve through continued collaboration with the digital business community across the UK. The aim is to make it a live data project in perpetual beta form.

Welcome to Tech Nation!

Best regards,
Tech City UK team

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*Referred to as digital company in this report for brevity

IN NUMBERS

THE UK'S DIGITAL TECHNOLOGY INDUSTRY

GREATEST VOLUME OF DIGITAL EMPLOYMENT CAN BE FOUND IN:⁶

- 251,590 INNER LONDON
- 61,653 BRISTOL & BATH
- 56,145 GREATER MANCHESTER
- 54,527 READING (AND BERKSHIRE)
- 44,951 LEEDS AREA

1.46M

PEOPLE EMPLOYED IN DIGITAL COMPANIES³



45K

CURRENT NUMBER OF DIGITAL JOBS BEING ADVERTISED IN THE UK⁴

62%

OF THOSE WERE OUTSIDE INNER LONDON⁴

over one million

DIGITAL TECHNOLOGY JOBS WERE ADVERTISED IN 2014 (+28% year on year)⁴



DIGITAL EMPLOYMENT GROWTH FORECAST

5.4%

BY 2020 (higher than total job growth)³



CLUSTER BENEFITS



77%

of companies responding to our survey report they have a **network of entrepreneurs** with whom they can share experiences and ideas¹



54%

claim that their cluster helps to **build regional reputation** and attract talent¹



40%

believe that their cluster helps them to secure access to appropriate and **affordable property** (e.g. co-working spaces, science parks)¹



33%

believe that their cluster helps **attract inward investment** from private and public bodies¹

DISTRIBUTION OF DIGITAL COMPANIES ACROSS THE UK

www.duedil.com/technation/2015

47,200

DIGITAL COMPANIES ANALYSED²

15%

OF TOTAL UK COMPANIES FORMED IN 2013-2014 WERE DIGITAL COMPANIES²

50%

FORMED SINCE 2008²

51%

ARE WITHIN THE 21 CLUSTERS²

98%

ARE SMALL BUSINESSES²

74%

ARE BASED OUTSIDE LONDON²

65%

CLAIM TO BE PART OF A CLUSTER¹

90%

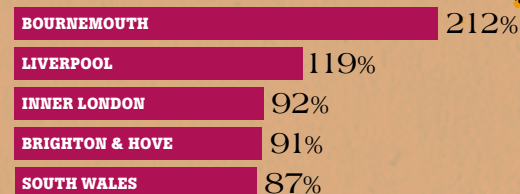
EXPECT REVENUE TO GROW NEXT YEAR¹

HIGH DENSITY CLUSTERS

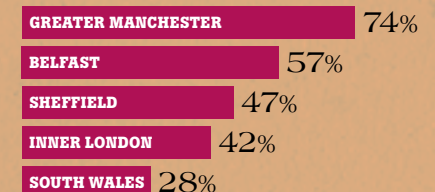
Concentration of digital companies compared to national average⁷



TOP 5 FASTEST GROWING CLUSTERS⁵



TOP 5 CLUSTERS BY AVERAGE COMPANY TURNOVER⁵



¹ Tech Nation survey conducted by MTM (September 2014)

² www.duedil.com/technation/2015 (January 2015)

³ Career Builder employment data (2013)

⁴ Adzuna (January 2015)

⁵ Based on growth of new companies formed since 2010

www.duedil.com/technation/2014

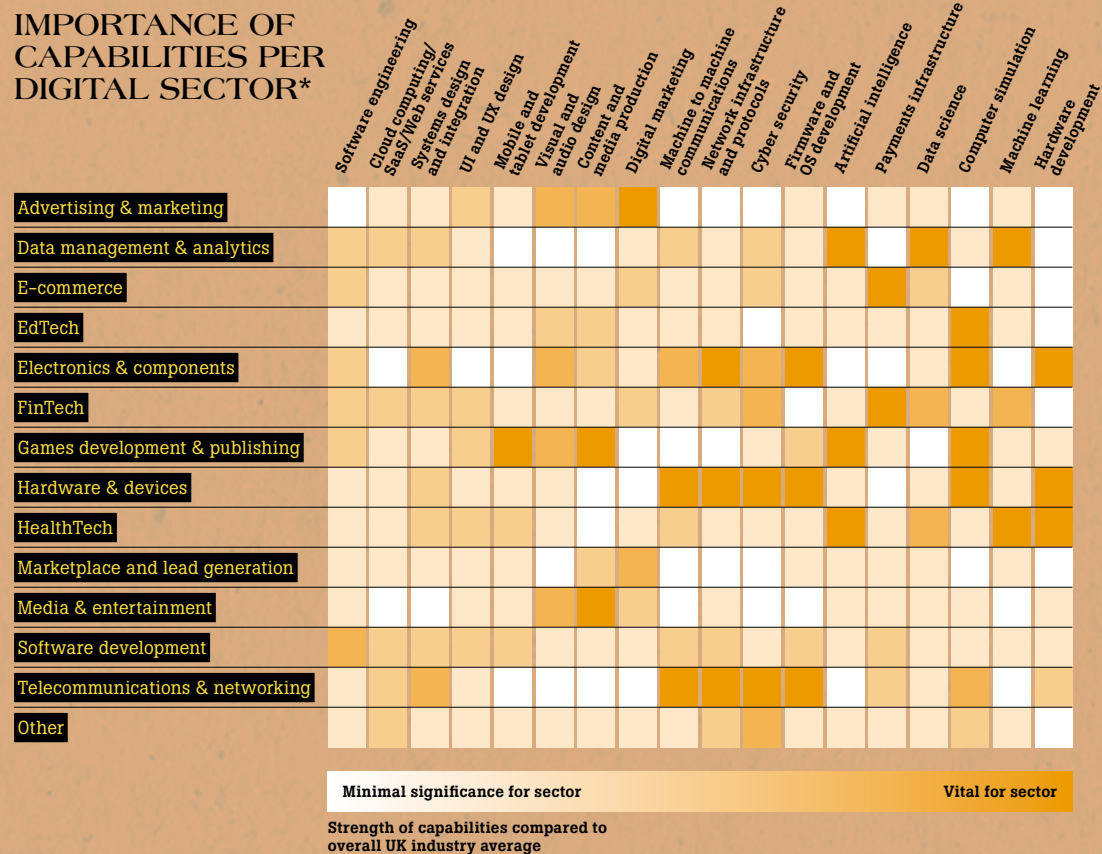
⁶ Out of 21 clusters analysed, Career Builder employment data (2013)

⁷ Concentration: digital companies as a % of total business population, www.duedil.com/technation/2015 (January 2015)

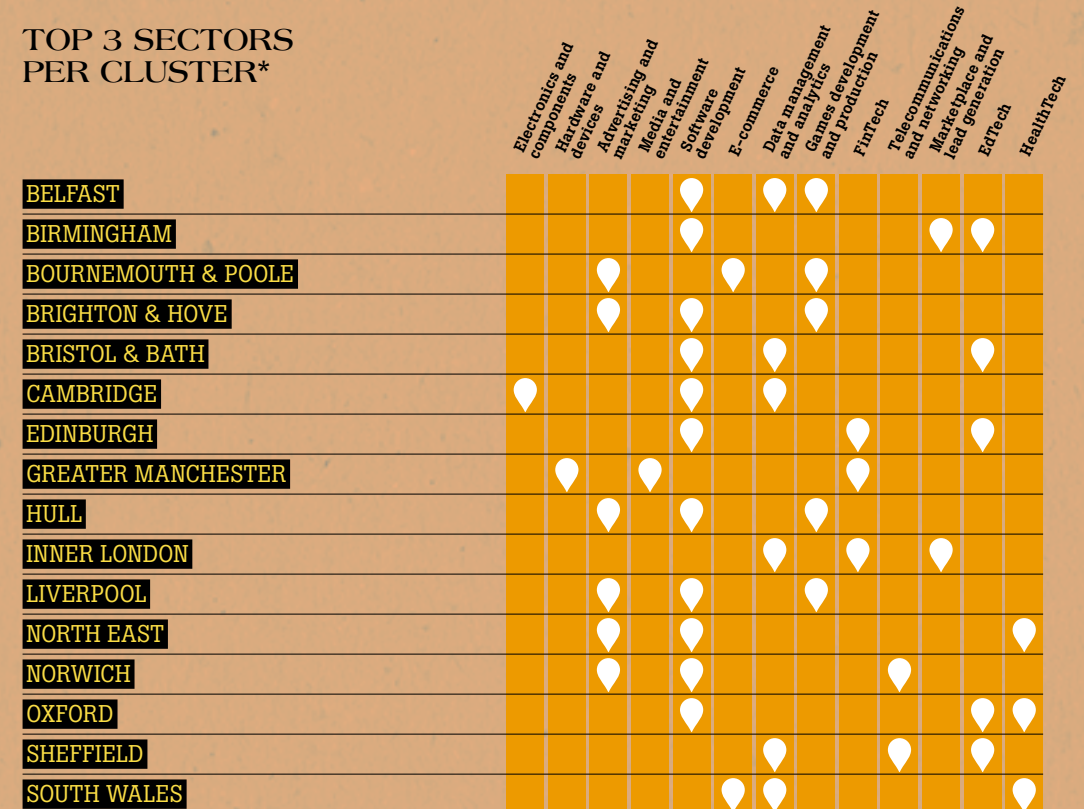
CLUSTER AND SECTOR SUMMARIES



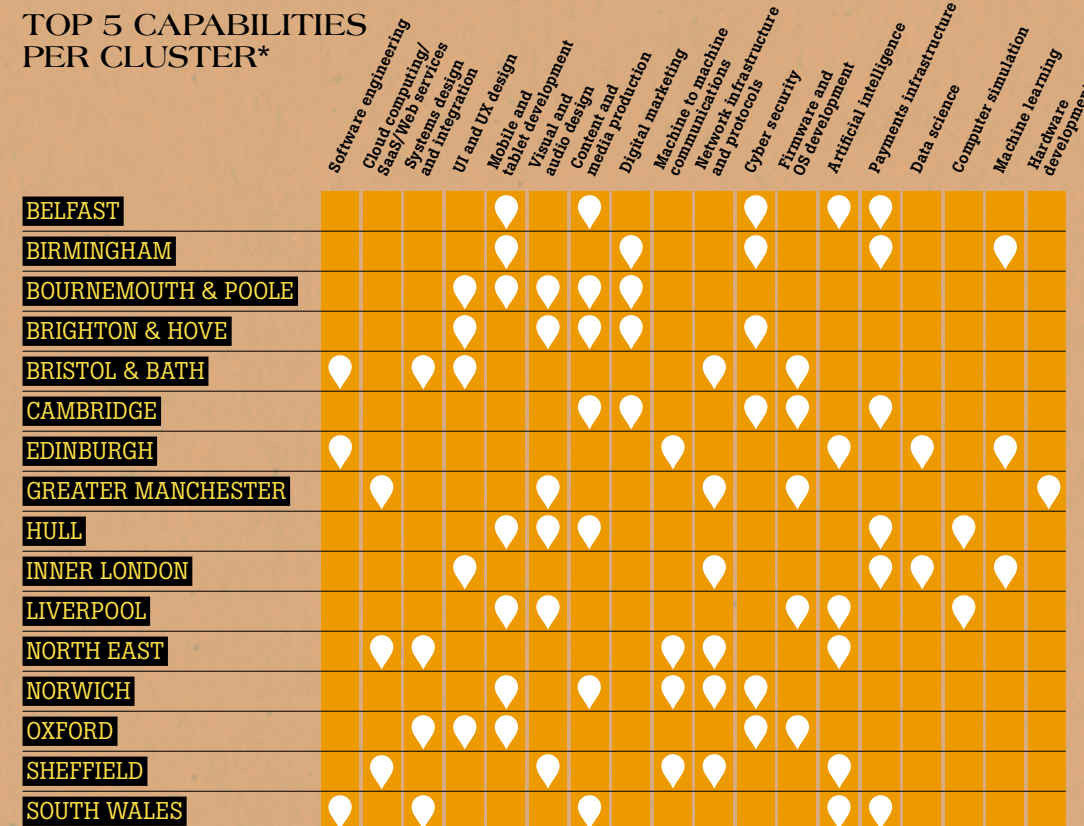
IMPORTANCE OF CAPABILITIES PER DIGITAL SECTOR*



TOP 3 SECTORS PER CLUSTER*



TOP 5 CAPABILITIES PER CLUSTER*



*Compared to UK average, Tech Nation Survey conducted by MTM (September 2014)

KEY FINDINGS



SUMMARY POINTS

Tech Nation uncovered a number of key findings regarding tech capabilities across the UK:

- 1 The UK's digital ecosystem is thriving
- 2 There are vibrant digital technology clusters across the UK, diversifying in expertise
- 3 Digital companies are growing in number and size
- 4 Digital is disrupting traditional industries and forming new 'born digital' sectors
- 5 A number of core capabilities are driving the UK's digital sector
- 6 Clusters provide tangible benefits to their members
- 7 Access to talent and broadband are key factors when choosing location
- 8 The focus on certain capabilities by local education institutions has led to sector specialism in certain clusters

The UK's digital ecosystem is thriving

We have one of the world's strongest digital economies, known globally for a number of specialisms, from artificial intelligence to video games development.

This report includes an analysis of approximately 47,200 digital companies. This figure is a subset of digital companies across the UK (the dataset is featured in our online interactive guide www.duedil.com/technation/2015). We also compiled data on employment; along with the qualitative and quantitative responses we received from our survey and interviews.

The UK's digital companies range from startups to traditional businesses that have re-imagined their offers into digital capabilities.

47,200

DIGITAL COMPANIES ANALYSED

98%

OF DIGITAL COMPANIES ARE SMALL BUSINESSES*

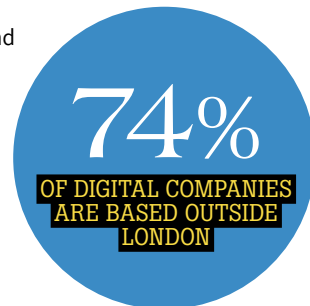
*www.duedil.com/technation/2015 (January 2015)

2

There are vibrant digital technology clusters across the UK, diversifying in expertise

Two thirds of the companies who responded to our survey described themselves as being part of a cluster.

We found the highest concentrations (e.g. volume of businesses within area) in London and the South East. However with a closer look, we can see that digital clusters have emerged across the UK, with their own identities and sources of competitive advantage.



INTRODUCING THE 21 UK CLUSTERS

Ordered by total Digital Employment

1 INNER LONDON

The capital has the largest volume of digital companies and workers with over 250,000 people in Inner London (12 boroughs).

2 BRISTOL & BATH

Recognised as a globally significant tech cluster, local companies cite fewer major barriers to growth here than other UK regions.

3 GREATER MANCHESTER

Manchester's long-standing media industry has now gone digital. The average company turnover growth is one of the highest in the UK.

4 READING

At the heart of the M4 corridor enterprise belt and the traditional telecommunication HQs, where one in five businesses are tech firms.²

5 LEEDS

Evidence of strong professional services and financial sectors, Leeds has a growing strength in data management, HealthTech and FinTech.

6 BELFAST

One of the strongest networks for business support, local customers and trading. Its 'knowledge economy' is the fastest growing in the UK.²

7 SOUTH WALES

Small firms and startups with great potential dominate the industry, with specialisms evolving in HealthTech and data management and analytics.

8 NORTH EAST

High positivity from companies on the benefits provided by the North East cluster. Its core strength lies in software development.

9 OXFORD

Supported by a number of nationally significant centres of excellence, there is a growing specialism in EdTech and HealthTech.

10 CAMBRIDGE

This internationally recognised cluster has a specialism in wireless communications and hardware, with businesses four times as likely to focus on electronics and components as the national average.

11 SHEFFIELD

High average company turnover with expertise in EdTech and telecommunications.

12 BIRMINGHAM

Rich heritage in advanced manufacturing and a strong talent base with growing strengths in machine learning and EdTech.

13 GLASGOW

Currently a test bed for smart city technologies, with a growing startup community.

14 EDINBURGH

A strong financial services presence has contributed towards a thriving FinTech sector; digital companies are three times more likely to specialise in FinTech than the national average.

15 NORWICH

Growing startup scene supported by one of the highest concentrations of academic research parks in the UK.

16 HULL

A superfast fibre-optic network has generated fast-growing sectors of software development, animation, marketing and advertising.

17 LIVERPOOL

One of the homes of British gaming, a strong community of companies specialising in games development continues to grow.

18 GREAT MALVERN

Leading cluster in cyber security, centred around GCHO.

19 BRIGHTON & HOVE

At 3.3x the national average, Brighton has the highest density of digital companies in the UK.³

20 BOURNEMOUTH & POOLE

A strong base in digital advertising and marketing businesses, with formation of new companies growing by over 200% since 2010.

21 DUNDEE

Famed for its gaming sector, producing global hits like Grand Theft Auto.



¹ The NI Knowledge Economy Index 2014, <http://www.nisp.co.uk/nisp-connect/the-ni-knowledge-economy-index/>

² KPMG Tech Monitor UK 2014, www.kpmg.com/UK/en/IssuesAndInsights/ArticlesPublications/Documents/PDF/Market%20Sector/Technology/tech-monitor-q4.pdf

³ Largest proportion of digital companies compared to total number of companies in the area

3

Digital companies are growing in number and size

GROWTH IN DIGITAL COMPANIES FROM FORMATION DATE DATA

Digital companies are experiencing a boom – over half of the companies analysed were formed since the start of 2008, with 15% set up in 2013-14 alone.

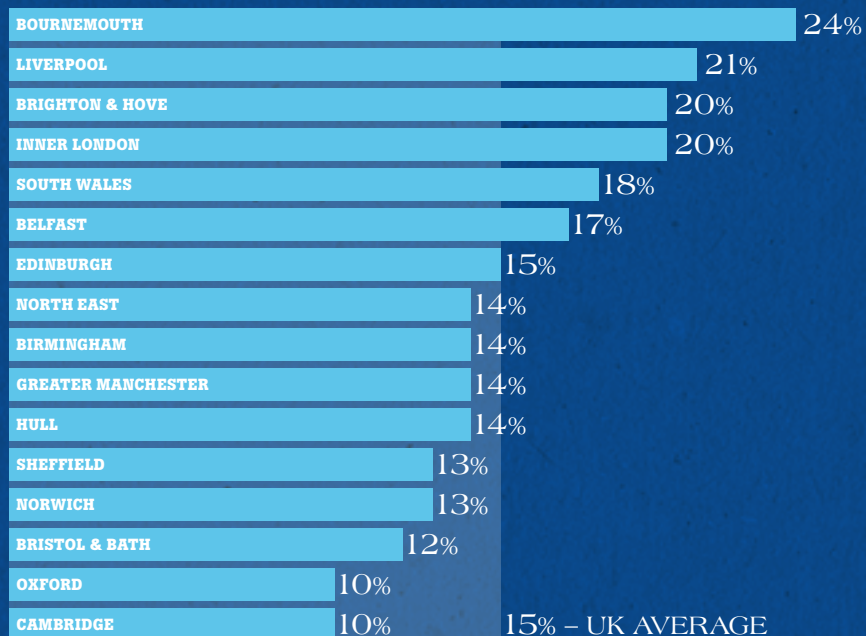
Clusters vary significantly in their age profile – some clusters like the long-established Cambridge cluster have a relatively small number of newer companies, with the digital companies in the region building on a local heritage in technology. In areas such as Bournemouth and Brighton, a large number of companies have emerged in the past couple of years, taking advantage of the areas' growing reputation as digital creative hubs, and new opportunities in sectors such as app development and mobile gaming.

The formation rate of new companies is rapidly growing, with 53% more digital companies formed in 2013 than in 2010. Some clusters are seeing a particularly sharp rise in the rate of company formation – Bournemouth has seen a rise of over 200%, and Liverpool a growth of 119%.

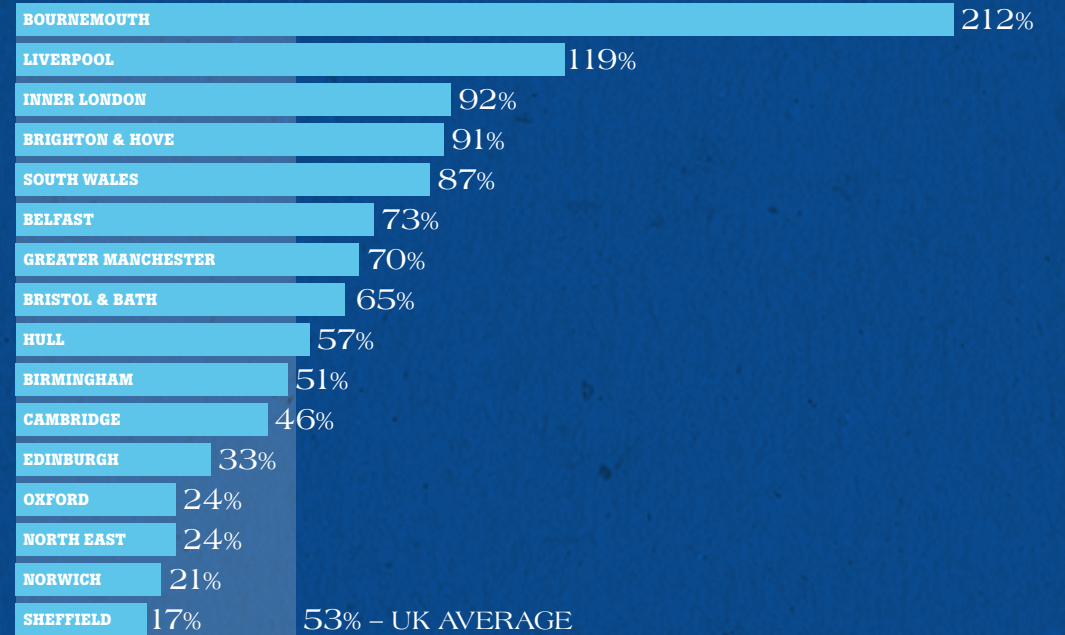
50%
COMPANIES FORMED SINCE 2008²

15%
OF TOTAL UK COMPANIES FORMED IN 2013-2014 WERE DIGITAL COMPANIES

DIGITAL COMPANIES FORMED IN 2013 AND 2014 AS A % OF TOTAL COMPANIES WITHIN THE CLUSTER*



GROWTH IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013 (%)*



GROWTH IN DIGITAL COMPANY REVENUES

Digital companies are growing faster than the average rate of business growth across the economy. Companies from our sample large enough to report data have seen turnover rise by an average of 6% per annum between 2006 and 2013.

Those digital companies operating in clusters are experiencing a higher rate of revenue growth compared to the national average. Companies in Greater Manchester, Belfast and Sheffield saw an average growth of 74%, 57% and 47% between 2010 and 2013.

Our survey suggests that this growth is reflected across small and medium sized firms as well: 56% of those we surveyed have seen revenues rise in the last year and 90% expect it to grow next year.

EMPLOYMENT

The UK's digital companies are creating huge employment opportunities across the country. Currently, there are more than 1.46 million digital jobs nationally, with the largest concentration in Inner London (228,572). According to Future Fifty company Adzuna, there are currently 45,000 digital jobs being advertised in The UK (excludes IT telesales). Some 62% of those were outside Inner London.

All of the occupations within the digital sector experienced employment growth between 2012 and 2013. In areas such as South Yorkshire, Cambridgeshire and Norfolk, digital job growth actually outpaced overall regional growth by the highest margin.

The percentage growth of digital jobs over the next six years is expected to be higher than that of all other occupations combined – the result of the formation of more and more digital businesses.

1.46M
PEOPLE EMPLOYED IN DIGITAL COMPANIES

* Data represents the proportion of digital companies in each region formed since January 2013 – those companies that are no longer active are not included. Source: www.duedil.com/technation

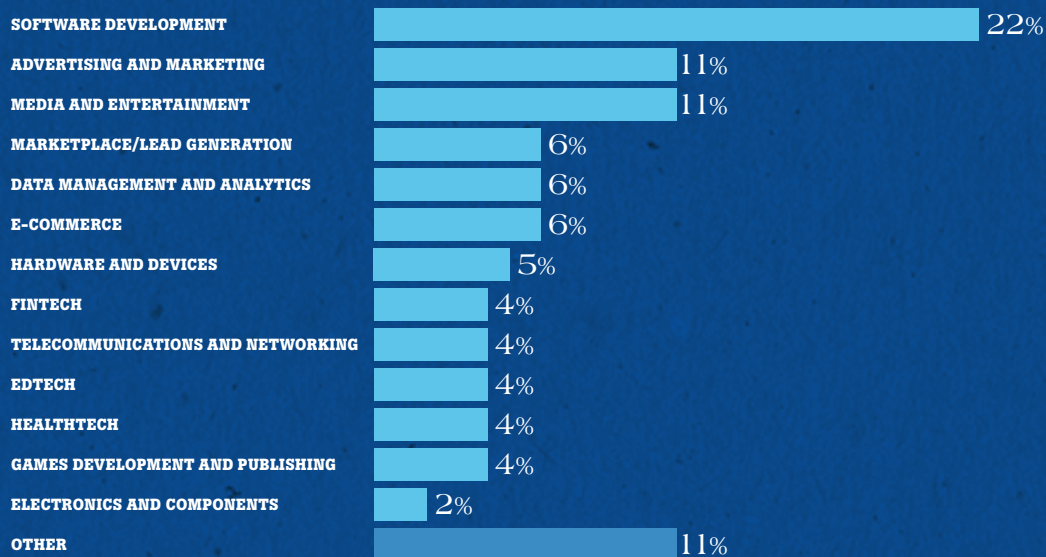
4

Digital is disrupting traditional industries and forming new 'born digital' sectors

Digital companies exist across almost all sectors of the economy, ranging from new 'born digital' sectors such as games development and microprocessors, through to traditional sectors that have been disrupted by digital, such as financial services and fashion. From our survey-based research:

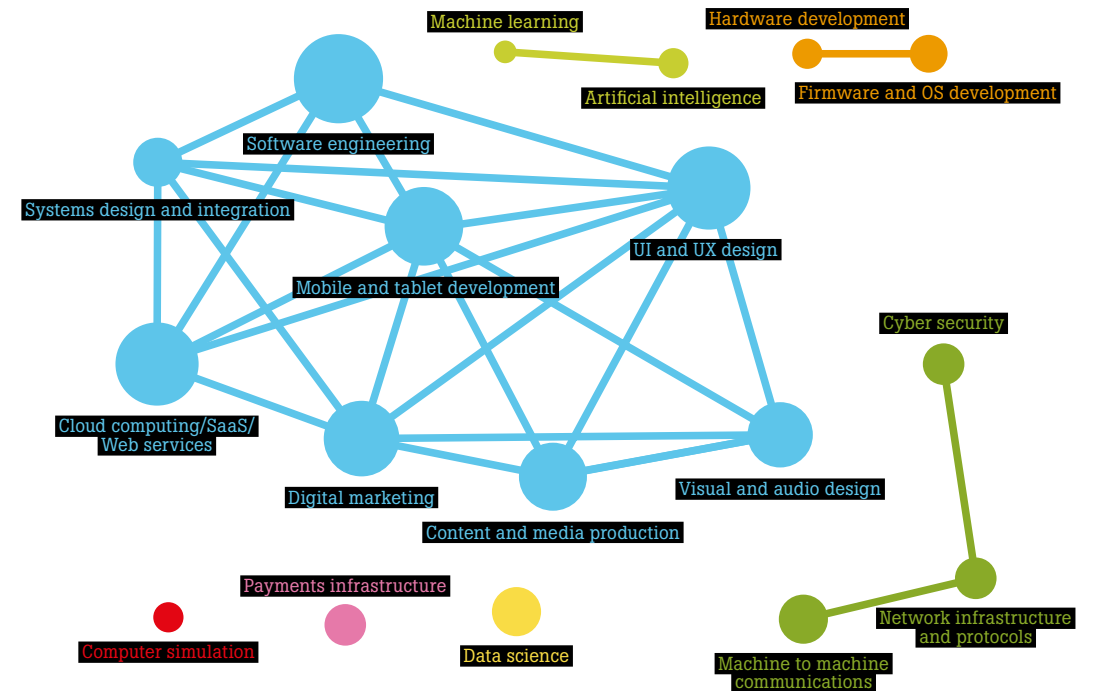
- Almost 25% of companies identified their sector as software development
- The next largest sectors are advertising and marketing, and media and entertainment (both 11%)
- There is then a long tail of companies operating in other 'born digital' sectors such as E-commerce and telecommunications (6% and 4%), as well as in other traditional sectors such as FinTech and EdTech (both 4%)

SECTOR BREAKDOWN OF DIGITAL COMPANIES SURVEYED*



* Data based on self-reporting by surveyed companies, who were given a set list of options Source: Tech Nation Survey conducted by MTM)

KEY CAPABILITIES OF DIGITAL COMPANIES, AND HOW THEY RELATE TO EACH OTHER*



* Bubble size determined by number of respondents reporting the skill as a 'core capability'. Bubbles are linked if over 30% of companies reporting one skill as core also report the other as core.

A number of core capabilities are driving the UK's digital sector

According to our survey-based research, companies on average described four areas as core strengths of their business, and declared to have 'some expertise' in a further six areas. These should not be viewed in isolation – it is unlikely that only one capability will power a digital company. For example, 57% of those who 'ticked' machine learning also described artificial intelligence as a core capability. Similarly, 51% of those specialising in cloud computing also said they were specialists in UI and UX design. The combination of core capabilities, and how they interrelate, drives the operation of these companies.

There is also a strong relationship between company size and capabilities: firms with capabilities in data science, network infrastructure or cyber security are twice as likely to employ over 100 people as those in visual design and content.

5

6

Clusters provide tangible benefits to their members

A core focus of our research was identifying clusters – an economic phenomenon that occurs when a critical mass of digital companies forms in a region. Clusters of companies interact formally (e.g. by trading or forming partnerships) and informally (e.g. networking, socialising).

Over 80% of survey respondents in Edinburgh, Bristol & Bath, Inner London, Brighton and Hove, and Liverpool stated they view themselves as part of a cluster – the highest in the country.

Digital clusters are an engine room for the growth of the UK economy. As part of the DNA of each cluster, the benefits of belonging to these communities vary across the country. Areas of particular strength exist in different regions, as shown by the graphic on the right.

There is an opportunity for tailored local strategies to focus on an area's competitive advantage, built around that cluster's DNA. A city's assets, heritage and emerging digital capabilities can be synthesised into a clear view of the region's areas of competitive advantage.

Whilst established clusters are organically cultivating their own momentum, greater support within the emerging, smaller clusters throughout the UK could accelerate growth. For example, Bournemouth and Norwich have burgeoning creative industries, Newcastle and Sunderland are centres of excellence for software and video games; and Cardiff has a specialism in HealthTech.

Cultivating a particular area of success defines a cluster for digital professionals and investors. By establishing a reputation for excellence in this way, clusters start building their own momentum for growth.



ACCESS TO SOCIAL NETWORKS

Nearly all companies in Edinburgh (95%) and Cambridge (90%) highlighted social networks as a benefit their cluster offered



ACCESS TO TALENT

Brighton and Hove, and Bournemouth and Poole both have the highest percentage of companies claiming their clusters give them access to the right talent for growth



ACCESS TO PROPERTY

92% of digital businesses in Edinburgh believe affordable office space is readily available. Many businesses also believed this was true in the North East and Manchester



ACCESS TO PRIVATE FINANCE

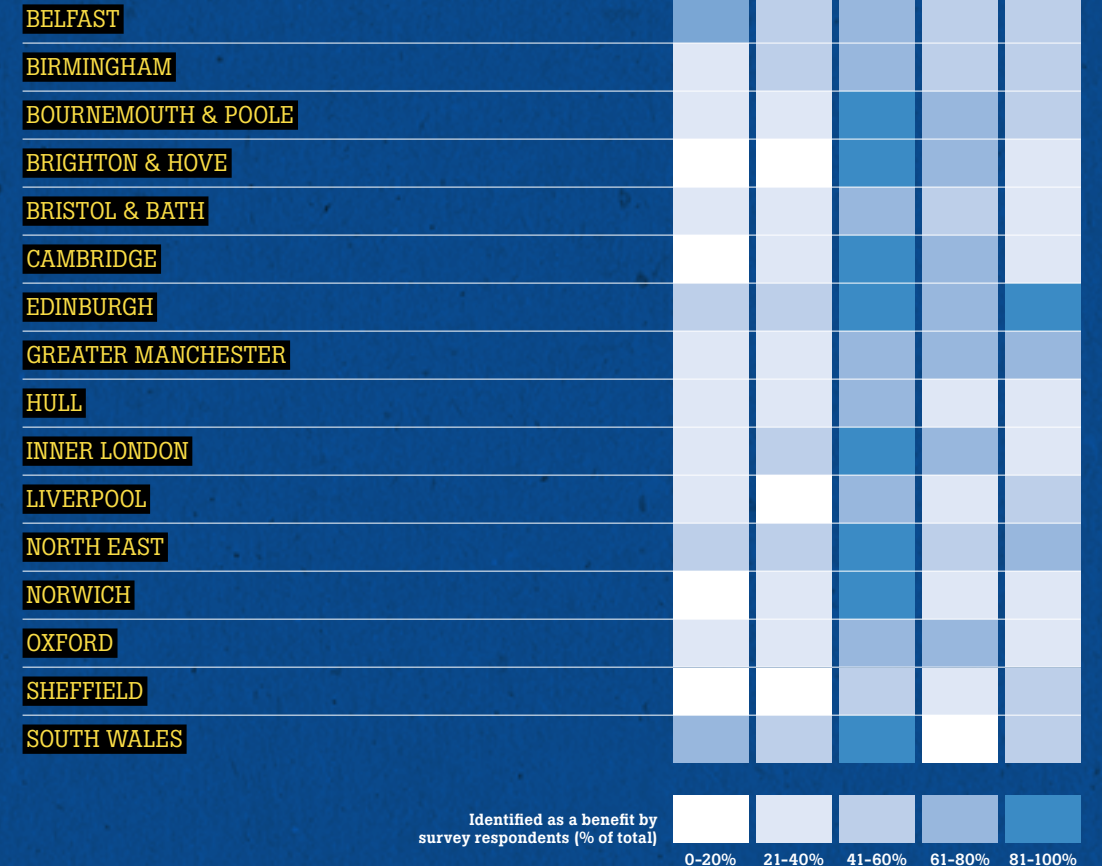
The strongest clusters for access to private finance according to our survey were Cardiff and the North East



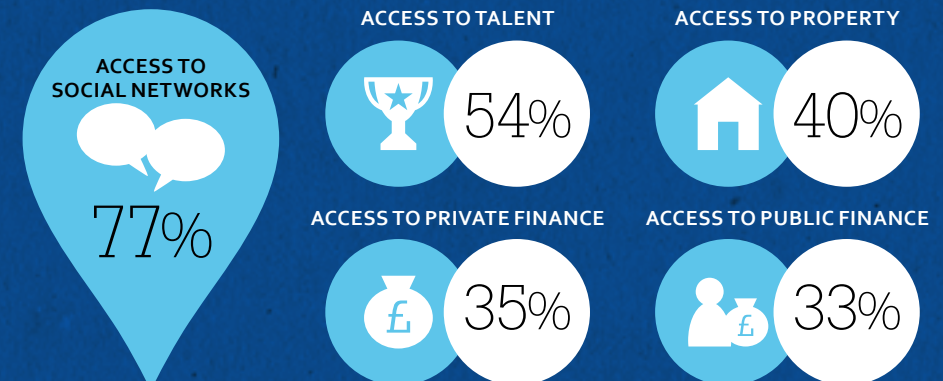
ACCESS TO PUBLIC FINANCE

75% of digital businesses in South Wales and Belfast feel they have access to public finance (grants, public funds, etc.)

KEY BENEFITS: UK CLUSTERS



KEY BENEFITS: NATIONAL AVERAGE



Access to talent and broadband are key factors when choosing location

7

A good supply of skilled workers and strong technical infrastructure are the top factors determining company location.

Core operational factors (broadband, skills, market opportunity) and lifestyle factors for employees (quality of life, community, personal reasons) are more important than access to finance, support from universities and sector expertise.

Immediate operational factors are more important regarding location than long term factors e.g. broadband is essential to a company's ability to function.

The focus on certain capabilities by local education institutions has led to sector specialism in certain clusters

8

The relationship between academic excellence fostering business growth can be seen clearly across the country. A few examples include:

- Edinburgh's strength in digital technology is powered by excellence in software engineering as well as some of the more hi-tech disciplines such as artificial intelligence and machine learning
- Cambridge's success as a cluster has been based on strong applied research from its various faculties – great electrical and software engineers driving the specialism in hardware and wireless communication
- Similarly, interviewees told us that one of the reasons the cluster in Bournemouth has formed is because of the strong supply of people with key skills from their local university – their marketing and gaming cluster is powered by (amongst other things) UI/UX expertise and computer simulation expertise



Image: Campus North, Newcastle

FUELLING GROWTH

Digital tech clusters across the UK are growing exponentially. Away from the big cities, we are witnessing pioneering business models and digital solutions emerging all over the country. Those with devolved powers to engage with local clusters have an incredible opportunity to help accelerate the growth of their digital ecosystem.

Funding future growth

A third of companies surveyed identified access to finance as a challenge. In particular, outside London and the South East there is an opportunity to improve access to equity finance in order to build business growth through the support of local bodies.

Companies highlighted other possible channels that could be explored: leveraging European funding where available; stimulating private funding by encouraging local high-net-worth individuals, companies and angel investors to create funds; promoting links between private finance in London and their cluster; and making the activities of their cluster more transparent and visible to national and international investors.

Presently, support schemes available include public funds such as the JEREMIE funds, and Government backed finance schemes, through bodies such as Creative England and Innovate UK (formerly the Technology Strategy Board). The British Business Bank's Enterprise Capital Fund is also a key resource, while initiatives like the London Co-Investment Fund (open to all regions) are emerging, combining private and public money.

STRENGTH OF GROWTH DRIVERS BY CLUSTER

	Access to advice and mentorship	Access to finance	Available property	Fast and accessible broadband	Good transport infrastructure	Positive economic climate	Strong skills base of region
BELFAST							
BIRMINGHAM							
BOURNEMOUTH & POOLE							
BRIGHTON & HOVE							
BRISTOL & BATH							
CAMBRIDGE							
EDINBURGH							
GREATER MANCHESTER							
HULL							
INNER LONDON							
LIVERPOOL							
NORTH EAST							
NORWICH							
OXFORD							
SHEFFIELD							
SOUTH WALES							

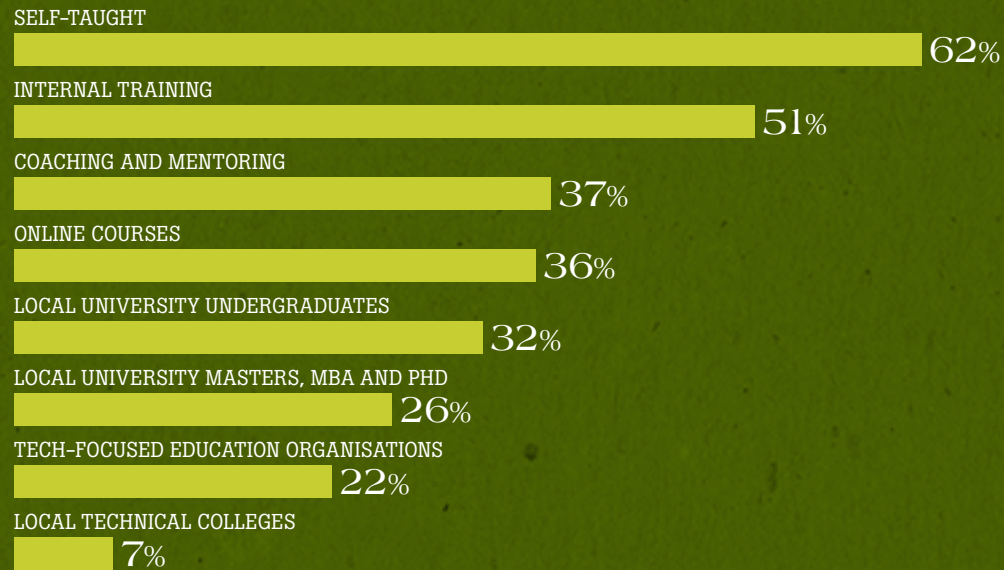
Low to high level of importance
Greater focus needed in area to encourage growth

Fast and accessible broadband

Although digital connectivity across the UK is improving fast, network speed can still vary. Data-hungry creative companies in Brighton, for example, want a solution to the region's overloaded broadband network. Digital businesses in Hull, on the other hand, benefit from one of the UK's fastest fibre-optic networks. Overall, just under 25% of companies in our study aired concerns around broadband infrastructure.

A number of regional and national initiatives are tackling digital connectivity, including the Connection Voucher Scheme and the Urban Broadband Fund (managed by Broadband Delivery UK). Greater coordination between local and national initiatives will ensure the biggest impact and secure nationwide digital inclusion.

OUTLETS DIGITAL COMPANIES RELY ON TO BUILD EMPLOYEE SKILLS



Access to talent

A larger pool of digitally skilled workers is high on the wish list of the UK's tech community. One-third of survey respondents considered a lack of local talent to be one of their biggest barriers to growth. In some clusters, a strong link between business and academia is opening up access to talent – great examples of these include Cambridge, Edinburgh and Manchester.

The Witty Review, and the Government's response, outlines steps to improve connections between entrepreneurship and academia. The Government has also invested some £18.4 million in the Tech Partnership. But companies in many clusters rely on other routes to build their employee skill base. Some 62% of companies surveyed said their employees were self-taught; while 51% of companies trained staff in-house.

We saw great strides in 2014 to tackle the issue. Educational innovations implemented by the Government include: the computing curriculum introduced in September 2014; Digital Business Academy, introduced by Tech City UK with UCL; apprenticeships for digital skills; short courses in digital skills (available April 2015); a National College for Digital Skills; an independent review of computer science degree accreditation; and the Tier 1 Exceptional Talent Visa for technology and the Entrepreneur Visa, available for companies to attract overseas talent from outside the EU.

The Home Office is currently exploring which jobs within the digital industry should be added to the Shortage Occupation List to further alleviate this issue. Better understanding of the most urgent skills locally that need to be met, and exploring the conversation on Intellectual Property, could unlock further growth.

Transport visions

Transport infrastructure was highlighted as a hurdle in particular for companies in Cambridge, Oxford and Norwich. It also featured prominently among respondents from East Yorkshire and Northern Lincolnshire.

Developing efficient transport infrastructure is particularly important if we are to create the environment where ideas and talent can move across the UK. Clearly, plans like HS3 can help with some of the concerns voiced in some of the Northern cities.

Making space

Access to suitable and affordable workspace featured as an issue for regions in the South East. The growth in co-working spaces and incubators is helping to address this, as they give flexible terms to fast growing companies. There are over 70 co-working spaces in London alone.*

Publicly funded support is available in a number of clusters, through centres like Business Growth Hubs and Digital Catapult Centres.

Affordable office space in city centres, close to transport links and similar businesses is a key need. The opportunity to accelerate growth could lie in supporting the growth of co-working spaces, incubators and innovation hubs across the UK.

Advice and Mentorship

Survey respondents and interviewees indicated their wish for a coherent business-support environment that provides layers of advice, mentoring and support to guide tech businesses on their growth trajectory. More than half the companies we surveyed had sought out training, advice or mentoring from other businesses or sector leaders in the past year.

Larger 'hub' organisations were also highlighted as playing a key role, supporting the cluster through provision of advice, investment or other resources. The Business Growth Service is a good example of this. In addition, cluster ambassadors such as serial entrepreneurs or senior figures from local organisations, were viewed as credible advocates for their cluster.

Telling the UK story through its cities and regions

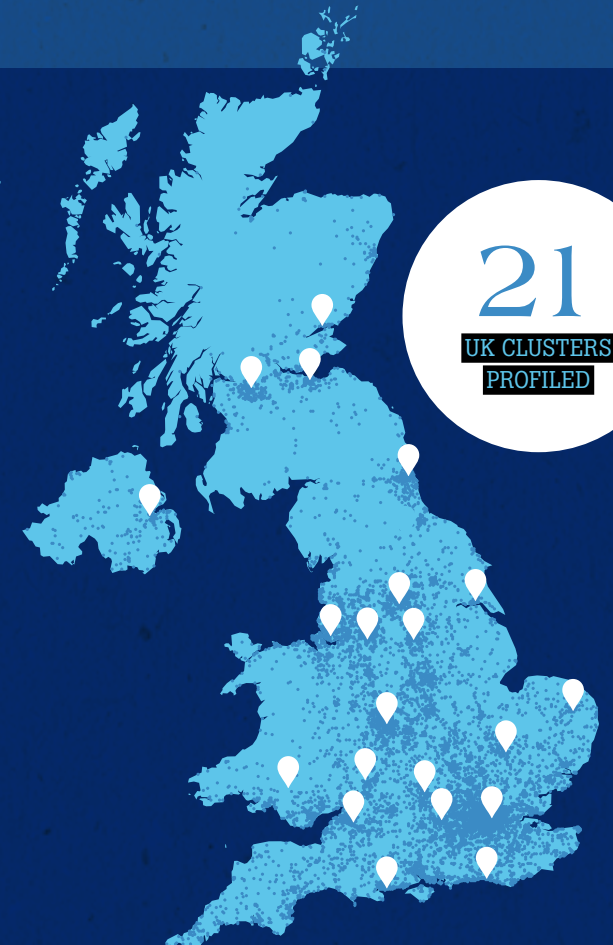
By working together, clusters can create a story that highlights regional specialisms, attracting the attention of investors at home and abroad.

Tech City UK has already begun to build the case for the UK, promoting a joined-up tech proposition to both domestic and international investors.

By strengthening each cluster and region's individual story and offering, we can present a powerful, coherent picture, showcasing the collective dynamism and diversity of the UK's network of digital excellence.

* Source: London & Partners, 2014

PROFILING THE UK CLUSTERS



Clusters are the growth drivers of the UK's digital economy. Every cluster has its own narrative, its particular area of expertise and potential for expansion. In the following pages we profile 21 digital technology clusters nationwide using the NUTS categorisation.*

- | | |
|--|--|
| 30 Belfast (and Northern Ireland) | 52 North East (including Newcastle and Sunderland) |
| 32 Birmingham | 54 Norwich (and Norfolk) |
| 34 Bournemouth & Poole | 56 Oxford (and Oxfordshire) |
| 36 Brighton & Hove | 58 Sheffield (and South Yorkshire) |
| 38 Bristol & Bath (and Gloucestershire and Wiltshire) | 60 South Wales (including Cardiff and Swansea) |
| 40 Cambridge (and Cambridgeshire) | 62 Dundee |
| 42 Edinburgh | 63 Glasgow |
| 44 Greater Manchester | 64 Great Malvern (and Worcestershire) |
| 46 Hull (including East Yorkshire and Northern Lincolnshire) | 65 Leeds |
| 48 Inner London | 66 Reading (and Berkshire) |
| 50 Liverpool | |

* 5 of the 21 clusters do not include information on 'key capabilities', 'notable sectors', 'key benefits' and 'fuelling growth' due to the limited availability of data.



BELFAST

AND NORTHERN IRELAND

DIGITAL EMPLOYMENT

32,000

KEY SECTOR FOCUS*

- GAMES DEVELOPMENT AND PUBLISHING
- SOFTWARE DEVELOPMENT
- DATA MANAGEMENT AND ANALYTICS

KEY CAPABILITIES*

1.7x MORE LIKELY TO SPECIALISE IN ARTIFICIAL INTELLIGENCE

1.7x MORE LIKELY TO SPECIALISE IN PAYMENTS INFRASTRUCTURE

1.5x MORE LIKELY TO SPECIALISE IN MOBILE AND TABLET DEVELOPMENT

GROWTH OF COMPANIES

73%

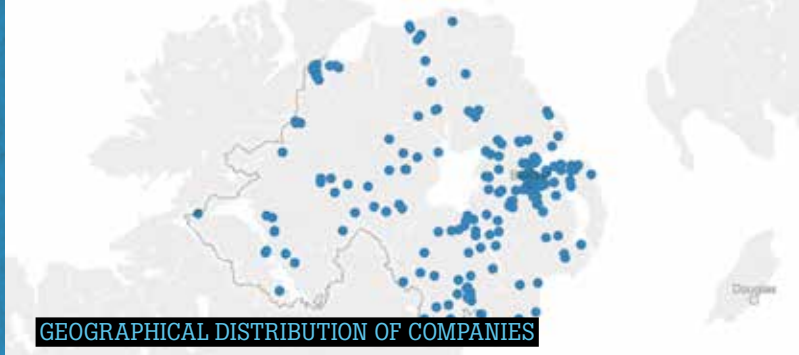
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Northern Ireland's digital technology scene is focused in and around Belfast and Derry/Londonderry. The regeneration of Belfast's former harbour into the Titanic Quarter, including the development of the Northern Ireland Science Park (NISP), is at the heart of Belfast's transformation.

The Northern Ireland Science Park offers Europe's fastest direct fibre link to the US, given its geographic location, and readily available space. Belfast's tech community benefits from a growing network of support groups such as Digital Circle, a representative organisation for digital content, and NISP Connect, a support ecosystem for creating and scaling companies, as well as the University of Ulster's technology and knowledge transfer company Innovation Ulster. Generation Innovation, local angel network Halo, and events like Friday Night Mashup are also helping to grow the startup community. Consumer and enterprise software are the main drivers for business growth, with a young and rapidly growing games development sector.

GEOGRAPHICAL DISTRIBUTION OF COMPANIES

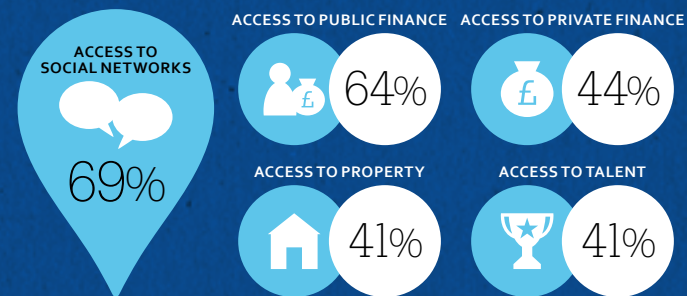


KEY BENEFITS

PROMOTING PUBLIC FINANCE

Public financial support is readily available, with companies in Northern Ireland twice as likely as the national average stating they could source it. InvestNI and the £29 million Techstart NI fund have done much to facilitate this. Local companies were more likely than the average to say that they can find formal support services (56%), local customers (54%) and cluster-based trading relationships (87%). This could be attributed to NISP CONNECT's work, linking up entrepreneurs to other businesses and services in the area.

CLUSTER BENEFITS

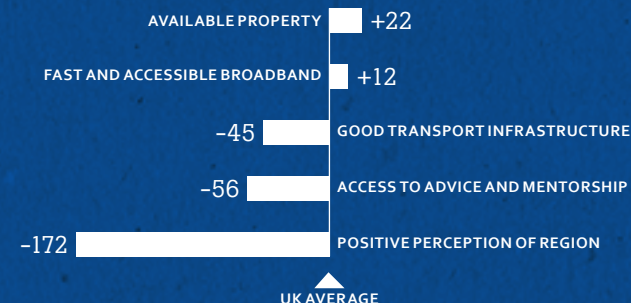


FUELLING GROWTH

ATTRACTING TALENT, GEOGRAPHICAL LOCATION

The support of local universities plus the science park make Northern Ireland a strong cluster in terms of technical infrastructure and property. However, its location can be limiting to company growth in terms of transport infrastructure and attracting high-quality workers.

STRENGTH OF GROWTH DRIVERS



"The NI knowledge economy is growing faster than the rest of the UK. Belfast is the epicentre, and there's great work going on across the region."

STEVE ORR
DIRECTOR
NISP CONNECT

EXAMPLE COMPANY PROFILES



Founded 2008

Analytics Engines develops analytics accelerators for software in Pharma, Finance, Oil and Gas.



Founded 2014

Inflyte is a music B2B promotion platform that allows businesses to send branded digital music promo campaigns direct to their clients' mobile devices for feedback.



Founded 2011

InLifeSize brings Hollywood-grade and AAA facial animation and augmented reality to consumers' mobile phones.

"The real advantage to me is the people. Northern Irish people are renowned for their high level of expertise coupled with a work hard / play hard attitude. These attributes cultivate a very strong team and an innovative working environment."

IAN SCOTT
CEO
TAGGLED

The Selfridges Building, Birmingham



BIRMINGHAM

DIGITAL EMPLOYMENT

20,064

KEY SECTOR FOCUS*

- EDTECH
- MARKETPLACE/LEAD GENERATION
- SOFTWARE DEVELOPMENT

KEY CAPABILITIES*

1.6x MORE LIKELY TO SPECIALISE IN MACHINE LEARNING

1.4x MORE LIKELY TO SPECIALISE IN CYBER SECURITY

1.2x MORE LIKELY TO SPECIALISE IN MOBILE AND TABLET DEVELOPMENT

GROWTH OF COMPANIES

51%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Birmingham has staked its claim as a leading digital technology cluster, with communities of startups and creative digital agencies emerging around 'Silicon Canal' and other key areas.

Birmingham and the West Midlands have a rich heritage in advanced manufacturing, including aerospace and automotive supply chain, with Jaguar Land Rover, Moog UTC and JCB having major operations in the area. The growing talent base, supported by five local universities, has attracted a number of prominent digital companies to the area, notably ASOS's development centre. Emerging hubs include Birmingham Research Park and the city's production and animation studios; Digbeth and the Custard Factory, one of the UK's largest hubs for digital, creative and technology businesses.

The growing startup community is supported by a number of networks and organisations. This includes the Silicon Canal network; events like hackathon Launch48; and Oxygen Accelerator, one of the leading programmes in the UK. Also, the Entrepreneurs for Future Centre within Birmingham Science Park's Innovation Campus is providing key support services. Notable startups include the payments transfer provider Droplet, mobile app developer Soshi Games, and Meducation, the social network for doctors.



"In the Midlands the growth is in manufacturing, aerospace, car supply chain... Where there's strength in health, it's hardware rather than software"

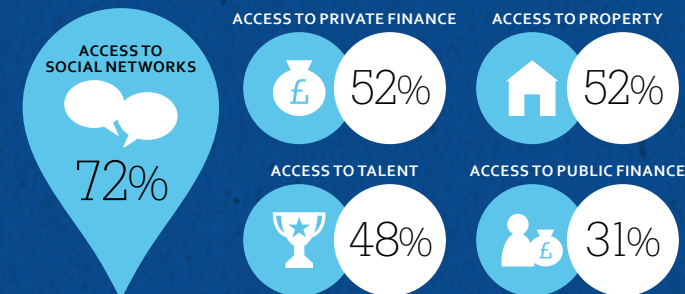
DAVE MACLEAN
MANAGING DIRECTOR
PACKT PUBLISHING

KEY BENEFITS

FLOURISHING HUBS TO DRIVE GROWTH

Although the cluster is seen as early stage and still developing organically, talent is regarded as a key driver of growth. Cluster members cite access to tech talent as a key benefit, with local universities supplying the sector with high-quality graduates.

CLUSTER BENEFITS

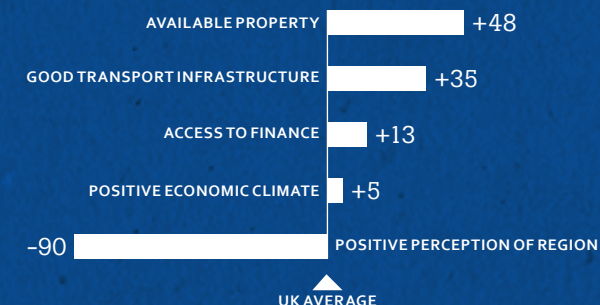


FUELLING GROWTH

EARLY-STAGE STATUS

The high competition for existing talent and Birmingham's early-stage status as a startup cluster makes it difficult to attract top-tier established talent to the region. Recent reports highlight this is improving; the local science park, Birmingham University's strength, and networks such as Silicon Canal (which is bringing together various tech groups) are helping to address the issue. The strength of education technology is currently limited due to public sector procurement, in most cases due to the length and complexity of the processes.

STRENGTH OF GROWTH DRIVERS



EXAMPLE COMPANY PROFILES

timeetc

Founded 2007

Time etc is a service that allows the customer to outsource tasks to approved assistants. Admin, customer service, copywriting and marketing are completed at a much lower cost than hiring, as the customer only pays for finished work.



Founded 2009

CrowdControlHQ is a social media risk management and compliance platform. The online technology delivers social engagement and compliance features through a single dashboard for multi-channel campaigns to help enterprises protect reputations online.

Whisk

Founded 2012

Whisk.com is a smart shopping list tool that helps people around the world discover, organise, and enjoy recipes online. Whisk displays a "Create Shopping List" button that allows people to quickly create a shopping list from any recipe online.

"The digital technology scene is growing fast – there are around 40-50 events every month – from a PHP group to a CEO meet-up – most of which weren't around 18 months ago."

SIMON JENNER
CHIEF ENTREPRENEUR
OXYGEN ACCELERATOR

Jetty at Poole Harbour, Poole

BOURNEMOUTH & POOLE

DIGITAL EMPLOYMENT

7,272

KEY SECTOR FOCUS*

- ADVERTISING AND MARKETING
- E-COMMERCE
- GAMES DEVELOPMENT AND PUBLISHING

KEY CAPABILITIES*

1.9x MORE LIKELY TO SPECIALISE IN DIGITAL MARKETING

1.8x MORE LIKELY TO SPECIALISE IN CONTENT AND MEDIA PRODUCTION

1.5x MORE LIKELY TO SPECIALISE IN UI AND UX DESIGN

GROWTH OF COMPANIES

212%

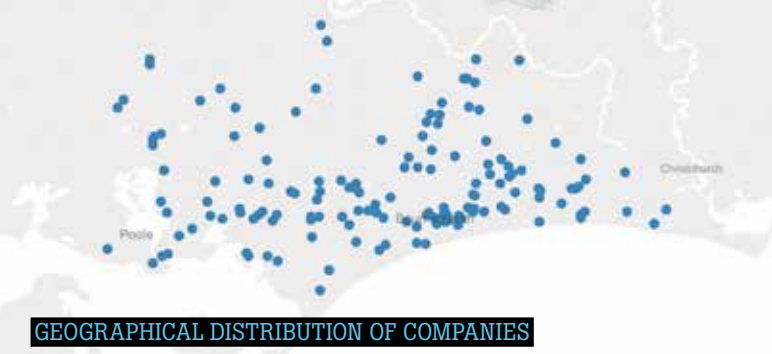
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Bournemouth is one of the UK's fastest-growing tech clusters in terms of the number of company registrations year-on-year over the last three years. Between 2013 and 2014, the cluster saw a rise of over 200% in the number of digital companies based there. Digital and advertising companies lead the way, closely followed by an emerging community of app development agencies.

Bournemouth's strong digital creative sector is partly driven by the supply of graduates from local universities, including the National Centre for Computing Animation at Bournemouth University, and the base of integrated marketing agencies that have acted as hubs for local creative talent. The cluster's entrepreneurs also point to the high quality of life as a key driver.

There is a growing sense of identity and buzz around the Bournemouth digital sector: 67% of companies reported that they are part of a digital cluster. Events such as the annual Bournemouth Silicon Beach festival and Digital Day Bournemouth are supporting this community, along with organisations like Silicon South. Co-working spaces include Nest Space and Factory Studios, and the Open Data Lab Bournemouth is the world's largest open device lab, housing over 450 connected devices free for anyone to test their products on. Leading companies include creative agencies Bright Blue Day and Thinking Juice, and app developer 3 Sided Cube.



"Bournemouth has a vibrant network of meet-ups and events, feeding off its community of creative and app development agencies."

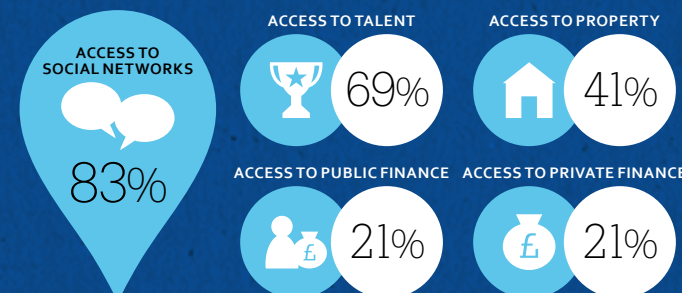
MATT DESMIER
FOUNDER
SILICON BEACH

KEY BENEFITS

SOCIAL NETWORKING

The majority of cluster members (83%) report a strong network of entrepreneurs to share ideas and expertise. In contrast, relatively few reported that access to public or private finance was beneficial to them (both at 21%), although this may reflect the fact that the majority of companies are marketing services businesses and do not typically seek funding.

CLUSTER BENEFITS

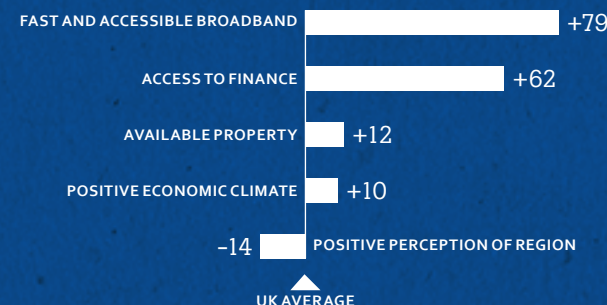


FUELLING GROWTH

ATTRACTING TALENT

Bournemouth's strengths in digital media production require a strong supply of skills, as best practice techniques and requirements change over time. While local universities are meeting much of this demand, promoting the region could help companies to grow more rapidly.

STRENGTH OF GROWTH DRIVERS



EXAMPLE COMPANY PROFILES



3D Marketing Solutions
Founded 2010
3D Marketing Solutions specialises in digital, data and direct marketing for SMEs and micro businesses. It helps companies find new ways to approach potential customers and provide strategic and tactical marketing management.



BASE
Founded 2008
We Are Base builds user-centred digital products and services for businesses, using existing data. It specialises in mobile and web applications.



redweb
Founded 1997
Redweb is a digital strategy, design and development company. It offers a range of services in-house, from commercial consultancy to the creative and technical aspects of web design.

"There is a skills shortage wherever you look, although I suspect this is the same as the rest of the country."

TOM QUAY
MANAGING DIRECTOR
WE ARE BASE



BRIGHTON & HOVE

DIGITAL EMPLOYMENT

7,458

KEY SECTOR FOCUS*

- ADVERTISING AND MARKETING
- SOFTWARE DEVELOPMENT
- GAMES DEVELOPMENT AND PUBLISHING

KEY CAPABILITIES*

1.7x MORE LIKELY TO SPECIALISE IN CONTENT AND MEDIA PRODUCTION

1.4x MORE LIKELY TO SPECIALISE IN UI AND UX DESIGN

1.3x MORE LIKELY TO SPECIALISE IN VISUAL AND AUDIO DESIGN

GROWTH OF COMPANIES

91%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Brighton has grown into one of the UK's most successful digital technology clusters. It has the highest concentration of digital companies in any of the UK regions, and companies have a very strong sense of community – 84% feel part of a digital cluster.

The city plays host to a wide range of networking events as well as larger conferences such as Develop, d-Construct and the Brighton Digital Festival. Companies are spread throughout the city, particularly in the North and South Lanes, with co-working hubs in Brighton Media Centre and The Skiff, the biggest co-working space south of London. The cluster is supported by organisations like Wired Sussex and freelance networks such as the Brighton Farm.

Brighton's burgeoning startup scene includes Clearleft, a leading UX consultancy; Spannerworks, a Brighton search firm bought by US marketers iCrossing for over £10 million; and analytics company Brandwatch, which recently bought London-based PeerIndex for £10 million. Brighton also has a growing games community, with a number of firms such as Boss Alien, Studio Gobo, Candy Labs (part of Mind Candy) and Shortround Games emerging out of the closure of Disney Black Rock in 2011.



"As a digital company you can be based anywhere. Brighton is easy to get into London from, but you can also live and work centrally, and there's a great network of companies to connect with."

ANNA LEWIS
FOUNDER
VALOBOX

KEY BENEFITS

STRONG COMMUNITY AND ACCESS TO TALENT

The Brighton cluster's core asset is a broad access to talent, with 80% of businesses saying that the availability of skilled workers is a core impetus for locating there. Local university undergraduate courses are key to building skills for 48% of companies in the region. As a reaction to a perceived lack of access to funding, there is also a strong base of service businesses that do not require external finance to grow.

CLUSTER BENEFITS

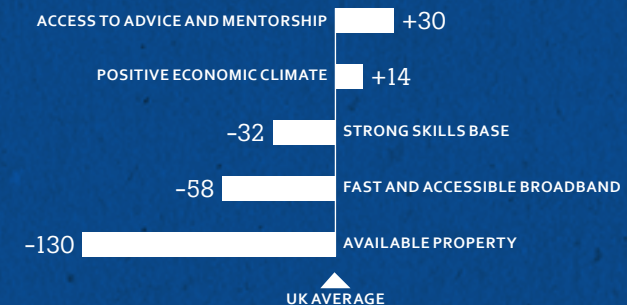


FUELLING GROWTH

PROPERTY AND BROADBAND SPEEDS

Brighton's high concentration of digital companies and lifestyle benefits has fostered the growth of a rich community of digital companies. However, this growth can put a considerable load on the city's infrastructure in terms of property and broadband.

STRENGTH OF GROWTH DRIVERS



EXAMPLE

COMPANY PROFILES

Brilliant Noise

Founded 2010

Brilliant Noise is a digital strategy and innovation agency. It pilots and scales new approaches to marketing and business that create long-term customer value. Brilliant Noise is helping to change every aspect of the way people work.



Founded 2007

Brandwatch is a social media monitoring and analytics technology platform. It gathers online conversations on a daily basis and provides clients with the tools to analyse them, helping brands and agencies to make smarter, data-driven business decisions.

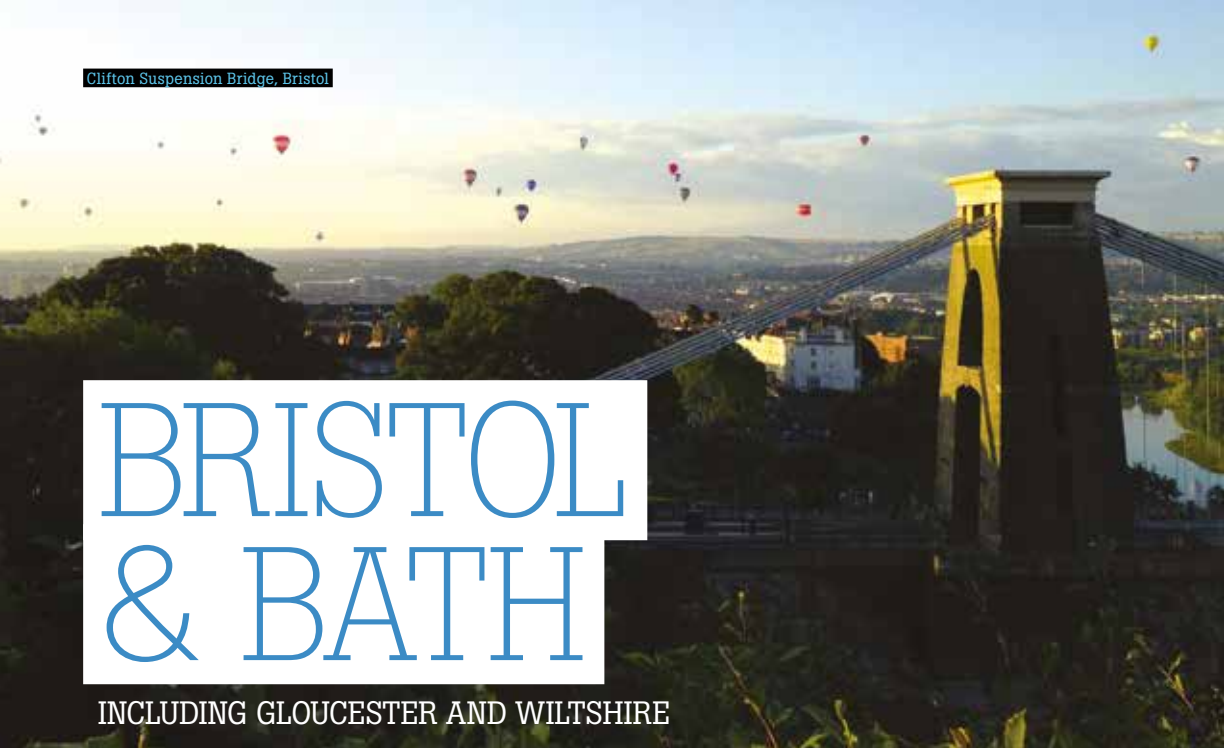


Founded 2009

Crunch is an online accountancy service which helps freelancers, contractors and small businesses take control of their finances. Its team of qualified accountants, account managers and simple online accounting software has helped its clients invoice over £1 billion in five years.

"Brighton has a fantastic talent pool – two universities and 30,000 students, with great strengths in the creative arts. We're working to break down the barriers between businesses and universities."

PHIL JONES
MANAGING DIRECTOR
WIRED SUSSEX



BRISTOL & BATH

INCLUDING GLOUCESTER AND WILTSHIRE

DIGITAL EMPLOYMENT

61,653

KEY SECTOR FOCUS*

- DATA MANAGEMENT AND ANALYTICS
- SOFTWARE DEVELOPMENT
- EDTECH

KEY CAPABILITIES*

1.2x MORE LIKELY TO SPECIALISE IN NETWORK INFRASTRUCTURE AND PROTOCOLS

1.1x MORE LIKELY TO SPECIALISE IN SYSTEMS DESIGN AND INTEGRATION

1.1x MORE LIKELY TO SPECIALISE IN UI AND UX DESIGN

GROWTH OF COMPANIES

65%

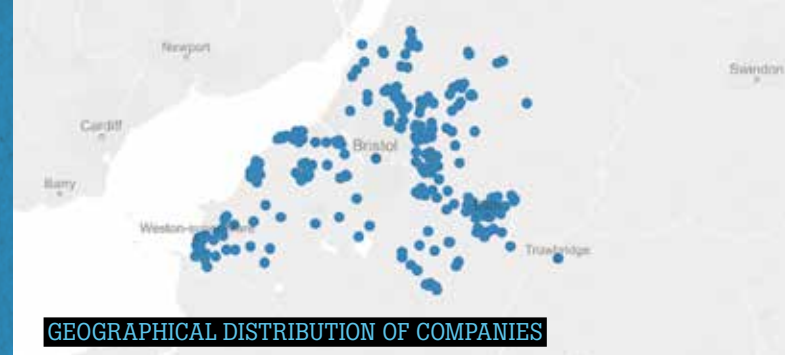
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

The Bristol & Bath region has been recognised as a fast growing, globally significant technology cluster alongside London. It has a rapidly growing technology sector and is home to global leaders Aardman Animation, Amazon (iMDB) and Hewlett Packard.

Bristol & Bath has strengths in digital and creative industries due to its rich heritage in aerospace, high-tech clusters and natural history film-making. The strong engineering talent in Bristol & Bath is supporting growth, with work ranging from Imaginarium's motion capture to Maplebird's development of micro-robotics. The cluster is also a hotbed for future technologies, supported by organisations such as Bristol & Bath Science Park, and leading business incubator SETSquared. Recent innovators include Ultrahaptics 'ultra-sonic' technology, and Open-Bionics 3D printable artificial limbs.

Local hubs and initiatives, such as the Engine Shed, The Guild, BathSPARK, TechSPARK, WebStart Bristol, Bristol Games Hub and Invest Bristol & Bath, provide a range of support services. As such businesses share a strong sense of identity, with 80% of companies reporting that they are part of a digital cluster. Factors attracting digital businesses to the region include talent, collaboration between sectors and a high quality of life.



"One of the strengths of the Bristol & Bath cluster is a lot of creative agencies – a creative tech cluster, including content creators – but also a large technology cluster"

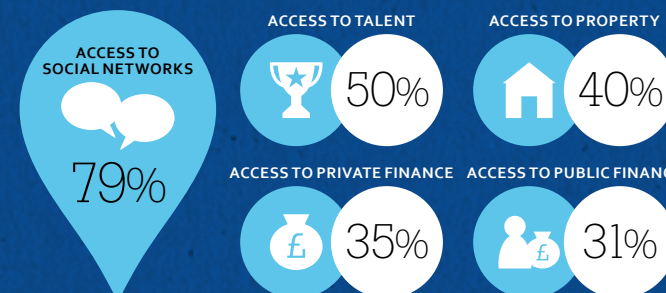
NICK STURGE
CENTRE DIRECTOR
ENGINE SHED
(& SETSQUARED)

KEY BENEFITS

STRONG NETWORK OF ENTREPRENEURS

The majority of cluster members (79%) report that there is a strong network of entrepreneurs in the region. A particular strength of the cluster is its ability to help companies find advice on business and marketing skills, with 48% of companies drawing on this support in the past year. This ranges from accelerators and seed funding through to office space, networking and VC pitch days.

CLUSTER BENEFITS

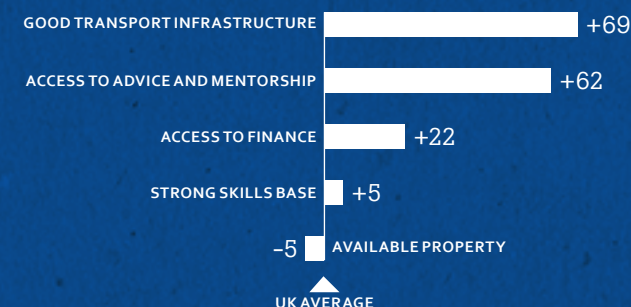


FUELLING GROWTH

SHORTAGE OF APPROPRIATE PROPERTY

Local companies cite fewer major barriers than other UK regions in this study. Competition for property and talent in the region is fierce. However, there is a wide range of support services, previously noted, that are tackling this issue. Also key is the delivery of Bristol Temple Quarter Enterprise Zone and five Enterprise Areas that are focused on providing accommodation for the digital sector.

STRENGTH OF GROWTH DRIVERS



EXAMPLE COMPANY PROFILES



Founded 2012

neighbourly is a social network that connects community projects with companies who want to make a meaningful difference. Communities tell their story through photos, video and chat, then share across social networks. Companies listen, back projects and get their staff involved.



Founded 1998

Gradwell builds and manages 'intelligent' Internet systems that support the needs for broadband, email, domains, web hosting and telecoms. Clients include 75% of the UK's telecom providers including BT, Virgin and Talk Talk.



Founded 2013

Health Apps Ltd produces easy-to-use apps to help people become healthier. Its apps undergo extensive research and are developed alongside medics and healthcare professionals.

"The tech scene in Bristol is really broad – there's a very strong creative sector, companies working on silicon chip design and also cybersecurity, games and computer simulation."

BONNIE DEAN
DIRECTOR
BRISTOL & BATH
SCIENCE PARK



CAMBRIDGE

INCLUDING CAMBRIDGESHIRE

DIGITAL EMPLOYMENT

21,862

KEY SECTOR FOCUS*

- ELECTRONICS AND COMPONENTS
- DATA MANAGEMENT AND ANALYTICS
- SOFTWARE DEVELOPMENT

KEY CAPABILITIES*

1.7x MORE LIKELY TO SPECIALISE IN FIRMWARE AND OS DEVELOPMENT

1.6x MORE LIKELY TO SPECIALISE IN PAYMENTS INFRASTRUCTURE

1.4x MORE LIKELY TO SPECIALISE IN CYBER SECURITY

GROWTH OF COMPANIES

46%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Cambridge is one of the UK's most established technology hubs. Its strengths span an unusually wide range of areas, including wireless communications, biotechnology, engineering and medical devices.

The formation of Cambridge Consultants in the 1960s helped create the conditions necessary to commercialise the research capabilities of the university and its students, sparking the area's innovative identity over the last 15 years. Cambridge has been responsible for fourteen \$1billion (£642million) technology businesses, with two, Autonomy and ARM (a university spin-out), reaching \$10–20billion in valuation, an achievement unmatched by any other UK cluster. In addition to its expertise in hardware, Cambridge also has strengths in gaming (Frontier Developments, Jagex), software (Bromium, Solarflare), cyber security (Darktrace, Cambridge Intelligence) and digital healthcare (Healx, BlueGnome). Other notable companies include Raspberry Pi and Neul (recently acquired by Huawei).

The established network of commercial, technical and academic research laboratories, as well as an excellent business support environment – including a self-sustaining venture capital market and networks like the Cambridge Angels, Cambridge Network, and Cambridge Wireless – mean that Cambridge companies are among the most likely to describe their cluster as fully developed.

GEOGRAPHICAL DISTRIBUTION OF COMPANIES

KEY BENEFITS

ACCESS TO TALENT

A vibrant network of entrepreneur engagement, through organisations like Cambridge Wireless and Cambridge Network, and strong access to talent are just two beneficial aspects of Cambridge's culture. However competition for talent is high. Local companies praise access to formal support services within the cluster, with 70% saying that help on IP, accounting and marketing is available. Although financial support for businesses is not always easily accessible, Cambridge Science Park continues to expand and internationals such as Microsoft offer inward investment.

CLUSTER BENEFITS

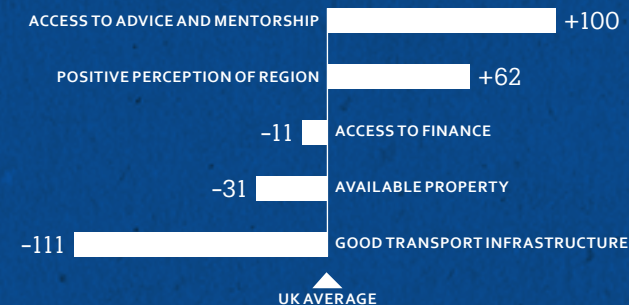


FUELLING GROWTH

INFRASTRUCTURE DIFFICULTIES AND LACK OF AFFORDABLE PROPERTY

While Cambridge itself has strong transport links to London, regional and national connections are noticeably weaker. The dominant presence of the Cambridge University colleges in the city centre has made commercial space a premium, making affordable property sometimes difficult to secure.

STRENGTH OF GROWTH DRIVERS



"In Cambridge we do the stuff that makes the phone happen. There's a continual generation of startups around communication."

PROFESSOR WILLIAM WEBB
CEO
WEIGHTLESS SIG

EXAMPLE COMPANY PROFILES

Sookio

Founded 2008

Sookio offers web content and social media campaigns, consultancy and training to small businesses and household names including Toshiba, University of Cambridge, Drinkaware, Magic FM and GOV.UK.

ARM

Founded 1990

ARM is a semiconductor IP provider. It designs scalable, energy-efficient processors and related technologies to deliver the intelligence in applications ranging from sensors to servers, including smartphones, tablets, enterprise infrastructure and the Internet of Things.

Psonar

Founded 2008

Psonar offers on-demand streaming on a pay-as-you-go basis, called Pay Per Play. With a large music catalogue tailored to every market in which it operates, and payment direct to consumers' mobile phone bills, Psonar offers access to music without the need of a bank or a credit card.

"Cambridge has a very entrepreneurial culture. We formed the ideaSpace accelerator to help people coming out of the university get started on high-impact new ventures."

STEWART MCTAVISH
FOUNDING DIRECTOR
IDEASPACE



EDINBURGH

DIGITAL EMPLOYMENT

17,136

KEY SECTOR FOCUS*

- FINTECH
- EDTECH
- SOFTWARE DEVELOPMENT

KEY CAPABILITIES*

2.9x MORE LIKELY TO SPECIALISE IN MACHINE LEARNING

2x MORE LIKELY TO SPECIALISE IN ARTIFICIAL INTELLIGENCE

1.4x MORE LIKELY TO SPECIALISE IN DATA SCIENCE

GROWTH OF COMPANIES

33%

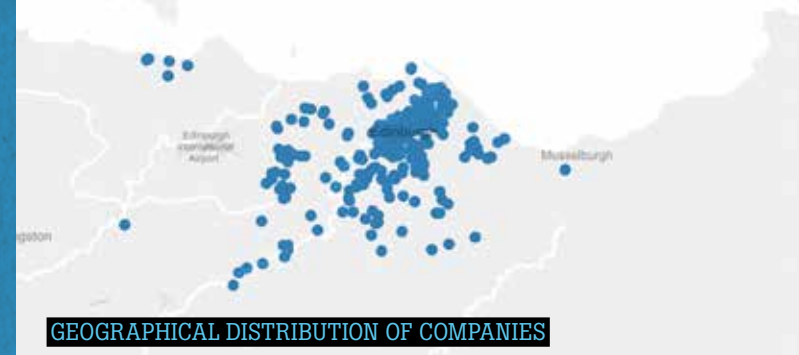
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Edinburgh's strong position as a startup city stems from a combination of its strengths in academia, extensive history in software businesses (Cisco, Oracle, IBM, Microsoft and Amazon) and the high quality of life, which encourages talented people to stay post-studies.

Edinburgh is a recent startup success story, with local examples including comparison website Skyscanner, online accountancy firm FreeAgent, and fantasy sports firm FanDuel, which recently raised £70 million in funding. Local companies feel a strong sense of community, with 88% reporting that they are part of a digital cluster. A solid support network of incubator programmes exists in the city centre, including TechCube and CodeBase.

Local businesses are more likely to seek support from other members of the community than in any other cluster and 82% reported having seen revenue rise in the past year. Digital companies also confirmed that Edinburgh University is a key source of talent and competitive advantage. Its computer science research budget is one of the largest in the world and has helped accelerate growth of the cluster. It also has the oldest centre for AI research in the UK, with 43% of companies having sought technical support from the university.

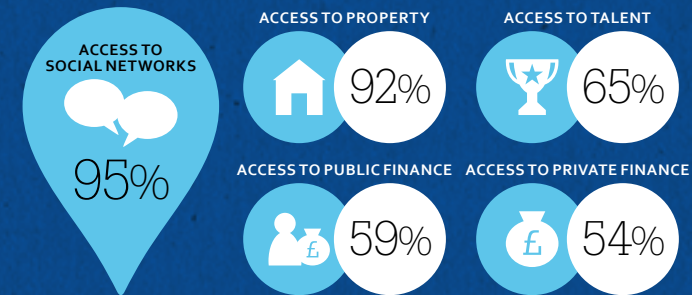


KEY BENEFITS

ACCESS TO FINANCE AND PROPERTY

The majority of companies agree that they can access property, finance, talent and networking through the cluster. Almost all companies feel that the cluster helped them find affordable working space, reflecting the efforts undertaken by organisations such as CodeBase and TechCube. Edinburgh companies also have very strong access to public finance, with 68% applying for public funding in the past year, more than any other cluster.

CLUSTER BENEFITS

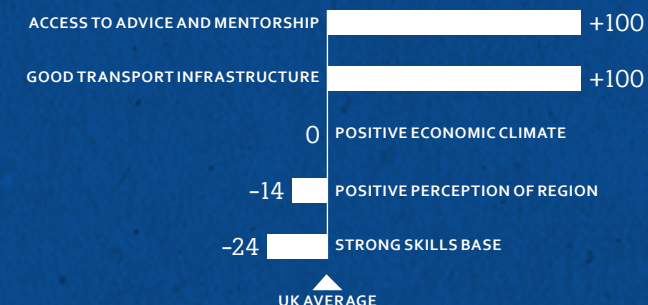


FUELLING GROWTH

TALENT MIGRATION

While Edinburgh University has one of the strongest computer science undergraduate courses in the UK, digital companies still report that they have challenges around attracting talent. Both talent production and talent migration emerged as barriers to growth.

STRENGTH OF GROWTH DRIVERS



"Edinburgh is a great place to live, and cost of living is quite low so you can easily get a company off the ground."

JOHN PEEBLES
CEO
ADMINISTRATE

EXAMPLE COMPANY PROFILES



Founded 2008

Holoxica is a high-tech startup specialising in holographic 3D technology including digital holograms and holographic video displays. The digital holograms are aimed at medical imaging, scientific visualisation or engineering design created from any kind of 3D model, scan or dataset.



Founded 2007

FreeAgent is an online accounting system specifically designed to meet the needs of micro-businesses, contractors and freelancers. FreeAgent's software and its team of support accountants currently help more than 35,000 customers to manage their business accounts more effectively.



Founded 2007

Kotikan is an app development company based in Scotland. They have been creating apps and advising on mobile strategies since 2007.

"There's a real range to the local companies. We have lots of FinTech because of the banks but there's a great breadth of digital skills across the sectors."

ANDY MURRAY
RECRUITMENT EXECUTIVE
FANDUEL

GREATER MANCHESTER

DIGITAL EMPLOYMENT

56,145

KEY SECTOR FOCUS*

- HARDWARE AND DEVICES
- MEDIA AND ENTERTAINMENT
- FINTECH

KEY CAPABILITIES*

1.5x MORE LIKELY TO SPECIALISE IN NETWORK INFRASTRUCTURE AND PROTOCOLS

1.2x MORE LIKELY TO SPECIALISE IN CLOUD COMPUTING/ SAAS/WEB SERVICES

1.1x MORE LIKELY TO SPECIALISE IN VISUAL AND AUDIO DESIGN

GROWTH OF COMPANIES

70%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Greater Manchester is a powerful hub for media, tech and content, founded on a strong research base and a growing talent pool from the area's five universities. With over 100,000 students, Greater Manchester has the largest student population in Europe.

Some £3.5 billion has been invested to support Manchester's digital and technology infrastructure. For example, Salford's £950 million MediaCityUK, Europe's first purpose-built business hub for the creative and digital industries, now hosts the BBC and ITV plus a range of content and production companies. The Sharp Project and Manchester Science Park host a range of digital technology and communication companies. In the Northern Quarter, a strong community of digital and creative startups has grown, alongside the SpacePortX co-working space.

Various networks and events are supporting the thriving startup scene, including Drinkabout Manchester and the online group, Manchester Startups. Local academic expertise is also an asset; The University of Manchester has specialisms in life sciences and materials science, and the longest established school of Computer Science in the UK. Meanwhile, Manchester Metropolitan's new digital hub, the Shed, offers space for graduates to test their technology. Notable companies include laterooms.com and boohoo.com. Key startups include Wakelet and Niftydrive.



"High-end content creation and complex content and data management and analytics are Manchester's two main overarching strengths"

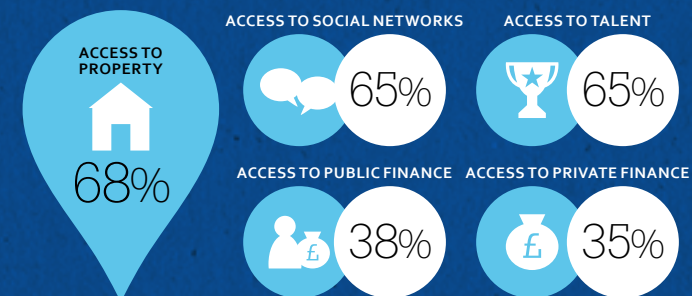
TIM NEWS
SENIOR BUSINESS DEVELOPMENT MANAGER
MIDAS

KEY BENEFITS

NETWORKING AND INFRASTRUCTURE

65% claim local networking groups that help entrepreneurs share ideas and support one another are a benefit. 68% praised the availability of working spaces such as SpacePortX, the Landing and the Sharp Project. Manchester's infrastructure investment is a key asset, with more National Grid supply points than London. It will be able to provide super-fast broadband to 6,200 businesses in 2015, and the London Internet Exchange (LINX) has launched its first regional peering point in Manchester.

CLUSTER BENEFITS

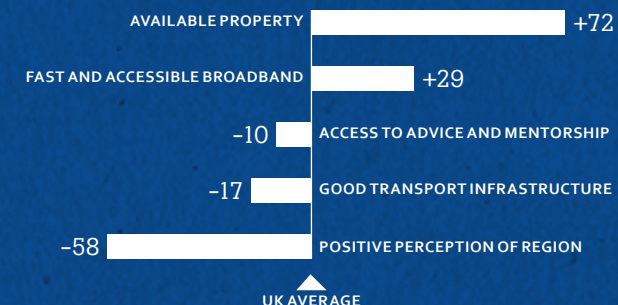


FUELLING GROWTH

ATTRACTING SKILLED WORKERS

Almost two thirds of companies believe that the Manchester cluster delivers benefits regarding access to talent. There are some 100,000 students in Manchester at any one time, providing the cluster with access to rich, diverse talent. Conversely, some still feel there is a shortage of talent in the cluster, along with poor transport infrastructure, despite its national and international connections. However there is a £1.5 billion public sector fund that has been created for transport schemes, as well as HS2 and HS3.

STRENGTH OF GROWTH DRIVERS



EXAMPLE

COMPANY PROFILES



Founded 2014

Formisimo is an advanced form analytics tool that measures user interaction with web forms. It helps to increase conversion rates of online retailers by revealing the customer pain points in online checkouts and forms.



Founded 1999

EON Reality is a Virtual Reality software developer. Its Virtual Reality solutions improve communication and knowledge transfer, from simulation based learning and safety training to the creation of interactive 3D sales and marketing materials.



Founded 2012

Bright Future Software provides software solutions for companies requiring a more stable and communicative relationship for their onshore software development projects.

"Manchester University is possibly our biggest asset - it has a global top 40 computer science department, although we still have too many engineers leaving the city."

DOUG WARD
CO-FOUNDER
TECH BRITAIN

HULL

INCLUDING EAST YORKSHIRE AND NORTHERN LINCOLNSHIRE

DIGITAL EMPLOYMENT

12,219

KEY SECTOR FOCUS*

- SOFTWARE DEVELOPMENT
- ADVERTISING AND MARKETING
- GAMES DEVELOPMENT AND PUBLISHING

KEY CAPABILITIES*

1.9x MORE LIKELY TO SPECIALISE IN PAYMENTS INFRASTRUCTURE

1.7x MORE LIKELY TO SPECIALISE IN COMPUTER SIMULATION

1.6x MORE LIKELY TO SPECIALISE IN VISUAL AND AUDIO DESIGN

GROWTH OF COMPANIES

57%

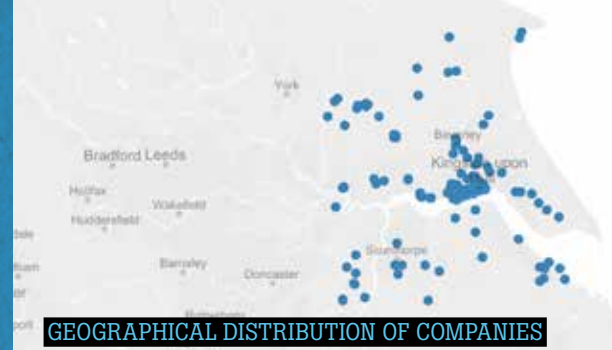
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

The emerging digital technology community in East Yorkshire and Northern Lincolnshire is focused around Hull, with concentrations in Grimsby, Howden and Melton.

The region is characterised by sizeable locally grown tech companies (Trident, Ebuyer, Summit) as well as a range of startups. These have been supported by significant local private sector investment including £15 million by the Wykeland Group into C4DI Digital Hub, a co-working space launching its own accelerator in 2015.

The high-speed fibre optic network provided by Kingston Communications is especially important for local animation and design businesses. Other local competitive advantages include the low cost of living and Hull University's strong computer sciences department. Larger innovation hubs, such as Spencer Engineering, have played a key role in growing the local startup community and support environment by providing advice and investment. Other hub organisations in the area include PwC, Ebuyer, and Amazon Web Services, through their Activate startup programme.



GEOGRAPHICAL DISTRIBUTION OF COMPANIES

"There are strong local networks – such as Spencer Engineering's incubating of local technology firms."

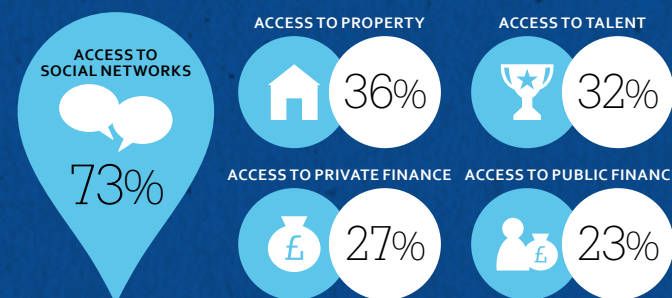
DOMINIC GIBBONS
MANAGING DIRECTOR
WYKELAND GROUP

KEY BENEFITS

FORMAL TRADING PARTNER NETWORKS

The majority of cluster members (73%) cited the strong network of entrepreneurs to share ideas and experiences with, while 45% said that a key advantage is that they can develop formal relationships, such as trading or partnering, with other companies in the cluster. However, relatively few believe that the cluster delivers benefits in terms of access to public or private finance (27% and 23% respectively), or access to talent (32%). The cluster is still quite early-stage, with all three of these areas significantly below the national average.

CLUSTER BENEFITS

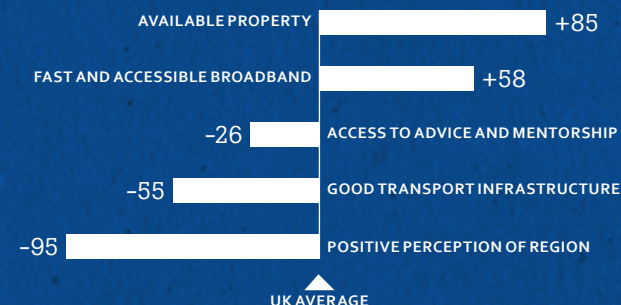


FUELLING GROWTH

POOR TRANSPORT INFRASTRUCTURE

Hull's fast fibre broadband network is regarded as a strong asset of the region, but survey respondents say that a lack of road and rail links hamper company development.

STRENGTH OF GROWTH DRIVERS



EXAMPLE COMPANY PROFILES



Founded 1994

Trident is the creator of several digital brand-management and E-commerce related services that are utilised by some of the worlds' best-known FMCG companies. It is now a \$65,000,000, 650 employee company with facilities in Singapore, China and USA.



Founded 2008

Cloud2 delivers fast enterprise intranets, business intelligence and clinical advice solutions focused on the NHS and corporate sectors.



Founded 2007

Sypro is a software product company providing project management software for over £3 billion of global construction projects.

"Hull's digital cluster reflects an established service sector and a growing startup scene as well as innovative companies that pre-date digital but have pivoted to become digital."

JOHN CONNOLLY
CO-FOUNDER
C4DI

INNER LONDON

COVERING TWELVE BOROUGHES

DIGITAL EMPLOYMENT

251,590

KEY SECTOR FOCUS*

- FINTECH
- MARKETPLACE/LEAD GENERATION
- DATA MANAGEMENT AND ANALYTICS

KEY CAPABILITIES*

1.8x MORE LIKELY TO SPECIALISE IN DATA SCIENCE

1.6x MORE LIKELY TO SPECIALISE IN MACHINE LEARNING

1.8x MORE LIKELY TO SPECIALISE IN PAYMENTS INFRASTRUCTURE

GROWTH OF COMPANIES

92%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

1 Source: London & Partners, 2014

As Europe's digital capital, Tech City in East London comprises thousands of companies, from multinationals like Google and Amazon, to fast-growing local companies like Transferwise, Unruly, Busuu and GoCardless, as well as physical hubs like Google Campus and UCL/Cisco's Idea London.

In addition to Tech City, other geographical tech hubs have formed, including Canary Wharf, the Knowledge Quarter (King's Cross), White City (Imperial West), the Olympic Park, Somerset House, Kentish Town, Tech City Croydon, Soho, Chiswick Park 'Media Village', among others.

Ecosystem-wise, in London alone there are over 36 business accelerators (eg. Seedcamp, Wayra, Techstars, Microsoft Ventures, Future Fifty and London Stock Exchange's Elite) as well as over 70⁺ co-working spaces (eg. Central Working, Level39, Tramperry, Second Home, TechHub, White Bear Yard, HearEast, We Work and Warner Yard, among others). Additionally, community networking organisations like 3beards, London's Tech Meet-ups, Tech London Advocates and Tech City UK are helping expedite cluster engagement.

London excels across the board, with particular strengths in FinTech, E-commerce, AdTech, Media and HealthTech. Peer-to-peer platforms, marketplaces, software development and data analytics are some of the key capabilities that stand out.

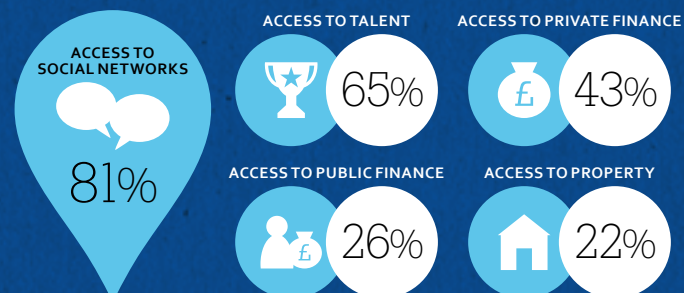
GEOGRAPHICAL DISTRIBUTION OF COMPANIES

KEY BENEFITS

THE BEST TECH TALENT AND PRIVATE FINANCE IN EUROPE

London's prime tech skills range from developers to designers to data scientists, and nearly two thirds cited this as a key benefit of the London cluster. London is supported by 45 higher education institutions, including five of the world's most prestigious institutions; King's College, Imperial College, University College London, London School of Economics and London Business School. London's top position in private finance is reflected well, with 51% of businesses saying they had sought financial support in the past year.

CLUSTER BENEFITS

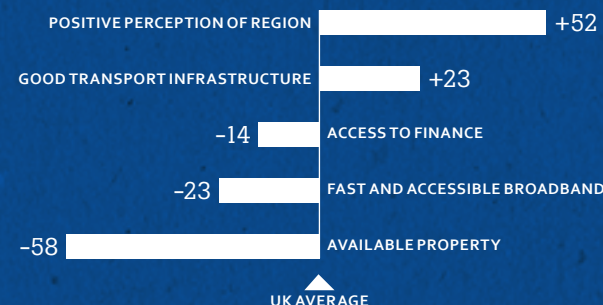


FUELLING GROWTH

AFFORDABLE PROPERTY AND TECHNICAL INFRASTRUCTURE

Despite having some of the country's most flexible working spaces in the world, such as The Tramperry, Central Working, Second Home, TechHub, White Bear Yard, WeWork, RainMaking Loft and Warner Yard, the lack of affordable property can be problematic. There can also be difficulties with broadband speeds and the ease of hiring enough skilled workers fast enough to fuel the growth of the businesses.

STRENGTH OF GROWTH DRIVERS



"London is Europe's number one tech capital and is competing on a global scale."

DAVID SLATER
DIRECTOR OF INTERNATIONAL BUSINESS DEVELOPMENT
LONDON & PARTNERS

EXAMPLE COMPANY PROFILES

GoSquared

Founded 2006

GoSquared helps over 50,000 businesses understand and connect with its online customers in more meaningful ways through easy-to-use software and real-time data analytics.

SPEKTRIX

Founded 2007

Spektrix provides cloud-based ticketing and marketing software for arts venues. The company lets arts organisations grow their audiences and increase revenue through its innovative technology and support team.

MUBI

Founded 2007

MUBI is a curated video-on-demand subscription service available anytime, anywhere. Every day MUBI's in-house film experts hand-pick a new cult, classic or award-winning film for its members to watch and discuss.

"The property market for businesses assumes that you know how big you're going to be next year – that's not realistic for fast-growing companies, and it's why co-working spaces are so important."

JAMES LAYFIELD
CEO
CENTRAL WORKING

Albert Docks, Liverpool



LIVERPOOL

DIGITAL EMPLOYMENT

9,560

KEY SECTOR FOCUS*

- GAMES DEVELOPMENT AND PUBLISHING
- SOFTWARE DEVELOPMENT
- ADVERTISING AND MARKETING

KEY CAPABILITIES*

2.8x MORE LIKELY TO SPECIALISE IN ARTIFICIAL INTELLIGENCE

2.1x MORE LIKELY TO SPECIALISE IN FIRMWARE AND OPERATING SYSTEM DEVELOPMENT

2.1x MORE LIKELY TO SPECIALISE IN VISUAL AND AUDIO DESIGN

GROWTH OF COMPANIES

119%

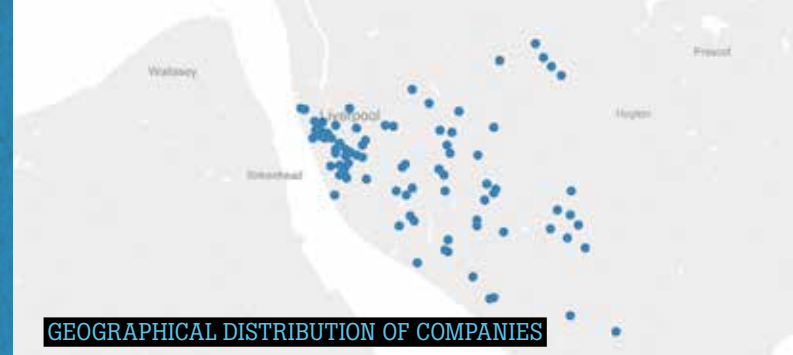
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Liverpool is particularly notable for its games development and benefits from a rich history in this space. **Psygnosis**, founded there in 1984, was a pioneer in racing games development in the UK and was quickly bought by Sony.

Liverpool's long-established gaming heritage from the 1990s is reflected in the current picture. Since the closure of Sony Studio Liverpool in 2012, talented developers have formed a number of local companies, including umbrella studio Starship and games company Firesprite. There are also growing clusters focused on IoT and HealthTech, as well as a strong ecosystem of mobile app development and creative agencies, including Studio Mashbo and Draw+Code.

The Baltic Triangle, the agency and gaming heartland, has become an important hub for the cluster, providing a variety of high-quality working spaces – such as Baltic Creative – for digital technology businesses. Away from this area, Liverpool DoES provides a co-working space, workshop and events hub for entrepreneurs and makers. A small but growing cluster of education and health firms are also located in the Liverpool Science and Innovation Park. Support organisations include Liverpool Vision, which also supports an e-health cluster as part of the TSB-supported More Independent programme.



"Liverpool has the beginnings of an eHealth and tele-care cluster. We have a chance to steal a march on other UK cities in this field."

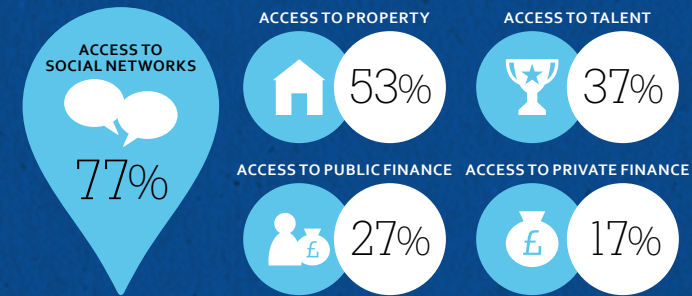
KEVIN MCMANUS
HEAD OF CREATIVE & DIGITAL INVESTMENT
LIVERPOOL VISION

KEY BENEFITS

INFORMAL NETWORKS OF ENTREPRENEURS

Affordable property is available in the cluster, supported by funding Liverpool has received from the European Regional Development Fund and the Northwest Regional Development Agency. In particular, as part of the development of Baltic Creative's development, a Community Interest Company.

CLUSTER BENEFITS

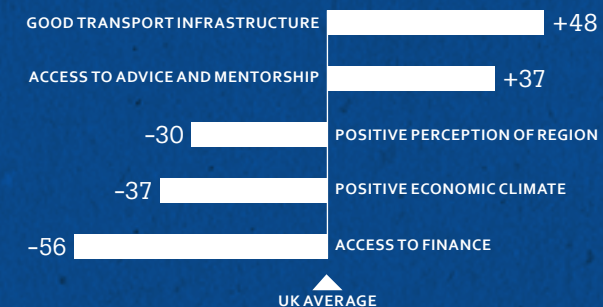


FUELLING GROWTH

ACCESS TO FINANCE

Access to finance is key in Liverpool due to the strong concentration of gaming and digital creative companies that require significant investment for development. A number of companies, such as Sentric Music, have relied on finance from outside the region. However this is improving with the NW Fund, Merseyside Special Investment Fund, Mayoral Investment Fund, and Standfast (focused on the games industry).

STRENGTH OF GROWTH DRIVERS



EXAMPLE

COMPANY PROFILES

studio Mashbo

Founded 2007

Studio Mashbo is a digital development agency that focuses on creating online problem-solving software for businesses. It enables business users to streamline web applications and make mobile and tablet websites more responsive.

LivingLens

Founded 2013

LivingLens turns users' video content into a searchable knowledge base. It takes the user's video content and enables them to search speech within the videos.

RIPSTONE

Founded 2011

Ripstone Publishing is an independent games publisher specialising in digital distribution. Ripstone is best known for games such as Pure Chess and Knytt Underground.

"A new generation of startups has grown from the skills base left over from companies such as Sony. I think the growth is also linked to the inherent entrepreneurial spirit that runs throughout Liverpool as a city."

EMILE COLEMAN
CEO
GLOBAL COACH

Millenium Bridge, Gateshead



NORTH EAST

INCLUDING NORTHUMBERLAND, TYNE AND WEAR

DIGITAL EMPLOYMENT

26,856

KEY SECTOR FOCUS*

- SOFTWARE DEVELOPMENT
- ADVERTISING AND MARKETING
- HEALTHTECH

KEY CAPABILITIES*

1.5x MORE LIKELY TO SPECIALISE IN MACHINE TO MACHINE COMMUNICATIONS

1.3x MORE LIKELY TO SPECIALISE IN CLOUD COMPUTING/ SAAS/WEB SERVICES

1.3x MORE LIKELY TO SPECIALISE IN SYSTEMS DESIGN AND INTEGRATION

GROWTH OF COMPANIES

24%

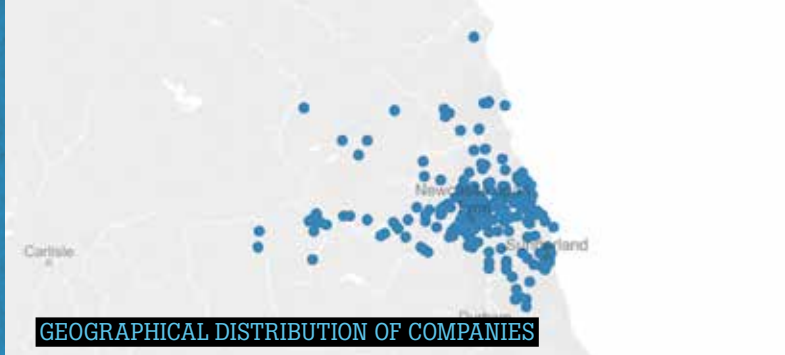
INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Newcastle and Sunderland form the core of this cluster. Its strong reputation for IT-based software engineering and back-office IT support businesses is underlined by the presence of FTSE 100 company Sage. Crucially, five local universities supply plentiful tech talent.

With its strong industrial history, this is an established community with a strong sense of identity – 77% of companies report that they are part of a digital cluster. The region has traditionally shown strengths in software development and gaming; leading games developers include Ubisoft Reflections, Epic Games UK and CCP Games.

Both private and public organisations support companies in this cluster. Over half of companies rely on local universities for training and recruitment, significantly above the national average. The area boasts a busy calendar of digital technology events, including Dynamo14, Thinking Digital, VRTGO, and The DIBI Conference, and plentiful support for digital companies. This includes Campus North, local VC Northstar Ventures, Sunderland Software City and pre-seed accelerator Ignite, which has been key to the creation of a number of digital startups.



“There’s a real myriad of companies in the North East, including a strong heritage of advanced manufacturing.”

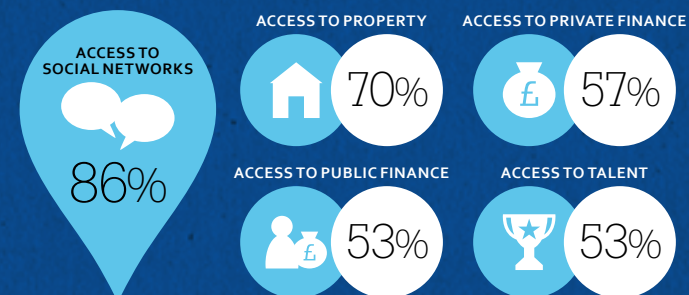
DAVID DUNN
CEO
SUNDERLAND
SOFTWARE CITY

KEY BENEFITS

HIGH SATISFACTION

Companies in the North East are some of the most positive in the UK about the benefits delivered by their cluster. Local networking groups help entrepreneurs share ideas and support one another, while co-working spaces throughout the region, such as Campus North, provide affordable space for startups. Some 48% of companies had sought public finance in the past year, reflecting Sunderland Software City’s work introducing companies to Innovate UK.

CLUSTER BENEFITS

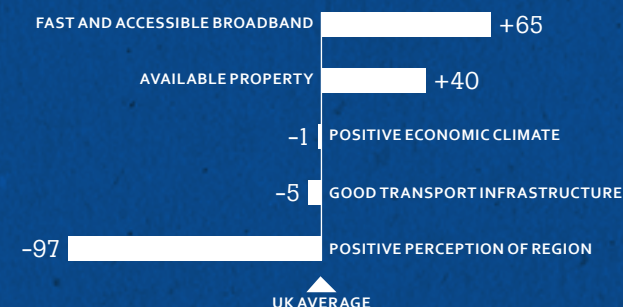


FUELLING GROWTH

WEAK INFRASTRUCTURE AND TALENT POOL

Recent investment by Newcastle City Council, Sunderland and BT in superfast broadband has clearly been successful, with local companies much less likely than their peers to complain about technical infrastructure. However, weak transport links in the region are a concern, as is talent’s attraction to the region.

STRENGTH OF GROWTH DRIVERS



EXAMPLE COMPANY PROFILES



Founded 2006

Saggezza is a global solutions provider that combines software development and implementation with its data analytics platform.



Founded 2013

Reframed is a social platform which enables users to comment on videos in real time, and share their videos and comments with other users.

Perfect Image/IT Solutions

Founded 1991

Perfect Image is a full-service IT provider, delivering tailored solutions and services that improve its customers’ businesses. It provides managed infrastructure and cloud services.

“There are clusters of activity across the North East – Newcastle is the hub, but Sunderland and Gateshead also have their own communities.”

PAUL SMITH
CO-FOUNDER & CEO
IGNITE 100



NORWICH

AND NORFOLK

DIGITAL EMPLOYMENT

14,521

KEY SECTOR FOCUS*

- TELECOMMUNICATIONS AND NETWORKS
- ADVERTISING AND MARKETING
- SOFTWARE DEVELOPMENT

KEY CAPABILITIES*

1.4x MORE LIKELY TO SPECIALISE IN CONTENT AND MEDIA PRODUCTION

1.2x MORE LIKELY TO SPECIALISE IN MACHINE TO MACHINE COMMUNICATIONS

1.2x MORE LIKELY TO SPECIALISE IN NETWORK INFRASTRUCTURE AND PROTOCOLS

GROWTH OF COMPANIES

21%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

A newly developing cluster, there is a growing startup scene in Norwich and East Yarmouth, that draws on the area's existing creative sector.

Survey respondents in Norfolk were almost three times as likely as the national average to be marketing services businesses. There is an ever-increasing body of technology startups emerging, including online carpooling service company Liftshare, and customer feedback survey company Servicetick. This ecosystem is supported by networks such as SyncNorwich, which has over 750 members, Norfolk Developers, and meet-up group Hot Source.

Support from local companies such as Proxama, has also played a prominent role. This includes setting up Whitespace, a co-working space in Norwich City Centre. Another key driver is the strong supply of creative graduates coming out of two local universities. In particular, graduates in computer science, software engineering and film, television and media studies from the University of East Anglia and video games art, design, digital photography, animation, and film graduates from Norwich University for the Arts.

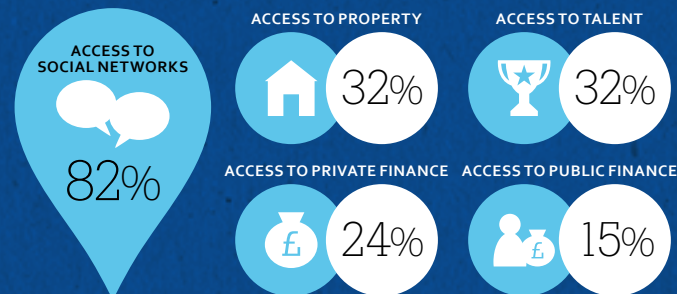
GEOGRAPHICAL DISTRIBUTION OF COMPANIES

KEY BENEFITS

SOCIAL NETWORKS

Most cluster members (73%) report that there is a strong network of entrepreneurs to share ideas and experiences with, reflecting the membership bases of local organisations such as SyncNorwich and Agile East Anglia.

CLUSTER BENEFITS

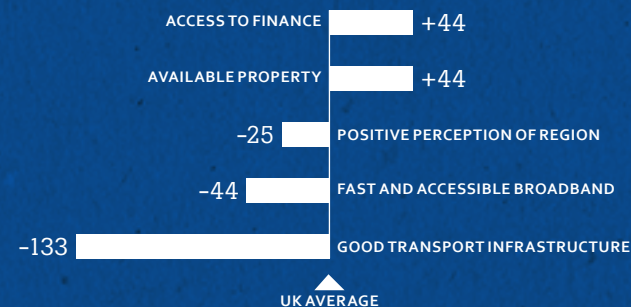


FUELLING GROWTH

WEAK INFRASTRUCTURE AND EARLY-STAGE STATUS

Few believe that the cluster delivers enough benefits in terms of access to public or private finance (15% and 24% respectively), despite the recent emergence of the Anglia Capital Group, which grew out of Cambridge Capital Group, and Connect East, a business angel network. It was also felt that the cluster needs to do more to raise its visibility as a technology hub.

STRENGTH OF GROWTH DRIVERS



"Norwich has strong universities and produces talented people. There has been a realisation that there is enough of a quantum mass of bright people to stay here."

JAMES DUEZ
CO-FOUNDER
RAINBIRD
TECHNOLOGIES

EXAMPLE

COMPANY PROFILES

MADE

Founded 2004

MADE is a digital communications agency, supplying branding, print design, digital services and strategic marketing support to organisations in East Anglia and London.



Founded 2012

Naked Element designs and builds made-to-measure enterprise software and cross-platform mobile apps.



Founded 2013

Rainbird is a cloud-based artificial intelligence platform that enables people to build smart decision tools, by capturing their expertise on any subject and publishing a virtual online 'expert' with human-decision making capabilities. Rainbird can be used to diagnose problems, make recommendations and analyse data.

"Norwich is a great place to work – a beautiful city, with a low cost of living."

SEAN CLARK
ENTREPRENEUR, SEARCH & SOCIAL
MEDIA MARKETING CONSULTANT
SEANCLARK.COM



OXFORD

AND OXFORDSHIRE

DIGITAL EMPLOYMENT

21,970

KEY SECTOR FOCUS*

- EDTECH
- HEALTHTECH
- SOFTWARE DEVELOPMENT

KEY CAPABILITIES*

1.2x MORE LIKELY TO SPECIALISE IN CYBER SECURITY

1.1x MORE LIKELY TO SPECIALISE IN MOBILE AND TABLET DEVELOPMENT

1.1x MORE LIKELY TO SPECIALISE IN SYSTEMS DESIGN AND INTEGRATION

GROWTH OF COMPANIES

24%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

A growing network of local developer and entrepreneur groups are emerging in this cluster. Success stories from the area include the high-profile acquisitions of NaturalMotion by Zynga and two university spin-outs, Dark Blue Labs and Vision Factory by Google.

Oxford has also shown strengths in big data and cyber security through support from the Big Data Institute, the Cyber Security Centre and the Global Cyber Security Capacity Programme. New strengths emerging include EdTech and HealthTech. A number of organisations have been established to support the growing startup scene, including Digital Health Oxford and Digital Oxford, which recently re-launched. Oxford Entrepreneurs, a student society based in Saïd Business School claims to be the largest student entrepreneurs society in the world. Venturefest also held its 2014 innovation conference at the Saïd Business School.

Local academic centres of excellence include three science parks, the University of Oxford's e-Research Centre, its long established Computer Science Department, and the Isis Innovation software incubator.



GEOGRAPHICAL DISTRIBUTION OF COMPANIES

"There are lots of startups across all sectors in Oxford, and an increasingly vibrant community – though it is not always easy to see from the outside."

DAVE FLETCHER
CHAIR
DIGITAL OXFORD

KEY BENEFITS

ACCESS TO TALENT AND VIBRANT NETWORK

Oxford's cluster identity is still at an early stage, with only 53% of companies claiming they are part of a digital cluster – the lowest proportion of any of the areas in this report. Those who do feel part of a cluster report a relatively vibrant social community, with strong access to talent, driven by the university, but limited benefits in terms of finance or property. The fragmented nature of the local community, which coalesces around the many different college institutes and groups rather than a single hub may contribute to this.

CLUSTER BENEFITS

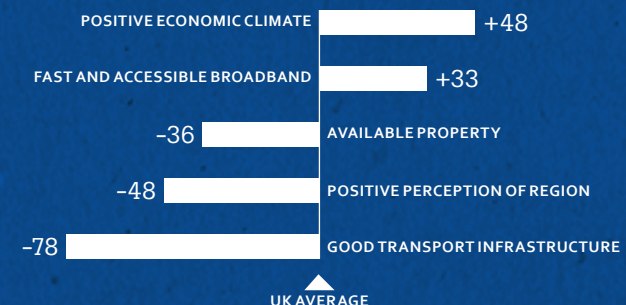


FUELLING GROWTH

TRANSPORT AND PROPERTY

Although Oxford has an outstanding reputation for academia, some claim the region is in the early stages of promoting entrepreneurship. Improved transport infrastructure, and affordable city-centre office space, are seen as key to fuel further growth by the local community.

STRENGTH OF GROWTH DRIVERS



EXAMPLE COMPANY PROFILES



Founded 1991

OmPrompt provides Customer Automation Management (CAM) services to many of the world's largest manufacturers through its intelligent cloud.



Founded 1969

Solid State Logic designs, manufactures and supplies worldwide analogue and digital sound mixing consoles for music recording studios, live music and theatrical performance, TV broadcast and film & television post-production.



Founded 2008

Incuna is a digital agency in the healthcare sector, delivering web and mobile apps for pharmaceutical companies, global health projects and the NHS.

"Our challenge is to better communicate the assets and opportunities in the region to establish a more dynamic investment ecosystem."

TONY HART
OXFORDSHIRE LEP



Sheffield Peace Gardens

SHEFFIELD

INCLUDING SOUTH YORKSHIRE

DIGITAL EMPLOYMENT

21,403

KEY SECTOR FOCUS*

- EDTECH
- DATA MANAGEMENT AND ANALYTICS
- TELECOMMUNICATIONS AND NETWORKING

KEY CAPABILITIES*

1.4x MORE LIKELY TO SPECIALISE IN ARTIFICIAL INTELLIGENCE

1.3x MORE LIKELY TO SPECIALISE IN MACHINE TO MACHINE COMMUNICATIONS

1.3x MORE LIKELY TO SPECIALISE IN NETWORK INFRASTRUCTURE AND PROTOCOLS

GROWTH OF COMPANIES

17%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

Sheffield leads South Yorkshire's digital sector, with smaller clusters based around Barnsley and Doncaster. Companies in this region boast one of the highest rates of turnover growth (47%) of all UK regions, despite a lower rate of company creation.

The area is known for advanced manufacturing and tech-enabled professional services, such as intelligent call centres and customer support. These growing tech sectors build on Sheffield's traditional strength in back-office professional services.

Sheffield's digital community is active; 60% of companies surveyed report that they are part of a digital cluster, though only 53% reported a strong network of entrepreneurs to share ideas and experiences with. There is a range of long-standing industry and startup meet-ups, and Sheffield University runs quarterly startup weekends. This activity is supported by the Sheffield Digital Campus and Dotforge, a pre-seed accelerator established in 2012.

Sheffield has two universities, bringing about 65,000 students to the city every year. Sheffield University is world-class for computer science, while Sheffield Hallam has fully integrated its Arts, Computing, Engineering and Sciences into a single facility, generating cross-disciplinary skills.



GEOGRAPHICAL DISTRIBUTION OF COMPANIES

"Where there is a critical mass of entrepreneurs and digital and creative people, you can create a Tech City-like cluster. We are starting to see this around Sheffield in particular."

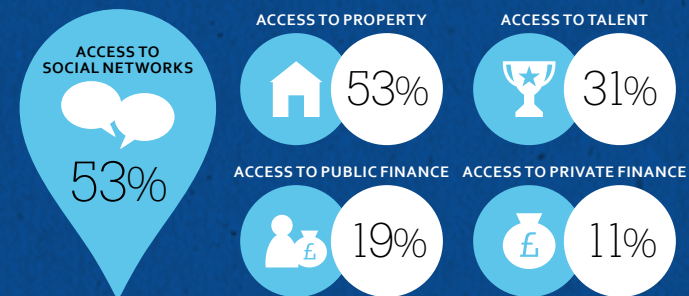
LEE STRAFFORD
CO-FOUNDER
PLUSNET

KEY BENEFITS

WELL-ESTABLISHED, PAST SUCCESSES

Two UK tech flotations of recent years; infrastructure software developer Servelec (£122 million) and distributed systems developer WANdisco (£15 million), originated in Sheffield.

CLUSTER BENEFITS

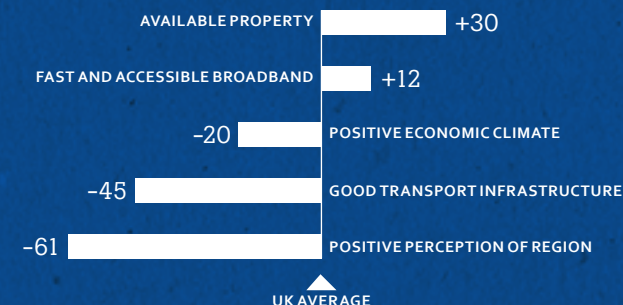


FUELLING GROWTH

POOR INFRASTRUCTURE, ATTRACTING TALENT

While Sheffield is well connected to London, South Yorkshire in general could benefit from enhanced connection to other Northern cities, as identified by the Institute of Civil Engineers. The local university's strong and growing reputation in technology needs to translate into attracting established talent. Other challenges include access to public or private finance and access to talent.

STRENGTH OF GROWTH DRIVERS



EXAMPLE

COMPANY PROFILES



Founded 1996

Rare is an integrated marketing agency providing a broad range of clients with strategic marketing, creative design and digital services. Its digital work encompasses website and mobile app design, bespoke software tools, search marketing and digital communications.



FLOWIFY

Founded 2013

Flowify is a tablet application for hospitality. Its personal assistant, Sofia, helps hotels and restaurants increase revenue and reduce costs.



a Foundation 9 Entertainment Studio

Founded 2003

Sumo Digital develops gaming software for all major console and handheld platforms as well as mobile and tablet.

"We're attracting fantastically talented, ambitious startups from around the world to Dotforge. Sheffield is at a tipping point, the cluster needs a hub to really galvanise the community."

EMMA CHESHIRE
CEO
DOTFORGE ACCELERATOR



SOUTH WALES

INCLUDING CARDIFF AND SWANSEA

DIGITAL EMPLOYMENT

28,308

KEY SECTOR FOCUS*

- HEALTHTECH
- DATA MANAGEMENT AND ANALYTICS
- E-COMMERCE

KEY CAPABILITIES*

1.3x MORE LIKELY TO SPECIALISE IN PAYMENTS INFRASTRUCTURE

1.1x MORE LIKELY TO SPECIALISE IN SYSTEMS DESIGN AND INTEGRATION

1.1x MORE LIKELY TO SPECIALISE IN ARTIFICIAL INTELLIGENCE

GROWTH OF COMPANIES

87%

INCREASE IN NEW DIGITAL COMPANIES INCORPORATED BETWEEN 2010 AND 2013

*Compared to the national average

South Wales is emerging as a digital technology hub, with 60% of the companies surveyed citing that they are part of a digital cluster. Most are based in Cardiff and Swansea, and a number benefit from support from centres like the Welsh ICE co-working space in Caerphilly.

Small firms and startups dominate, with 87% of companies employing five people or fewer. These firms are optimistic about the future, 98% expect to grow revenues next year. The startup scene in Cardiff and Swansea spans multiple sectors, including media and sport. However its real potential may lie in health, with Wales' status as a life sciences hub a key strength. A number of travel technology and FinTech startups exist in Cardiff, alongside an emerging games cluster.

This is a growing sector supported by organisations such as Cardiff Start, a tech startup network, and co-working spaces like FoundersHub, Indycube, GloWorks and TechHub Swansea, and industry groups such as Unified Diff, Cardiff & Swansea Start, Games Dev South Wales and Digital 2015. The Alacrity foundation in Newport helps graduates set up high-tech enterprises. Local startups include health app Nudjed and photo printing API Pwinty.

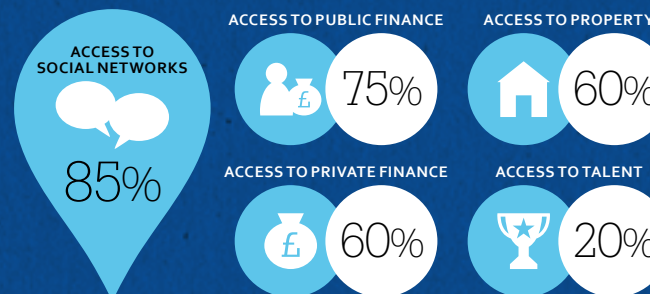
GEOGRAPHICAL DISTRIBUTION OF COMPANIES

KEY BENEFITS

ACCESS TO FINANCE AND PROPERTY

A vibrant network of entrepreneurs to share ideas and experiences with was highlighted by 85% of companies. TechHub Swansea and the ICE centre have helped provide affordable, flexible property and a focal point around which social networks can form. Funds such as Business Wales' Digital Development Fund and Cardiff University's Fusion IP partnership were mentioned by three quarters of companies as having helped with access to finance, though funding remains a concern.

CLUSTER BENEFITS

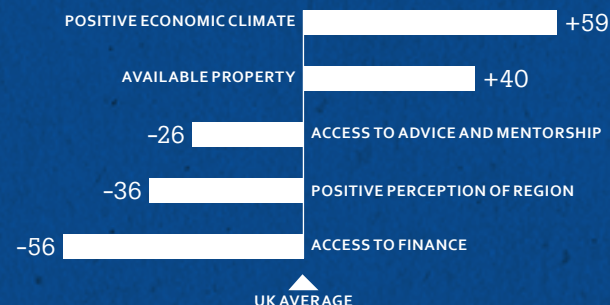


FUELLING GROWTH

ATTRACTING TALENT

Attracting skilled workers continues to be a challenge for the region, despite the presence of five local universities. Local policymakers and cluster leaders are seeking to address this through public funding schemes and a growing range of networking opportunities, such as Jobs Growth Wales and a pilot for a software university currently running.

STRENGTH OF GROWTH DRIVERS



"Cardiff and Swansea have real strengths in media and sport for the digital technology sector to build around. We have the BBC and top-class football and rugby."

NEIL COCKER
CO-FOUNDER
CARDIFF START

EXAMPLE COMPANY PROFILES



Founded 2012

Pwinty provides an API (application programme interface) allowing users to order photo prints from within an application. It helps app creators to monetise its apps while driving customer satisfaction.



landmax.pro

Founded 2013

Landmax.pro is a cloud-based, one-stop solution for lettings and estate agents which enables them to manage accounts, maintenance, advertising and communication all in one place.



Founded 2009

Dizzyjam is an E-commerce platform for selling products to a community or fanbase. Its bespoke tools enable users to monetise massive vertical markets.

"It's a really diverse sector. There's a strong HealthTech community that works with the BioTech companies we have here, but also lots of data companies and E-commerce."

GARETH JONES
CEO
WELSH ICE



DUNDEE

DIGITAL EMPLOYMENT

3,808

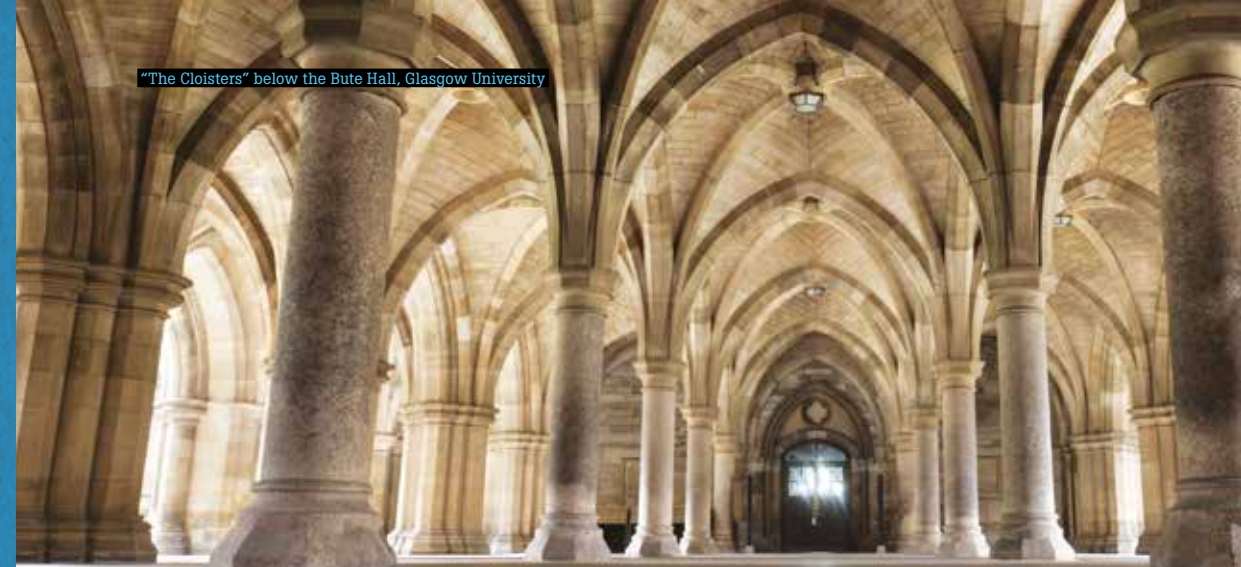
2013-2020 GROWTH

2.28%



Dundee's digital technology sector has been driven by a thriving games industry. The city's digital tech businesses have produced several hit video games, including the first of the Grand Theft Auto series (DMA Designs, now Rockstar North) and the Championship Manager Series (Dynamo Games). Last year the city hosted the NEO digital arts festival, while the Dundee Design Museum welcomed its first games designer in residence.

The strength of this sector has been underpinned by significant investment in education. In 2009 the UK Government invested £2.5 million in a video game centre at Abertay University, the first university in the world to offer a course in computer video gaming engineering. This investment has continued with the set-up of IDEAScotland (a collaboration of Brightsolid, DC Thomson, University of Abertay Dundee and University of Dundee) which will support startups in the digital, technology and creative media sectors in Dundee and more broadly.



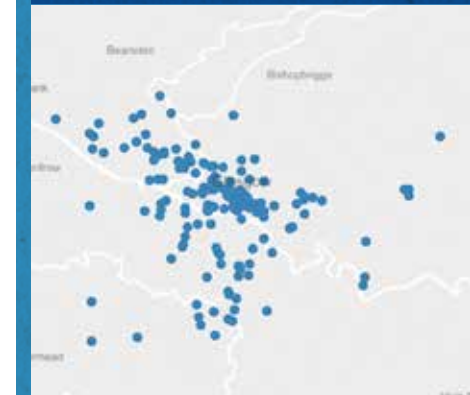
GLASGOW

DIGITAL EMPLOYMENT

19,282

2013-2020 GROWTH

3.34%



Glasgow has long been a centre for innovation, including in digital technology. The University of Strathclyde provides a reliable pool of computer science graduates and labour costs are typically lower than London, making it an attractive location for startups. The University of Glasgow and Glasgow School of Art are also producing talent well-suited to local tech companies.

There are a number of networking forums, such as the RookieOven meet-up for startups. The city currently lacks a network of incubators and accelerators to support the startup community, but there are plans to open the RookieOven Space in 2015.

Glasgow has already produced well known digital innovators, including Insignia Technologies ("smart" packaging, with pigments to identify expired food) and design agency Snook (apps to deliver feedback to local police forces). Others include Insurance by Jack, innovating how small businesses buy insurance, and Farm Geek, which is developing business management software for farmers.

The city was recently awarded a £24 million 'smart cities' grant from the UK Government, to help integrate digital technology further into the fabric of the city and provide opportunities for digital tech businesses in the future, including helping to develop the support framework required to help the cluster grow. Local startup Dynamically Loaded is supporting this through its innovative personal data store platform.

Priory Church, Great Malvern

GREAT MALVERN

INCLUDING WORCESTERSHIRE

DIGITAL EMPLOYMENT

9,353

2013-2020 GROWTH

0.7%

The Great Malvern cluster focuses primarily on cyber security and includes around 80 small companies.* Many began their origins as spinouts from QinetiQ, the privatised arm of the Government's Defence Evaluation and Research Agency, which has a large operation in the town. The close proximity of GCHQ in Cheltenham and the Special Air Services (SAS) in Hereford has made the area a magnet for professionals with specialist cyber security skills.

The majority of small cyber security companies in Malvern are located at the Wyche Innovation Centre. However, core companies within the cluster are located across Worcestershire, Herefordshire and Gloucestershire. Key IQ Ltd runs a co-working space and helps the area's 80+ cyber security companies network and collaborate. Companies cooperate on a range of initiatives to encourage growth, improve the cyber security of local enterprises, and also raise awareness of cyber security amongst young people.

The area in and around Malvern, dubbed 'Cyber Valley' is now recognised as a growing centre in the UK for the research, development and commercialisation of cyber security products and services.

* There are a further 13 cyber clusters in existence or soon to be launched across the UK, following the lead of the flourishing Malvern cluster. This includes Bath; Cambridge; Exeter; London; Kent; North East (Tyne & Wear); Northern Ireland (Belfast); South Wales (Cardiff); Sussex (Brighton); Solent (Southampton); Thames Valley (Reading).

City Square, Leeds

LEEDS

Leeds has a strong digital technology sector, specialising in data analytics and management which underpins strengths across health analytics, data science and technology and FinTech.

The city has one of the highest concentrations of health informatics professionals globally with firms such as EMIS and TPP. The National Consumer Data Research Centre at the University of Leeds, and firms such as Asda contribute to this cluster's specialism in data.

Leeds is also a major centre for financial services, the home of the internet bank First Direct, and this, alongside digital strengths, means the city is well placed to take advantage of opportunities in FinTech.

The cluster includes a number of the digital operations of major corporates such as Sky (Leeds is the home of SkyBet), NHS (hosting the NHS Data Spine), Pace, EchoStar Telecommunications and Rockstar (developers of a number of the Grand Theft Auto series).

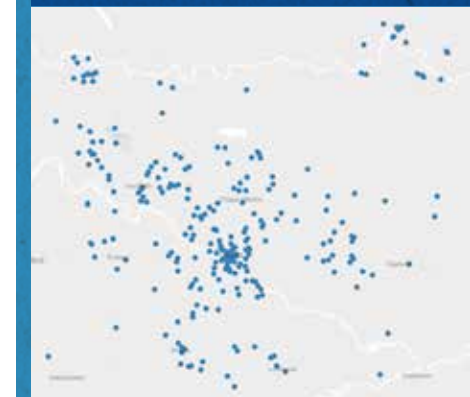
Leeds' startup community is beginning to galvanise through Lean Startup Yorkshire, Leeds Hack, the Leeds Data Mill (the city's open data platform) and the Advanced Digital Institute in nearby Saltaire (Bradford). Also, physical spaces like RoundFoundry and Duke Studios are housing growing startups and creative companies. Opportunities for collaboration have been boosted through the IP Exchange group iXLeeds, the recent launch of a Digital Catapult centre in Bradford, the Open Data Institute Node and the enterprise investment made by Leeds University.

DIGITAL EMPLOYMENT

44,951

2013-2020 GROWTH

7.28%



READING

INCLUDING BERKSHIRE

DIGITAL EMPLOYMENT

54,527

2013-2020 GROWTH

5.3%

Located at the heart of UK's traditional enterprise and science tech belt, Reading has a strong history in digital technology. According to KPMG, Reading is the UK's number one local authority digital cluster in the UK (almost one-in-five enterprises are tech firms) and the proportion of tech enterprises in Reading is three times the national average.

Reading is home to some of the world's biggest technology companies including Oracle, Microsoft, Symantec, Huawei and Nvidia and the UK's pioneering Big Data startup, DataSift, which is based at the enterprise centre in the University of Reading (UoR). The UoR is home to many science-based specialisms, including climate change and satellite imaging, and has just received funding for a multi-million pound environmental "Big Data" centre.

The startup scene is currently being re-energised by ConnectTVT, which has opened an innovation hub and co-working space. There are also plans to build a lab and space to be shared with an accelerator in 2015. Early stages indicate Big Data, Open Data and Internet of Things (IoT) as particular areas of expertise and a focus on business tech innovation.



PROFILING DIGITAL SECTORS

As well as understanding where the UK's digital companies are growing by geographical location, Tech Nation seeks to showcase the sectors these companies are excelling in. We want to highlight the capabilities and specialisms that are at the beating heart of the UK digital economy.

In this section we examine eleven key sectors, and noted which companies in our survey identified as being reflective of their business activities:

- | | |
|-------------------------------------|--------------------------------------|
| 68 Advertising and marketing | 74 HealthTech |
| 69 Data management and analytics | 75 Marketplace and lead generation |
| 70 E-commerce | 76 Media and entertainment |
| 71 EdTech | 77 Software development |
| 72 FinTech | 78 Telecommunications and networking |
| 73 Games development and publishing | |

We also looked at the capabilities that are likely to be critical to each of these sectors, and noted the clusters where there is a growing sector specialism.



ADVERTISING AND MARKETING

Built on the UK's historic strength as a creative nation, this sector, along with media and entertainment, makes up one of the two largest sectors of the digital economy. 11% of survey respondents described advertising and marketing as the sector that best described their business. This includes a wide range of professional services agencies providing SEO, social media analytics, app development and real-time advertising.

We found thriving communities across the UK, with this sector mapping closely to traditional marketing strongholds, such as Inner London, Brighton and Bournemouth. We also found a high number of advertising and marketing companies in Hull and Cambridge. In certain cases, companies have chosen to cluster around certain locations in order to be near universities that produce strong graduates; or close to business clients. Some respondents cited better quality of life as a key factor (particularly in the case of places such as Brighton and Bournemouth).

POINTS OF INTEREST

- 83% said they traded or partnered with other members of their cluster
- 62% said that local quality of life was a key reason for company location – more than any other sector

EXAMPLE COMPANY PROFILES



BRIGHTON AND HOVE
FOUNDED 2003

Leapfrog is a retail marketing agency specialising in the premium/luxury sector. It helps its clients craft game-changing digital experiences to increase loyalty, profitability and market share.

ONESPACEMEDIA

CAMBRIDGE
FOUNDED 2008

Onspacemedia is a digital creative agency that provides elegant, cost-effective services to an international client base. It specialises in strategy-inspired web development.

REVENUE GROWTH

72% SAID REVENUES GREW LAST YEAR

33% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Brighton
- Bournemouth
- Cambridge
- Hull
- Inner London
- Norwich

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Digital marketing
- Content and media production
- Visual and audio design
- UI and UX design
- Mobile and tablet development

PRIMARY NEED

40%
said focus on local skills



DATA MANAGEMENT AND ANALYTICS

REVENUE GROWTH

67% SAID REVENUES GREW LAST YEAR

37% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Belfast
- Bristol & Bath
- Cambridge
- Inner London
- Sheffield
- South Wales

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Artificial intelligence
- Data science
- Machine learning
- Cloud computing/SaaS/ Web services
- Machine to machine communications

PRIMARY NEED

37%
said improved access to finance

Data management and analytics includes a wide range of companies with many working horizontally across other sectors. As such, a number of these companies categorized themselves within other sectors (e.g. HealthTech, because the business specialises in data management for health organisations). These businesses have core expertise in data storage and unlocking insights through quantitative intelligence. 'Big Data' is driving trends in this sector, with companies growing rapidly.

The sector needs highly skilled talent, employing a higher percentage of PhD and Masters-level employees compared with other digital sectors. This reflects the need for a strong range of technical skills around AI, advanced data analysis, and machine learning. Support from local universities is therefore crucial with these firms more likely to locate themselves near educational institutions to take advantage of research developments and a thriving talent pool. Leading clusters in this sector include Inner London, Bristol & Bath, South Wales, Sheffield, Cambridge and Belfast, with a number of cross-sector companies found across the UK.

POINTS OF INTEREST

- 1.5x more likely to have sought private financial support
- 1.5x more likely to consider masters and PhD programmes as key to building skills

EXAMPLE COMPANY PROFILES



EDINBURGH
FOUNDED 2008

SoDash/Winterwell helps organisations deliver excellent and efficient customer service via social media, using software based on data-science and big-data analytics.



BRIGHTON AND HOVE
FOUNDED 2009

Trackpal provides fully automated reporting designed for digital marketing professionals that makes the regular process of weekly and monthly data performance reporting more profitable.



E-COMMERCE

E-commerce includes businesses selling physical and digital goods directly to consumers and businesses, or providing the platforms and infrastructure to enable those transactions. Looking broadly at this sector, and including all related activity by companies, E-commerce is clearly an integral part of the UK economy. Indeed, according to the ONS, in 2013, a fifth of UK business turnover was generated by E-commerce sales¹ and in 2014, UK nationals spent £54 billion online (16.5% of global spend).²

The emergence of prominent E-commerce companies is one of the UK's big economic success stories. The likes of AO.com, notonthehighstreet.com and MADE.com have seen significant growth, while ASOS.com has become one of the world's leading global clothing E-commerce businesses. Distance selling regulations, the early adoption of innovative payment methods, and logistical efficiencies have contributed to the UK's position as a leading E-commerce powerhouse. E-commerce companies are prominent in Greater Manchester, South Wales, Bournemouth and Inner London, with distribution centres located in Greater London and Sheffield.

POINTS OF INTEREST

- 1.5x as likely as other companies to consider local university support a reason for their location

EXAMPLE COMPANY PROFILES

SECRETSALES.com

GREATER LONDON
FOUNDED 2007

SecretSales.com is a fashion flash sales business, which allows consumers to access sales from over 1500 brands on a range of categories including fashion, accessories, beauty and homeware.



BOURNEMOUTH AND POOLE
FOUNDED 2004

Folk Digital are thinkers, storytellers, designers and developers offering digital leadership to luxury brands through purposeful storytelling, future-proof E-commerce and intelligent innovation.

REVENUE GROWTH

71% SAID REVENUES GREW LAST YEAR

55% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Bournemouth
- Greater Manchester
- Inner London
- Sheffield
- South Wales

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Payments infrastructure
- Cyber security
- Digital marketing
- Software engineering
- Data science

PRIMARY NEED

52%
said improved access to finance

¹ www.ons.gov.uk/ons/rel/rditz/e-commerce-and-internet-use/e-commerce-and-internet-use--2013/sty-ecom-2013.html
² blog.payoneer.com/in-2015-ecommerce-sales-will-reach-1-592-trillion/#sthash.aQ2RCC7f.dpuf



EDTECH

Educational Technology (EdTech) – using technology to improve learning – includes companies developing hardware (e.g. interactive whiteboards), software platforms (e.g. virtual learning environments), learning apps (e.g. a language learning app) and digital content.

Business opportunity extends well beyond the UK because English is a key language for e-learning globally. The finance community is investing heavily – from private equity companies and VCs, to world leaders like Pearson.

Organisations like The Education Foundation are helping to support the growth of the sector, through initiatives like the EdTech Incubator. Sheffield and Oxford are both cited as having strengths in EdTech, with EdTech firms clustering around Oxford's publishers in particular. Birmingham and Edinburgh also have a growing expertise in this sector.

POINTS OF INTEREST

- 57% have sought advice on business and marketing skills – more than any other sector
- 2x as likely as other businesses to have used tech-focused education specialists to build skills

EXAMPLE COMPANY PROFILES



NORTH EAST
FOUNDED 2007

The Test Factory provides online assessment solutions to corporate and education clients. Its technology and platform help clients deliver sophisticated online tests in over 20 languages worldwide each month, to support learning, accreditation and recruitment.



LEEDS
FOUNDED 2007

Sonocent is a new form of note-taking based on annotating visualised audio. It has a desktop product Audio Notetaker as well as a phone/tablet companion product Sonocent Recorder.

FINTECH

Financial clusters have grown up around the UK's existing international finance hubs of London and Edinburgh. This is a rapidly growing sector for the UK, worth around £2 billion annually.

FinTech is establishing a presence in Leeds, the second largest centre for banking outside London, and Belfast – the number one destination for financial technology research and development investments (according to UKTI). Cardiff, Greater Manchester, and Birmingham also have growing expertise, supported by the presence of key banks and financial institutions.

According to EY, the UK's growing strengths in FinTech are due to the presence of a large and technologically sophisticated customer base; good availability of business capital; and excellent financial services infrastructure. Government policy has also been a driver for growth with government supporting initiatives like Innovate Finance and Project Innovate (a programme of the Financial Conduct Authority supporting FinTech).

POINTS OF INTEREST

- 1.8x more likely to cite access to finance, and 1.6x more likely to cite support from local universities as drivers of location
- More than twice as likely as other companies to have sought private finance in the past year

EXAMPLE COMPANY PROFILES



INNER LONDON
FOUNDED 2005

Small World FS provides a trusted, simple and low-cost way for consumers and businesses to send money to 190 countries worldwide.



EDINBURGH
FOUNDED 2011

miiCard (My Internet Identity) allows individuals and businesses to confirm an online identity that eliminates fraud, removes barriers to new customer acquisition and reduces operational costs.

REVENUE GROWTH

88% SAID REVENUES GREW LAST YEAR

64% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Belfast
- Cardiff
- Edinburgh
- Greater Manchester
- Inner London
- Leeds

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Payments infrastructure
- Cyber security
- Machine learning
- Data science
- Software engineering

PRIMARY NEED

51%
said better access to talent

REVENUE GROWTH

45% SAID REVENUES GREW LAST YEAR

30% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Belfast
- Birmingham
- Bournemouth
- Brighton
- Bristol & Bath
- Dundee
- Hull
- Liverpool
- North East

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Computer simulation
- Artificial intelligence
- Mobile and tablet development
- Content and media production
- Visual and audio design

PRIMARY NEED

49%
said improved access to finance

¹ www.nesta.org.uk/publications/map-uk-games-industry

GAMES DEVELOPMENT AND PUBLISHING

The UK has a strong competitive advantage in the games industry which dates back to the 1980s. Nesta estimates this sector contributes £1.7 billion to the UK economy.

Games development and publishing includes businesses developing and distributing games across a number of platforms like consoles, PCs and mobile and tablet devices.

Investment by major console developers (e.g. Sony, Microsoft, Nintendo) and publishers (EA, Activision etc.) has been a key driver, with independent UK games companies acquired by major US and international businesses (e.g. Psygnosis in Liverpool being purchased by Sony, Rare by Microsoft, etc).

The growth of iOS and tablet gaming, as well as platforms such as Steam and XBLA have enabled smaller, 'indie' studios to emerge, requiring less upfront financial support from publishers – but access to finance is a key issue for new studios as even simple games can require months or years of work before launch.

POINTS OF INTEREST

- 2x as likely to declare local sector expertise to be a key reason for location
- 1.4x as likely to develop skills through local masters and PhD courses

EXAMPLE COMPANY PROFILES

MEDIATONIC™

BRIGHTON AND HOVE
FOUNDED 2005

Mediatonic creates original games that connect millions of players across the globe. Its UK studios are focused on IP for digital platforms and live services.



BOURNEMOUTH AND POOLE
FOUNDED 1998

Amuzo is a casual game developer specialising in the creation of web and smart device games. Amuzo titles have been played more than three quarters of a billion times and have reached #1 on the App Store in 147 countries.

HEALTHTECH

Companies are engaged in developing digital solutions to improve the health of individuals, from life tracking apps and hospital management software to digitally driven healthcare devices. 4% of survey respondents described HealthTech as the sector that best described their business.

Success has been driven by the strength of the research community and its integration with the commercial market. Notable examples are London for life sciences and Cambridge in biotechnology. Expertise can also be found in Oxford, Birmingham, the North East and South Wales, where the Welsh Government has launched a number of HealthTech funds.

HealthTech companies told us that improving access to finance is key to enabling growth in the sector. Government initiatives include the Integrated Digital Care Fund, which provided over £500 million.

POINTS OF INTEREST

- 95% of HealthTech businesses expect to grow their turnover next year
- 2x as likely to have sought space in an accelerator and 1.5x as likely to have sought mentoring as other companies

EXAMPLE COMPANY PROFILES



INNER LONDON
FOUNDED 2010

Big Health uses tracked data to create personalised behavioural medicine programmes, delivered via web and mobile. Its first product Sleepio helps patients overcome long-term poor sleep.



BOURNEMOUTH AND POOLE
FOUNDED 2011

Nourish enables better joint health and social care for older people by making care management more effective, and reassuring loved ones who are kept in the loop.

REVENUE GROWTH

56% SAID REVENUES GREW LAST YEAR

42% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Birmingham
- Cambridge
- Inner London
- Oxford
- North East
- South Wales

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Machine learning
- Hardware development
- Artificial intelligence
- Data science
- Machine to machine communications

PRIMARY NEED

58%
said improved access to finance

REVENUE GROWTH

59% SAID REVENUES GREW LAST YEAR

41% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Birmingham
- Greater Manchester
- Inner London
- South Wales

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Digital marketing
- Content and media production
- UI and UX design
- Cloud computing/SaaS/ Web services
- Software engineering

PRIMARY NEED

49%
said improved access to finance

MARKETPLACE AND LEAD GENERATION

Marketplace and lead generation businesses are marketing-led companies that take advantage of the skill sets of digital advertising. They focus on helping buyers and sellers find each other online, providing services such as classified ads, price comparison and audience retargeting.

This is an emerging area of digital innovation, with firms using affiliate relationships and new programmatic trading techniques to reach and target consumers. Notable examples include Quidco.com, which leverages existing affiliate programs by major online retailers to reward consumers, and MoneySuperMarket.com, one of the UK's most sophisticated companies for retargeting and RTB (real-time bidding) advertising techniques.

There is a high concentration of these firms in Wales, which has a number of success stories with GoCompare.com, MoneySuperMarket.com and Confused.com. A growing expertise can also be found in Birmingham and Greater Manchester.

POINTS OF INTEREST

- 95% of businesses expect to grow their turnover next year
- 70% most likely to have sought mentoring from experienced entrepreneurs

EXAMPLE COMPANY PROFILES

HVSSLE.com | sorted

GREATER LONDON
FOUNDED 2012

Hassle.com is an online marketplace that matches busy professionals with local trusted cleaners for the home. It allows people to find, book and pay for a cleaner's time via its online platform.



INNER LONDON
FOUNDED 2009

Housetrip is a holiday rental website that makes booking a holiday home as easy as a hotel, with over 300,000 holiday apartments, villas, cottages and chalets, in 19,000 destinations.

MEDIA AND ENTERTAINMENT

Media and entertainment has traditionally been a source of strength within the UK and 11% of survey respondents selected it as the sector that best described their business. These companies use a broad array of digital skills to create, promote and distribute media products, ranging from online video delivery to ebook publishing. Of all the sectors identified within our report, companies in media and entertainment were most likely to claim that they traded or partnered with other members of their cluster (82% of respondents).

In addition to London's position as a world-leading news and entertainment hub, clusters can also be found throughout the country particularly where major media and production corporates have a strong presence. This includes Greater Manchester, home to the oldest television studios in the UK, and major hubs for both ITV and the BBC; and South Wales, where the BBC, S4C, local independent production companies and Pinewood Studio Wales (opening in 2015) provide opportunities for digital in broadcasting. There is also a growing sector in digital media production in Birmingham, Bristol & Bath and Sheffield.

POINTS OF INTEREST

- 62% cited local quality of life as a key reason for company location – more than any other sector
- 69% employed five people or less, more than any other sector

EXAMPLE COMPANY PROFILES



NORTHERN IRELAND
FOUNDED 2014

Inflyte is a music B2B promotion platform that allows businesses to send branded digital music promo campaigns direct to its clients' mobile devices for feedback.



SHEFFIELD
FOUNDED 2001

ZOO Digital is a provider of cloud-based media production services and software to global creative organisations, mainly in the entertainment industry.

REVENUE GROWTH

53% SAID REVENUES GREW LAST YEAR

25% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Birmingham
- Bristol & Bath
- Greater Manchester
- Inner London
- Sheffield
- South Wales

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Content and media production
- Visual and audio design
- Digital marketing
- Computer simulation
- UI and UX design

PRIMARY NEED

37%
said improved economic climate

REVENUE GROWTH

68% SAID REVENUES GREW LAST YEAR

37% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Belfast
- Brighton
- Bristol & Bath
- Cambridge
- Edinburgh
- Inner London
- North East
- Oxford

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Software engineering
- Machine to machine communications
- Systems design and integration
- Mobile and tablet development
- Cloud computing/SaaS/ Web services

PRIMARY NEED

42%
said focus on local skills

SOFTWARE DEVELOPMENT

Software development was highlighted by 22% of survey respondents as the sector that best described their business. This is an umbrella category that includes organisations developing software applications for consumers, software for devices ranging from smartphones and tablets to TV set top boxes, as well as enterprise applications. This sector sits at the heart of our digital economy.

While hardware innovation continues to attract a lot of attention, the last decade has seen unprecedented innovation in software development, from cloud computing to front-end app development.

Software development is a core strength in Northern Ireland and the North East, with companies 1.7 times more likely to work in this sector compared to the UK average. There is also a strong presence of software development companies in Brighton, Bristol & Bath, Inner London, Oxfordshire and Edinburgh.

POINTS OF INTEREST

- 76% said that self-taught programming knowledge was key to building their business – more than any other sector

EXAMPLE COMPANY PROFILES



LIVERPOOL
FOUNDED 2013

Elite Sport Technologies Limited (Global Coach) is the software company behind the Global Coach brand. Global Coach provides sport's best coaches with the technology to plan, organise and collaborate on training sessions digitally and in a fraction of the time taken using traditional methods.



BRISTOL & BATH
FOUNDED 2008

SimpleWeb is a software developer which builds SaaS and mobile products, using small internal teams consisting of front and back-end developers, strategists and UI/UX designers.



TELECOMMUNICATIONS AND NETWORKING

From smartphone components to Wi-Fi networks, switches, and routers, telecommunications and networking companies develop and sell the hardware and software that carries digital content and services.

The companies in this sector are primarily made up of large multinationals (e.g. BT, Vodafone). But a number of smaller companies are playing a key role in providing broadband to city centre locations, including Optimity in London, Kingston Communications in Hull, Telcom in Manchester and Glasgow, Fusion Wifi in Bournemouth and Aimes Grid Services in Liverpool.

Cambridge is renowned for its role in developing wireless communications, with well known strengths in mobile and devices, while Reading has been the traditional heartland for companies such as Huawei, Oracle and Vodafone. Other areas where expertise is growing include Bristol & Bath and Sheffield.

POINTS OF INTEREST

- 89% reported that strong technical infrastructure was a key reason for their location – more than any other sector
- 63% most likely to consider local customers to be a major benefit of cluster membership

EXAMPLE COMPANY PROFILES

Optimity

INNER LONDON
FOUNDED 2008

Optimity supplies fast broadband connections to fast-growth businesses, using a pioneering wireless technology that avoids the need to install fibre optics.



NORTH EAST
FOUNDED 2013

Rymote provides a network optimisation service and brokers business applications via the cloud, helping businesses access the latest in innovative software.

REVENUE GROWTH

69% SAID REVENUES GREW LAST YEAR

20% SAID REVENUES GREW BY MORE THAN 25%

NOTABLE CLUSTERS

- Cambridge
- Glasgow
- Greater Manchester
- Inner London
- Norwich
- Sheffield

KEY CAPABILITIES

Capabilities and skills driving this sector include:

- Network infrastructure and protocols
- Cyber security
- Machine to machine communications
- Firmware and OS development
- Computer simulation

PRIMARY NEED

64% said access to technical infrastructure to operate through





METHODOLOGY

Tech City UK undertook this original research to understand and reveal digital capabilities across the country. The project was initiated in early 2014 with the objective of determining the reach and impact of the UK's digital economy, beginning with a focus on concentrations of UK digital companies and their business activities.

Tech Nation is the first time a community-driven project of this scale has ever been attempted in the UK. It has three broad objectives:

- 1 To understand the location of the UK's digital technology companies
- 2 To assess the technology capabilities, sector expertise and benefits of each of the UK's digital technology clusters
- 3 To inform policy, investment, and collaboration efforts

No project can claim to offer definitive, complete coverage; the digital economy is too fast-moving for that. However, armed with the insights derived from Tech Nation, it is our hope that future debate and policy-setting around the UK's digital sector can be informed by soundly sourced evidence.

DEFINING A DIGITAL TECHNOLOGY COMPANY

For the Tech Nation project, we first needed to define a "digital technology company", as distinct from a more generic "technology company".

This goal presented a number of challenges. Many companies today use digital channels for buying, selling and exchanging information. This, however, does not mean that the company is intrinsically digital. A restaurant with a website is not a digital technology company, while a site that enables its customers to order from restaurants all over the city is. Equally, many companies are evolving from a legacy to a digital model. At what stage do such companies become "digital", if indeed they ever do? These were some of the first questions that we had to consider.

We started with a broad definition: "any company whose primary capability is producing software or delivering software-enabled hardware". In the initial scoping period, this was expanded to include the agreed primary characteristics of a digital technology company:

- Provides a software or firmware-based product or service as its primary business or
- Primarily operates over a digital platform, such as applications or websites or
- Produces hardware products that directly enable software-driven devices
- We have excluded the following three categories of company from our definition:
 - Manufacturing and industrial technology companies
 - Companies that support the digital technology sector (e.g. incubators, venture capital funds)
 - Companies that use digital as a channel for their primarily offline business (e.g. a restaurant with a website)

Only UK-registered companies with accounts filed at Companies House are included within Tech Nation. Sole traders are not included. The majority of the companies covered were small and medium enterprises and microbusinesses, which make up 99% of UK businesses (and 98% of digital technology companies). According to the UK Government, the usual definition of small and medium sized enterprises (SMEs) is any business with fewer than 250 employees. Micro-businesses are businesses with 0-9 employees.

DATA SOURCES

Four main sources were used to collate data for the Tech Nation report:

- 1 **TECH NATION SURVEY**
completed by over 2,000 companies
- 2 **INTERVIEWS**
with 43 digital technology experts from across the UK
- 3 **EMPLOYMENT DATA**
collated by CareerBuilder
- 4 **TECH NATION INTERACTIVE GUIDE**
compiled by DueDil

1 TECH NATION SURVEY

For the purposes of gathering qualitative data for the Tech Nation report, we developed a survey and garnered over 2,000 responses from digital companies. Via the survey we wanted to understand:

- Do clusters have specialisms?
- What are their strengths and where is the opportunity?
- What are the challenges that we need to address to encourage further growth?

More than 2,000 companies meeting our definition of a digital company completed the survey.

2 INTERVIEWS

We then interviewed 43 representatives from the digital technology community to glean their insights (these interviewees came from across the UK and were a mixture of entrepreneurs, LEP and council members, startup founders, accelerator leaders, community leaders, along with leaders of both public sector and private sector organisations).

Thanks to the following for their participation:

- Phil Jones, Managing Director, Wired Sussex
- Anna Lewis, Founder, Valobox
- Simon Jenner, Chief Entrepreneur, Oxygen Accelerator
- Katie Judge, Senior Regeneration Officer, Solihull Metropolitan Borough Council
- Dave Maclean, Managing Director, Packt Publishing
- James Burkmar, Entrepreneur
- Matt Desmier, Creative & Digital Consultant, Wise Old Uncle
- Tom Quay, Managing Director, Base
- Mike Hawkyard, Head of Business

Development, Amuzo Games

- Soraya Jones, CEO, Cambridge Wireless
- Stewart McTavish, Founding Director, Idea Space
- Professor William Webb, CEO, Weightless SIG
- John Connolly, Co-Founder, C4DI
- Sarah Cinch, Business Development Manager, LEP in Humber
- Dominic Gibbons, Managing Director, Wykeland Group
- Jon Moss, Founder, Hull Digital
- Olly Headey, CTO, FreeAgent
- Andy Murray, Recruitment Executive, FanDuel
- John Peebles, CEO, Administrate
- Nick Sturge, Centre Director, Engine Shed (& SETsquared)
- Simon Bond, Innovation Director, SETsquared
- Bonnie Dean, Director, Bristol & Bath Science Park
- Paul McCafferty, COO and Co-Founder, Just One Database
- Doug Ward, Co-Founder, Tech Britain
- David Slater, Director of International Business Development, London & Partners
- James Layfield, CEO, Central Working
- Kevin McManus, Head of Creative & Digital (Investment), ACME/Liverpool Vision
- James Duez, Non-Executive Director, White Space Ltd.
- Paul Greyner, Director, Naked Element Limited (and Founder Norfolk Developers)
- Sean Clark, Search & Social Media Marketing Consultant, SeanClark.com
- Steve Orr, Director, Northern Ireland Science Park's CONNECT Programme
- David Dunn, CEO, Sunderland Software City
- Paul Smith, Co-Founder & CEO, Ignite
- Dave Fletcher, Chair, Digital Oxford
- Neil Cocker, Co-Founder, Cardiff Start
- Gareth Jones, CEO, Welsh Innovation Centre for Enterprise
- Lee Strafford, Co-Founder, Plusnet
- Emma Cheshire, CEO, Dotforge Accelerator
- Leanne Buchan, Partnerships Lead (Secondment), Leeds Data Mill
- James Clark, Policy Manager, BVCA
- Fredi Nonyelu, CEO, Briteyellow
- Mark Lumley, Partner, Head of Commercial, Shulmans LLP
- Jim Sims, Development Manager, BTVLEP

3 EMPLOYMENT DATA

To better understand the change in digital jobs, we studied industries (using the Standard Industrial Classification (SIC)) and occupations (using Standard Occupational Classification (SOC)), that rely heavily on digital technology, and their change across various cluster regions (as defined by the Nomenclature of Territorial Units for Statistics (NUTS)). Total jobs across all industries and occupations served as a benchmark for much of the research.

We provide job numbers from 2013 and projections from 2014 to 2020.

Data presented for the selected industries and occupations for Great Britain is based on CareerBuilder and EMSI information, sourced from the following:

- Business Register Employment Survey (BRES)
- Workforce Jobs Series (WJS)
- Annual Survey of Hours and Earnings (ASHE)
- Labour Force Survey (LFS)
- Annual Population Survey (APS)
- Working Futures (WF)
- Mid-Year Population Estimates
- Subnational Population Projections
- Annual Business Inquiry (ABI)

Employment data for Great Britain in this report was provided by CareerBuilder in conjunction with Economic Modeling Specialists Intl. (EMSI), a CareerBuilder company specializing in labour market analysis.

We looked at growth and employment of digitally enabled occupations. Using SOC, this approach takes into account the number of jobs, regardless of industry.

Digital occupations are defined by a selection of Standard Occupation Codes (SOC). Below are the SOCs used in the analysis:

- 1136 Information technology and telecommunications directors
- 2133 IT specialist managers
- 2134 IT project and programme managers
- 2123 Electrical engineers
- 2124 Electronics engineers
- 2126 Design and development engineers
- 2127 Production and process engineers
- 2135 IT business analysts, architects and systems designers
- 2136 Programmers and software development professionals
- 2137 Web design and development professionals
- 2139 Information technology and telecommunications professionals n.e.c.

- 2426 Business and Related Research Professionals
- 2473 Advertising accounts managers and creative directors
- 3112 Electrical and Electronics Technicians
- 3131 IT operations technicians
- 3132 IT user support technicians
- 3421 Graphic designers
- 3416 Arts officers, producers and directors
- 3417 Photographers, audio-visual and broadcasting equipment operators
- 7214 Communication operators
- 5242 Telecommunications engineers
- 5244 TV, video and audio engineers
- 5245 IT engineers

For Northern Ireland, data was sourced from the Northern Ireland Statistics and Research Agency from the Department of Finance and Personnel.

The SOC codes used in this analysis:

- 1136 Information technology and telecommunications directors
- 2133 IT specialist managers
- 2134 IT project and programme managers
- 2123 Electrical engineers
- 2124 Electronics engineers
- 2126 Design and development engineers
- 2127 Production and process engineers
- 2134 IT project and programme managers;
- 2135 IT business analysts, architects and systems designers
- 2136 Programmers and software development professionals
- 2137 Web design and development professionals
- 2139 Information technology and telecommunications professionals n.e.c.
- 3131 IT operations technicians
- 3132 IT user support technicians
- 3421 Graphic designers
- 3416 Arts officers, producers and directors
- 3417 Photographers, audio-visual and broadcasting equipment operators
- 3131 IT operations technicians
- 7214 Communication operators
- 5242 Telecommunications engineers
- 5245 IT engineers
- 2426 Business and Related Research Professionals
- 3112 Electrical and Electronics Technicians
- 1136 Information technology and telecommunications directors
- 2473 Advertising accounts managers and creative directors
- 5244 TV, video and audio engineers

4 TECH NATION INTERACTIVE GUIDE

As well as the Tech Nation report, we have built an accompanying interactive online guide which maps the location and capabilities of roughly 47,900 digital companies across the UK. For the interactive guide, we collaborated with our partner DueDil to build the Tech Nation website www.duedil.com/technation/2015. We mapped a number of the digital companies across the UK, using data from different sources including the Companies House database of limited companies, data from partners including Crunchbase and AngelList, and data from the websites of digital companies. These companies were then categorised into UK NUTS 3 regions, in order to understand the geographic profile of UK digital technology companies.

Where available we have also captured data on the incorporation date. There are caveats to this data: many companies are too small to submit full accounts to Companies House, and our formation data does not include those companies that are no longer active.

Working with these parameters, we drew on seven main data sources:

- 1 First, we used the 2003 and 2007 Standard Industrial Classification of Economic Activities (SIC) system to include companies that self-identify as "digital":
 - 7221 (2003) Publishing of software
 - 3002 Manufacture computers and process equipment
 - 5821 (2007) Publishing of computer games
 - 5829 Other software publishing
 - 62011 Ready-made interactive leisure and entertainment software development
 - 62012 Business and domestic software development
 - 6311 Data processing, hosting and related activities
 - 6312 Web portals
- 2 CrunchBase data on UK digital companies.
- 3 AngelList data on UK digital companies.
- 4 Company websites. We drew on DueDil's 2.7 million company-to-domain matches for 1 million+ companies.
- 5 Information was extracted from Wikipedia monthly data dumps, specifically to identify famous companies.
- 6 Companies that completed the Tech Nation survey (that are also listed on Companies House)
- 7 Tech City UK's Future Fifty list.

We next extracted keywords from our core data sources. (Within unstructured text, we applied natural language processing to identify candidate keywords.)

We then conducted a classification exercise in which 2,000 companies were independently tagged by project partners as digital, non-digital or ambiguous candidates. The results of this exercise were used to create a machine-learning training set. (The training set was tested against 500 non-digital companies.)

This training set was then used to identify "digital" companies from among the wider universe of UK-registered companies, using the data sources outlined above.

As a verification stage, crowdsourcing was used to identify and remove anomalous companies. Within this stage, and to ensure we had no poor-performing assessors, we asked multiple people to tag individual entities.

Finally, a keyword-clustering stage was implemented to enrich the keyword database.

This final database was used to show the companies within Tech Nation, and their location (based on registered and trading address, where available).

GEOGRAPHICAL CLUSTERS

Regional areas with a concentrated survey response of over 30 companies were profiled for this report. In addition, we also included four additional clusters based on our knowledge of the tech communities that exist there (Leeds, Dundee, Glasgow and Reading). This is not an exhaustive analysis of all the digital tech clusters that exist across the UK (noteworthy absentees include Aberdeen and Coventry).

These regional areas were then defined by NUTS categorisations, primarily NUTS 1 and NUTS 2. The specific categorisation used for each region was determined by the nature of the cluster. Some clusters cover a broader geographical area than others due to the spread of the tech companies and how the community interacts (e.g. the cluster in Liverpool covers a smaller geographical region than the Bristol & Bath cluster).

The following cluster regions were used in the analysis:

Inner London

- Inner London – East (UKI12)
- Inner London – West (UKI11)

North East (including Northumberland and Tyne and Wear)

- Northumberland (UKC21)
- Sunderland (UKC23)
- Tyneside (UKC22)

Hull (including East Yorkshire and Northern Lincolnshire)

- East Riding of Yorkshire (UKE12)
- Kingston upon Hull, City of (UKE11)
- North and North East Lincolnshire (UKE13)

Sheffield (including South Yorkshire)

- Barnsley, Doncaster and Rotherham (UKE31)
- Sheffield (UKE32)

Greater Manchester

- Greater Manchester North (UKD32)
- Greater Manchester South (UKD31)

Bristol & Bath (including Gloucestershire and Wiltshire)

- Bristol, City of (UKK11)
- Gloucestershire (UKK13)
- North and North East Somerset, South Gloucestershire (UKK12)
- Swindon (UKK14)
- Wiltshire CC (UKK15)

South Wales

- Cardiff and Vale of Glamorgan (UKL22)
- Central Valleys (UKL15)
- Gwent Valleys (UKL16)
- Monmouthshire and Newport (UKL21)
- Swansea (UKL18)
- Bridgend and Neath Port Talbot (UKL17)

Birmingham (UKG31)

Bournemouth and Poole (UKK21)

Brighton and Hove (UKJ21)

Cambridge (including Cambridgeshire CC) (UKH12)

Edinburgh, City of (UKM25)

Liverpool (UKD52)

Norwich (including Norfolk) (UKH13)

Oxfordshire (UKJ14)

Reading (including Berkshire) (UKJ11)

Leeds area (UKE4)

Glasgow (UKM34)

Belfast (and Northern Ireland) (UKNo)

Dundee (and Angus) (UKM21)

Great Malvern (and Worcestershire) (UKG12)

THE FUTURE FOR TECH NATION

The Tech Nation process is designed to be as sensitive as possible to the fast-changing digital economy. We've sought to compensate for the rigidity of the SIC code system by deploying other techniques for identifying digital companies. Our aim has been to build as scrupulous a model as possible, though we cannot claim to be comprehensive. In future, we'll look to bring on more data partners to keep improving. This is just the beginning.

We welcome any relevant feedback into the research process. Please contact us with input and where possible, we will factor it into future iterations of Tech Nation.

info@techcityuk.com

GLOSSARY

Born digital sector – a term used to define business activities that have emerged in the digital era. Describes sectors that are purely digital and do not exist outside of the digital industry e.g. games, software development and microprocessors.

Cluster – are an economic phenomenon that occurs when a critical mass of digital technology companies forms in a region. Clusters of companies interact formally (e.g. by trading or forming partnerships) and informally (e.g. networking, socialising).

Digital company – a shortened version of digital technology company. See methodology for full description.

Digital job – a job in a digital company as per the above definition.

Fastest growing cluster – a cluster where the number of digital companies incorporated has grown faster than the national average.

High-density cluster – a cluster where a significant proportion of the total companies operate in the digital sector.

Key capability – an area of expertise or skill. Sectors will often feature key capabilities i.e. skills that are critical to delivering success. E.g. payments infrastructure skills play a large part in FinTech companies.

NUTS categorisation – short for Nomenclature of Territorial Units for Statistics: a geocode standard for referencing the subdivisions of countries for statistical purposes. We have relied on the NUTS1 and NUTS2 level categorisations of UK regions to analyse the 21 clusters (chosen dependent on geographical spread of companies in the area).

NHS – National Health Service.

OS development – operating system development.

Public finance – finance available from Government / local Government funding mechanisms.

Private finance – finance available from private individuals or companies such as friends and family, angel investors, institutional venture capital funds or corporate venture capital funds.

Sector – a sub-division of the digital industry where there is a specific focus. E.g. digital companies building solutions in the education sector as known as EdTech companies; digital companies building solutions in the financial services sector as known as FinTech companies.

Smart cities – is a vendor / city term commonly used to refer to the creation of knowledge infrastructure. 'Smart City', in everyday use, is inclusive of terms such as 'digital city' or 'connected cities'.

SECTORS

Advertising & Marketing – promotion and brand building of products and services via digital platforms and channels.

Data Management & Analytics – data management is the development, execution and supervision of plans, policies, programs and practices that control, protect, deliver and enhance the value of data and information assets.

E-commerce – also known as electronic commerce, E-commerce is trading in products or services online.

EdTech – abbreviated form of Educational Technology – the design, creation and application of technology for learning.

FinTech – abbreviated form of financial technology. Includes both facilitators (those supporting the technology infrastructure within financial institutions) and disrupters (those challenging current systems with new innovative methods). FinTech covers the application of technology across all elements of finance.

Games Development & Publishing – creation of video games and applications, for a variety of platforms, including consoles, PCs, mobile and tablets.

HealthTech – design, creation and application of software driven technology within the healthcare industry to improve efficiency, assist in diagnosis and treatment, and enable better customer care within healthcare services. Also covers applications developed for personal use.

Marketplace/Lead Generation – companies providing an online marketplace platform collating products and services from various sources for the consumer to select from. Lead generation relies on data sourced from the consumer to inform search results, and targeted advertising.

Media & Entertainment – digital disruption of the creation and design of digital print media, television production, radio broadcasting, music recording and production. In particular it covers online and mobile platforms.

Software Development – is the computer programming, documenting, and testing involved in creating and maintaining applications and frameworks involved in a software product.

Telecommunications & Networking – infrastructure networks for data and voice communications.

CAPABILITIES

Artificial Intelligence – the development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

Cloud Computing/SaaS/Web Services – the provision of B2B or B2C services that do not require the installation of client-side software / applications.

Computer Simulation – the design of a virtual model that represents a physical system, the execution of that model on a digital computer, and the analysis of the resulting output.

Content & Media Production – the creation of information that delivers value to the end-user or audience.

Cyber Security – the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access.

Data Science – the study of information's provenance, what it represents and how it can be turned into a valuable resource in the creation of business and IT strategies.

Digital Marketing – the marketing of products or services using digital channels to reach consumers.

Firmware & OS Development – the development (design, build and testing) of memory and code that dictates the operational usage of a device.

Hardware Development – the development (design, build and testing) of the physical aspect of devices – e.g. computers, telecommunications.

Machine Learning – the study and construction of algorithms that can learn from data. Such algorithms operate by building a model based on inputs and using that to make predictions or decisions, rather than following only explicitly programmed instructions.

Machine-to-Machine Communications – technologies that allow both wireless and wired systems to automatically communicate with other devices of the same type and perform actions without the manual assistance of humans.

Mobile & Tablet Development – the development (design, building and testing) of applications/software for use on mobile and tablet devices.

Network Infrastructure & Protocols – network infrastructure and protocols provide the communication path and services between users, processes, applications, services and external networks.

Payments Infrastructure – the institutions, instruments, rules, procedures, standards, and technical means established to affect the transfer of monetary value between two or more parties.

Software Engineering – the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software.

Systems Design and Integration – the process of linking together different computing systems and software applications physically and/or functionally to act as a coordinated unit.

UI & UX Design User Interface (UI) design – is the design of websites, computers and software applications with a focus on making the user's interaction as simple and efficient as possible, thus facilitating the user to accomplish the desired end result / goal.

User Experience (UX) design – is the process of enhancing user satisfaction by improving the usability and ease of use in the interaction between the user and a product.

Visual & Audio Design – the development of visual and audio media with the purpose of conveying information to the end-user in line with the desired experience.

We believe the UK is the best place to start and grow a digital business. We deliver programmes focused on accelerating the growth of digital businesses, in London and cities across the UK, at all stages of their development. A publicly funded organisation with a private sector mentality, we also provide a voice of advocacy for digital entrepreneurs. We feed back our findings to policy-makers to influence change and we are dedicated to fostering the right conditions to start, grow and scale a digital business in the UK. The Tech Nation team included Katy Turner, Emma Swift, Ian Plunkett, Ryan Procter, Pan Demetriou and Ravi Lal.

CORE PROJECT PARTNERS



Dubbed "the Bloomberg of unquoted companies" by the FT, DueDil is the one of largest sources of private company information in Europe. It has a huge database of more than 45 million companies. DueDil is a research tool primarily used for B2B lead generation and credit risk management. Since its inception in 2011 it has raised more than \$25m from respected investors including Oak Investment Partners, Passion Capital and Notion Capital.



MTM is an independent research and strategy consultancy. We are specialists in the media and technology sectors, providing expert advice to our clients on how to succeed in fast-moving, digitally-driven markets.



Adzuna is a search engine for job ads that lists every job, everywhere. Our mission is to be the best place to start looking for a job. We search thousands of websites so you don't have to and bring together millions of ads so you can find every job, everywhere.



Where the world meets startups. Investors: invest in early-stage startups. Startups: find team members, angel investors and venture capital.



CrunchBase is the world's most comprehensive dataset of startup activity and it's accessible to everyone. Founded in 2007 by Mike Arrington, CrunchBase began as a simple crowd sourced database to track startups covered on TechCrunch. Today you'll find about 650,000 profiles of people and companies that are maintained by tens of thousands of contributors.



F6S is where startups grow together, enabling such companies to find Accelerator Programs, Free Deals, Events and Contests.



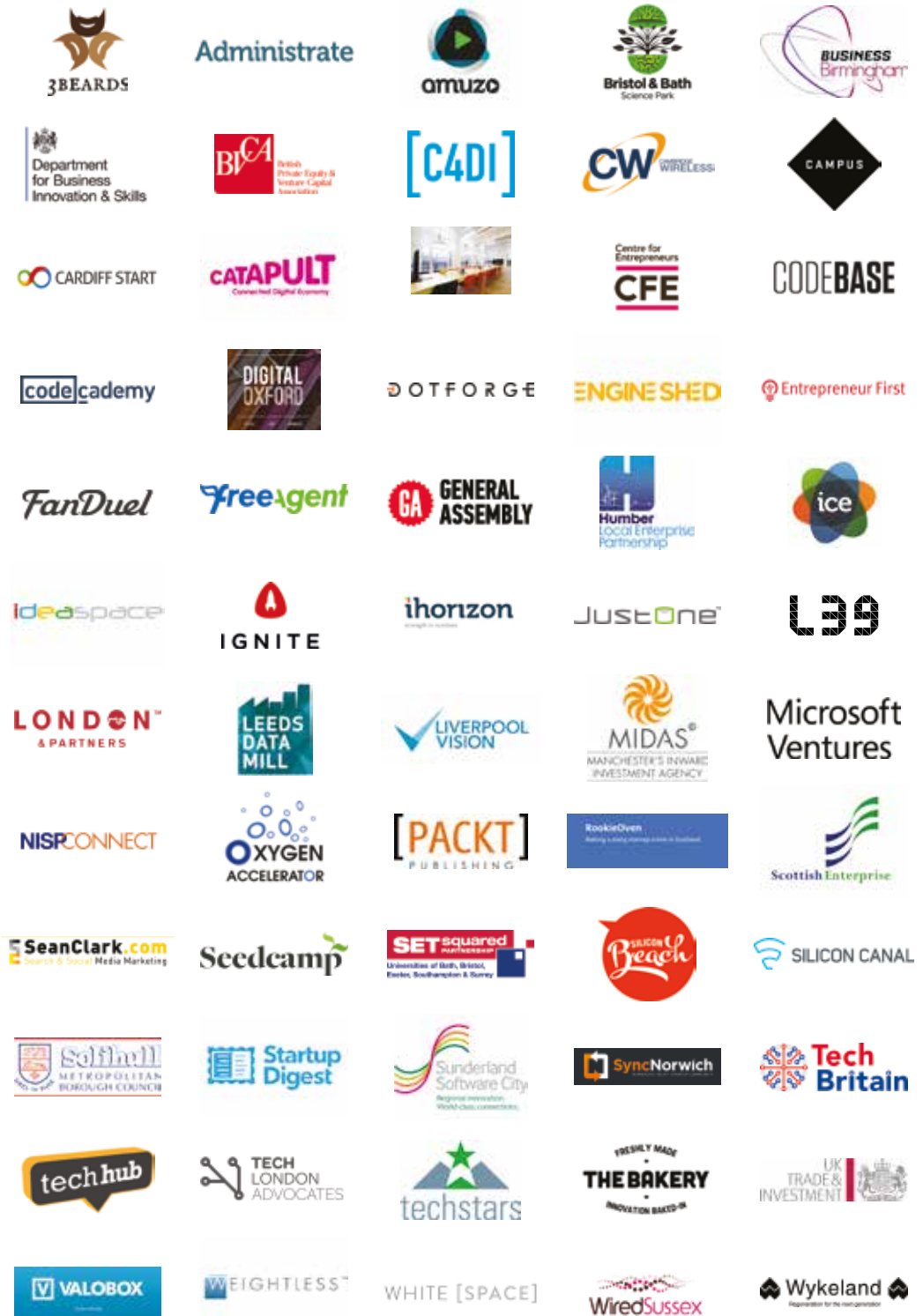
Employment data in this report was provided by CareerBuilder in conjunction with Economic Modeling Specialists Intl. (EMSI), a CareerBuilder company specializing in labour market analysis. As the global leader in human capital solutions, CareerBuilder works with the world's top employers, providing everything from labour market intelligence to talent management software and other recruitment solutions.



Seven Hills, the campaigning company, was founded by Michael Hayman MBE and Nick Giles to generate momentum for Britain's high growth companies and most exciting entrepreneurs. Seven Hills was named best corporate consultancy in the world for 2014 by the Holmes Report and is one of the fastest growing communications agencies in the UK.


COMMUNITY PARTNERS

We would like to thank all of our community partners across the UK who helped support the creation, development and promotion of the Tech Nation project.





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duedil.com/technation/2015