TECH NATION
2016
TRANSFORMING UK INDUSTRIES
GEOFF MULGAN CEO, NESTA
Digital technologies are unlike any others – they change everything businesses do. That’s why, as this research confirms, digital jobs and activity are becoming ever more important in traditionally non-digital areas of the economy – from retail to financial services and the public sector.

The team at Nesta led on the collection and analysis of the data and drafting of Tech Nation 2016, crunching the numbers behind the fantastic graphics in this report. It’s a snapshot of a fast-expanding area of the economy, with over 80% of clusters seeing growth in turnover or jobs in the last year alone.

Perhaps the most striking message in Tech Nation 2016 is the extent to which digital skills now bring big rewards, with the average digital job offering salaries over £15,000 higher than non-digital jobs. Nesta has been campaigning for many years to promote digital making and coding skills, promoting computer science in the curriculum, and code clubs of all kinds. Here is powerful evidence that I hope will persuade parents and young people to take up digital skills – and not just help themselves to earn and achieve more, but also help the UK become even more of a technological powerhouse in the future.

EILEEN BURBIDGE CHAIR, TECH CITY UK AND PARTNER, PASSION CAPITAL
GERARD GRECH CEO, TECH CITY UK
Welcome to Tech Nation 2016, our second annual publication on the UK’s digital economy.

Fuelled by a strong digital growth trajectory, the UK is an evolving Tech Nation. The 2016 report demonstrates the clear contribution that digital technology is making to employment in digital and traditional industries, and to the economy across the country.

The opportunities are enormous if we are to fulfil our potential as a nation driven by digital tech innovation. The journey starts with knowing what we have to offer and where we need to get to, working with a highly supportive Government to create the optimum set of conditions for continued growth.

The response from the digital community and their eagerness to share data in support of Tech Nation 2016 has been phenomenal. The entire team at Tech City UK would like to thank our research partner Nesta, and project partners Growthhinet, Github, AngelList, Burning Glass, Crunchbase, dealroom.co, Frontier Economics, InvestNI, Leeds Data City, Meetup & Multiple and everyone who participated in this research project.

The picture painted by Tech Nation 2016 reflects the core values of the digital mindset – always changing, innovating and optimising. The result is an industry worth celebrating.

THE RT HON DAVID CAMERON MP
THE PRIME MINISTER
Britain’s world leading tech sector gives us a competitive edge that is not just transforming our daily lives but also our economy – we are a becoming a true Tech Nation. It’s also helping us to transform the way Government works.

We’ve seen some real successes with Tech City UK, but this is not purely about specialist startups and digital businesses. Tech is truly transforming the way we do all kinds of business, right across the country.

Indeed, more than half of all digital jobs now aren’t in high-tech hubs of London or Leeds – they are in businesses of every description, in every sector – in those that would not traditionally be considered digital businesses at all.

The digital economy is expanding at an extraordinary pace, creating jobs and fueling growth in regions and cities up and down the country, adding some £37 billion to the economy and every year, providing security and opportunities for working people.

This Government has stood foursquare behind the country’s digital transformation, backing new technologies, investing in infrastructure, supporting investment, removing barriers to innovation and helping upgrade the digital skills that a modern work force needs. And we will continue to back, with all levers at our disposal, the innovation, creativity and entrepreneurship that is redefining and strengthening the modern British economy.
We believe the UK is the best place to start and grow a digital business. Through dedicated programmes, we support the digital technology sector’s need for skills, infrastructure, and investment. We gather and share vital information, which informs policymakers. We give digital entrepreneurs a national and local voice. Our work accelerates the growth of digital businesses, in London and across the UK, at all stages of their development. You can see our work in action with Future Fifty, Digital Business Academy, the Tech Nation Visa Scheme, Tech Nation Cluster Alliance, HQ-UK and Northern Stars, as developed and delivered by our sister team Tech North. We aim to make life better for the digital entrepreneur.

Nesta...

Nesta is the UK’s innovation foundation. We help people and organisations bring great ideas to life. We do this by providing investments and grants and mobilising research, networks and skills. We are an independent charity and our work is enabled by an endowment from the National Lottery. Nesta is a registered charity in England and Wales 1144091 and Scotland SC042833.

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ACKNOWLEDGEMENTS

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We’d like to extend our gratitude to the 1800+ businesses who completed our survey, and to the 36 businesses featured as case studies. Thanks to the 135 community partners (see page 124) who helped promote the survey and to those who participated in the research interviews (see page 117). Thanks to those who provided additional oversight and content for the report; our Tech North colleagues (Laura Bennett, Paul Lancaster and Coral Grainger), the Tech Nation Alliance who continue to support their local tech communities, Jon Bradford, Jonathan Brech, Louise Clarke, Emma Cheshire, Neil Cocker, Jamie Coleman, John Connolly, Charlotte Crossley, Bonnie Dean, Matt Desmier, David Dunn, Katie Gallagher, Tony Hart, Mike Hall, David Hartley, Michael Hayes, Liz Humphries, Matt Johnston, Phil Jones, Fiona Lettice, Kevin McManus, Nick Milner, Jim Mooide, Steve Orr, Joe Pearce, Emma Philpott, Ben Ravilious, Alan Scrase, Lee Strafford, Nick Sturge, Sophie Taylor, Steve Wainwright, Amy Watson, Tristan Watson, Doug Ward and Belinda Wallock.

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Digital tech businesses are at the heart of the UK economy and are playing an important role in driving growth. The impact of this dynamic sector is profound, predicated on a fundamental belief in innovation and doing things differently. Digital tech businesses are transforming the employment landscape, driving productivity, and reimagining traditional industries.

Last year, Tech City UK conducted one of the most comprehensive, community-led research projects into the growth of digital tech clusters. This was the start of an iterative process designed to reflect the constantly evolving nature of technology in the UK’s business landscape.

In partnership with Nesta for Tech Nation 2016, Tech City UK has tracked clusters to gauge the UK’s Digital Tech Economy. To get a comprehensive insight into digital employment, we’ve analysed data from Government, job advertisements and official ONS data, allowing us to understand the impact of the digital technology economy on wider business, employment, and economic trends. A full breakdown of the methodology behind the research can be found on page 114.

The findings of this report show the continued growth of digital tech clusters. These findings are focused upon the areas where digital technology businesses are having the greatest impact: economic growth, employment, productivity, and the digital disruption of traditional industries.

At the heart of Tech Nation 2016 is a detailed overview of the sector specialisms, benefits and challenges in 27 notable digital tech clusters across the country. Details of the unique DNA of each cluster sit alongside headline statistics around employment, turnover and average salaries. This is designed to compare and contrast the key digital tech clusters that shape our Tech Nation. The report also turns its eyes to the sectors in which the UK is excelling.

Ultimately, Tech Nation 2016 demonstrates a Digital Tech Economy that is transforming British business for individuals, cities and the country as a whole. We hope this landmark report is an invaluable resource for the network of professionals, entrepreneurs, investors and policymakers that make up the digital tech community.

WHAT IS THE DIGITAL TECH ECONOMY?

Includes all jobs within the Digital Tech Industries and digital tech jobs within traditionally non-digital industries

Digital Tech Industries

Traditional (non-digital) Industries

There are three job types within the Digital Tech Economy*

Native

Digital job in digital tech industries

(Front-end developer in a software company)

Support

Non-digital job in digital tech industries

(Marketing Manager in a data analytics company)

Transformer

Digital job in traditional industries

(Data Scientist in the public sector)

WHAT IS A DIGITAL TECH BUSINESS?

Business that provides a digital technical service/product/platform/hardware, or heavily relies on it, as its primary revenue source

They are active across the economy

01 Operating in digital sectors

Apps and software development, data management and analytics

02 Disrupting traditional industries

Public sector, film and broadcast media

03 Creating new sub-sectors

Edtech, Fintech

*See Nesta/Tech UK (2015), Dynamic mapping of the information economy industries
**DIGITAL TECH ECONOMY**

1.56m jobs¹

Job creation 2.8x faster than the rest of the economy (2011-2014)

£50,000

Almost £50K average advertised salary²

36%

higher than the national advertised average²

**DIGITAL TECH INDUSTRIES**

£161bn turnover³

Grew 32% faster than the rest of the economy (2010-2014)³

32%

**58,000**

identified active digital tech businesses⁴

**Digital Tech Economy jobs exist within traditionally non-digital industries¹**

41%

**TOP SECTORS⁴**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>App &amp; Software Development</td>
<td>17%</td>
</tr>
<tr>
<td>Data Management &amp; Analytics</td>
<td>12%</td>
</tr>
<tr>
<td>Hardware, Devices &amp; Open Source Hardware</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

**58,000**

digital tech businesses found across the UK

Over 80% of Tech Nation clusters have seen growth in digital turnover, digital jobs and advertised digital salaries

(See page 32 for definition of cluster)

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¹ Annual Population Survey (2014)

² Burning Glass (2015) refers to advertised digital salary

³ Annual Business Survey/Business Structure Database (2014)

⁴ GrowthIntel (2015)
Building on last year’s inaugural report, Tech Nation 2016 is the most ambitious data-driven mapping of the UK’s digital tech ecosystem to date.

Our key findings are:

01 DIGITAL TECH: DRIVING THE ECONOMY
Digital Tech Industries are a key contributor to the UK’s economy, growing faster in turnover, GVA and productivity than the rest of the economy.

02 FROM DIGITAL INDUSTRIES TO DIGITAL ECONOMY
Digital technologies are transforming businesses beyond the Digital Tech Industries.

03 GROWING OPPORTUNITY: DIGITAL TALENT AND SKILLS
The Digital Tech Economy is creating highly paid employment opportunities across the UK, almost three times faster than the rest of the economy.

04 THE POWER OF CLUSTERS AND NETWORKS
Clusters of digital tech businesses are playing a key role in supporting growth across UK cities, growing at a faster rate than their local economies.

Glossary

GVA
Gross Value Added measures the contribution of each economic unit by estimating the value of an output (goods or services) less the value of inputs used in that output’s production process. It is used in the estimation of GDP.

Turnover
The amount of money taken by a business over a year.
The Digital Tech Economy is powering growth; employment is rising faster than the rest of the economy. Digital Tech Industries have seen fast growth in turnover and GVA.

JOBS: DIGITAL TECH ECONOMY

There are 1.56 million jobs in the Digital Tech Economy, covering all jobs in the Digital Tech Industries and digital tech jobs within Traditional Industries. This continues to outpace the rest of the economy: jobs grew 11.2% between 2011 and 2014 which is 2.8x faster than the rest of the workforce.

These jobs can be found across the country; 80% are based outside of London.

VOLUME: DIGITAL TECH BUSINESSES

Data from GrowthIntel identifies 58,000 active digital tech businesses within the UK. 75% of these operate outside of London.

GROWTH: DIGITAL TECH INDUSTRIES

In 2014, the GVA of the nation’s Digital Tech Industries was estimated at £87 billion. Between 2010 and 2014 GVA grew 27%, adding an additional £19 billion to the economy (see chart 1). Over the same period, jobs in the Digital Tech Industries were 90% more productive than jobs in the economy overall.

Similarly, there has been rapid growth in turnover. In 2014, turnover of Digital Tech Industries was estimated at £161 billion. It grew 32% faster than the national average between 2010 and 2014.

faster growth in digital turnover than the national average (2010 - 2014)

£161bn estimated turnover of the Digital Tech Industries in 2014
The Digital Tech Economy is increasingly diverse, encompassing digital tech businesses and digital workers across all industries. Our analysis shows the extent to which digital innovation is having an impact across businesses and the people working for them.

The Digital Tech Economy is increasingly diverse. We have identified 16 different sectors within the UK (see chart 2): App & software development, Data management & Analytics, and hardware, Devices & open source hardware are currently the nation’s largest. New ‘born digital’ sub-sectors, such as games and cloud computing are forming. Equally exciting are the innovations that are evolving within traditional industries and forming new sub-sectors, like Fintech and Healthtech.

### The Digital Tech Economy is creating new industries and transforming existing ones.

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### TRANSFORMING THE BUSINESS LANDSCAPE

The Digital Tech Economy is creating new industries and transforming existing ones.

### 2. Sector specialisms of digital tech businesses (% breakdown)

<table>
<thead>
<tr>
<th>Sector Specialism</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>App &amp; software development</td>
<td>16.7%</td>
</tr>
<tr>
<td>Data management &amp; analytics</td>
<td>11.7%</td>
</tr>
<tr>
<td>Hardware, devices &amp; open source hardware</td>
<td>11.3%</td>
</tr>
<tr>
<td>Enterprise software &amp; cloud computing</td>
<td>8.5%</td>
</tr>
<tr>
<td>Telecommunications &amp; networking</td>
<td>8.3%</td>
</tr>
<tr>
<td>Digital advertising &amp; marketing</td>
<td>8.2%</td>
</tr>
<tr>
<td>E-commerce &amp; marketplace</td>
<td>7.7%</td>
</tr>
<tr>
<td>Digital media &amp; entertainment</td>
<td>6.3%</td>
</tr>
<tr>
<td>Cyber security</td>
<td>5.1%</td>
</tr>
<tr>
<td>Fintech</td>
<td>5.0%</td>
</tr>
<tr>
<td>Gaming</td>
<td>4.8%</td>
</tr>
<tr>
<td>Online gambling</td>
<td>4.3%</td>
</tr>
<tr>
<td>Social networks</td>
<td>3.3%</td>
</tr>
<tr>
<td>IoT &amp; connected devices</td>
<td>0.9%</td>
</tr>
<tr>
<td>Edtech</td>
<td>0.8%</td>
</tr>
<tr>
<td>Healthtech</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Tech City UK, Nesta, GrowthIntel, 2015
TRANSFORMING THE EMPLOYMENT LANDSCAPE

4. Digital Tech Economy jobs breakdown

Of the 156 million jobs in the Digital Tech Economy, 41% or as many as 648,000 digital tech jobs are within traditional industries (see chart 4). Within these industries digital tech jobs make up a growing percentage of their workforce, notably in Programming and broadcasting and Scientific research (see chart 5). Looking at total numbers, the top employers of digital tech jobs include the Public Sector and Education (see chart 6).

This trend highlights how traditional industries are adapting to society’s growing reliance on digital technology. E-commerce is one powerful example. Looking at the GrowthIntelligence data, over 40% of traditional fashion businesses now use E-commerce to expand their trade, along with 32% of consumer goods businesses and 14% of food and drink retail businesses.

5. % proportion of digital tech jobs within traditional industries

6. Digital jobs within the top 5 employers of digital talent (traditional industries)

65,870
Public Administration

60,520
Education

48,010
Financial Services

34,210
Retail

31,370
Other financial services and insurance activities

7. Digital ad growth in traditional industries (according to the online job market)

Advertising and Market Research: 59%

Office administration: 70%

Financial services: 79%

Public administration: 90%

Healthcare: 110%

Online job market data from Burning Glass reveals a similar story. Between 2012 and 2015, the number of adverts for digital jobs across traditional industries grew by 34%. Those within the health sector, which witnessed the greatest growth, rose by an astonishing 109.8% (see chart 7). Public administration, defence and social security rose by 90.3% and financial services by an almost as impressive 78.5%.

In 2015 over a third of digital job adverts were in traditional industries. Chart 8 shows the largest volume of digital job adverts were for roles within Financial service activities, Education and Human health services.

8. Top 10 traditional industries by volume of online digital job adverts

02

See page 9 for further information.
GROWING OPPORTUNITY: DIGITAL TALENT AND SKILLS

Across the UK, the Digital Tech Economy is creating job opportunities for a range of skill sets.

AVERAGE DIGITAL TECH SALARIES

According to Burning Glass data, over a million online adverts for digital jobs were placed in the UK in the first nine months of 2015. The average advertised salary for these roles was just under £50,000, 36% higher than the national average. An evident ‘digital premium’ exists across the country (see chart 9) and salaries are rising.

The average advertised salary for digital roles grew by 13% between 2012 and 2015, 19% faster than the average advertised salary for non-digital roles. This pattern occurs across the country: 77% of the digital tech clusters we identified have seen average advertised salaries for digital roles increase by more than 10%, with the highest advertised salary growth occurring in Leeds (see chart 10).

In fact, advertised digital salaries rose faster than the local average in 8 out of 10 of the cluster areas we analysed, in particular Belfast, Southampton and Glasgow.

Demand for digital talent shows no signs of slowing. In fact, while the need for specific roles varies, 43% of digital tech businesses say that skills shortages are limiting their growth.

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KEY FINDINGS

03

ATTRACTION DIGITAL TECH TALENT

12. Where digital tech businesses source talent (Tech Nation 2016 Survey)

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experienced talent from a local cluster</td>
<td>53.1%</td>
</tr>
<tr>
<td>Universities in a local cluster</td>
<td>35.8%</td>
</tr>
<tr>
<td>Online</td>
<td>35.2%</td>
</tr>
<tr>
<td>Experienced talent from the UK</td>
<td>29.7%</td>
</tr>
<tr>
<td>EU</td>
<td>19.3%</td>
</tr>
<tr>
<td>Recruiters</td>
<td>19.3%</td>
</tr>
<tr>
<td>UK Universities</td>
<td>18.4%</td>
</tr>
<tr>
<td>Non-EU</td>
<td>15.6%</td>
</tr>
</tbody>
</table>

Tech City UK, Nesta, Tech Nation 2016 Survey

To counter the skills demand, UK digital tech businesses are recruiting from diverse sources (see chart 12). Areas such as Reading & Bracknell, Cambridge and London in particular, are hiring from overseas, including both EU and non-EU countries. Whilst in Brighton, Bournemouth & Poole, and Bristol & Bath, experienced talent from local cluster is cited as the most common source. Cambridge, Oxford, Edinburgh and Sheffield are also more reliant on local universities for talent.

Yet despite the role of universities in supplying technical talent, more than 50% of the universities within the identified clusters produce fewer computer science graduates than the national average given the size of their student base.

Dundee, Ipswich, Sunderland, Glasgow, Belfast and Bournemouth & Poole all produce disproportionate numbers of computer science graduates. Bristol & Bath, Cambridge, Reading & Bracknell, Newcastle, Norwich and Oxford, meanwhile punch above their weight in maths and physics disciplines, which are also integral to the Digital Tech Economy.

20% of digital tech businesses say that EU countries (beyond the UK) are an important source of talent

1 in 3 digital tech businesses source talent from local universities

Dundee
London
Manchester
Cambridge
Edinburgh
Bristol & Bath
Glasgow
Belfast
Oxford
Brighton
Leeds
Birmingham
Belfast
Cambridge
Edinburgh
Bristol & Bath
Southampton
Southend
Belfast
Bournemouth & Poole

DIGITAL TECH SPECIALISMS FOR INDIVIDUALS

13. Importance of sources for skills development according to digital tech businesses

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-taught programming</td>
<td>66.5%</td>
</tr>
<tr>
<td>Mentoring</td>
<td>60.5%</td>
</tr>
<tr>
<td>In-house training</td>
<td>42.7%</td>
</tr>
<tr>
<td>Online training</td>
<td>33.6%</td>
</tr>
<tr>
<td>Local universities</td>
<td>26.8%</td>
</tr>
<tr>
<td>External training</td>
<td>12.0%</td>
</tr>
<tr>
<td>UK Universities</td>
<td>15.4%</td>
</tr>
</tbody>
</table>

Tech City UK, Nesta, Tech Nation 2016 Survey

Informal or in-house training remains the most common source of skills development, with universities ranking relatively low (see chart 13). Again, there is a divergence among clusters. Businesses in Leeds (77%), Norwich (73%) and Reading & Bracknell (71%) heavily rely on company in-house training for skills development. Meanwhile self-taught learning is viewed as most important in Edinburgh (81%) and Glasgow (79%).

In software development activities, this ‘self-taught’ cohort is enabled in large part by online open source platforms. Github is the key open-source platform for developers, with more than 18,000 active users in the UK. Chart 14 reveals high user activity is concentrated around the key digital tech clusters such as London, Cambridge, Manchester, Oxford, Brighton, Bristol & Bath, Edinburgh, Glasgow and Belfast.
THE NATIONAL PICTURE

Tech Nation 2016 profiles 27 key digital tech clusters across the UK, examining how their concentration of talent and networks are accelerating the growth of digital tech businesses.

The majority of digital tech clusters have seen growth in recent years. In fact, in almost all clusters, the local Digital Tech Industries have outpaced all others on nearly every economic measure (see chart 15).

1. This list doesn't include all areas with high levels of digital business intensity or employment in the UK, especially those whose tech sectors are dominated by large businesses. Some examples of such areas include Guildford and Woking, Wrexham and Wrexham, Lublin and Warsaw and Milton Keynes and Aylesbury. Some commentary on these areas is provided in the cluster profiles section.

3. Digital tech businesses as % of total businesses

4. The amount of money taken by a business over a year

16. Top five leading indicators of cluster growth

<table>
<thead>
<tr>
<th>BUSINESS DENSITY</th>
<th>TURNOVER: TOTAL</th>
<th>TURNOVER: GROWTH</th>
<th>JOBS: TOTAL</th>
<th>PRODUCTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3x Reading &amp; Bracknell</td>
<td>£62.4bn London</td>
<td>+180% Southampton</td>
<td>£328,223 London</td>
<td>£296,340 Bristol &amp; Bath</td>
</tr>
<tr>
<td>1.3x Brighton</td>
<td>£9.96bn Reading &amp; Bracknell</td>
<td>+153% Truro, Redruth &amp; Camborne</td>
<td>£51,901 Manchester</td>
<td>£205,390 London</td>
</tr>
<tr>
<td>1.1x Cambridge</td>
<td>£8.16bn Bristol &amp; Bath</td>
<td>+129% Dundee</td>
<td>£40,440 Reading &amp; Bracknell</td>
<td>£196,800 Reading &amp; Bracknell</td>
</tr>
<tr>
<td>1.1x Bournemouth &amp; Poole</td>
<td>£2.2bn Manchester</td>
<td>+101% London</td>
<td>£36,768 Birmingham</td>
<td>£171,720 Southampton</td>
</tr>
<tr>
<td>1.1x London</td>
<td>£1.8bn Birmingham</td>
<td>+63% Leicester</td>
<td>£36,547 Bristol &amp; Bath</td>
<td>£170,460 Oxford</td>
</tr>
</tbody>
</table>

17. Key Benefits across Tech Nation clusters (national average %)

Access to local networks: 64%
Access to commercial property: 63%
Access to university talent: 55%
Access to experienced industry talent: 53%
Access to business support: 40%
Access to trading partners: 40%
Strong local cluster brand: 26%
Access to private finance: 24%
Access to public finance: 24%
Access to experienced industry talent: 26%
Access to university talent: 24%
Access to commercial property: 24%
Access to local networks: 24%

In our Tech Nation survey, respondents told us their UK location brings a number of benefits (see chart 17). The most popular benefit, cited by 64% of businesses, is access to local networks. This is particularly clear in Edinburgh (where 87% of businesses cite it as a benefit) Birmingham (82%) Bristol & Bath (81%).
MEETUPS

Networks and face-to-face contact are essential to successful digital tech clusters. Data from Meetup can be used to understand this activity. Almost 180,000 individuals across the country have been involved in digital tech Meetups.

There has been an explosion in Meetup activity since 2010, with 1,359 digital tech groups currently active in the UK. These groups cover an ever-expanding set of technologies and industries (see chart 19).

Meetup data also reveals local areas of expertise: Edtech is strong in Oxford and Bristol & Bath, software development in Cambridge, gaming in Brighton, E-commerce in Liverpool, and information security in Belfast and Norwich.

Clusters may be a local phenomenon, but for today’s businesses, networks know no such boundaries. UK digital tech businesses currently collaborate across the UK and internationally. In fact, Meetup data reveals a considerable level of cross-cluster networking taking place. The figures confirm London’s centrality to the UK’s Digital Tech Economy, and its strong ties with Bristol & Bath, Brighton and Cambridge. However, they also show regional networking in areas such as the North West and the West Midlands.

INTERNATIONAL COLLABORATION

Many digital tech businesses are international in their outlook: around a third have partners and suppliers in the EU or North America. There are divergences among clusters, however. For instance, Cambridge and Norwich-based businesses have comparatively greater numbers of partners in North America. Cambridge and Oxford have more partners in Asia than other clusters do, while London and Oxford are the clusters most likely to work with partners from EU countries.

Analysis of the markets in which UK digital tech businesses operate reveals a similar pattern (see chart 20). Again, Oxford and Cambridge have the highest proportions of businesses selling internationally.
SUSTAINING THE SUCCESS OF THE DIGITAL TECH SECTOR

The UK’s Digital Tech Economy has great strengths. Now, the entire digital tech ecosystem, including entrepreneurs, educators, central and local policymakers must work together to identify and address key challenges. By doing so, the community can secure the future success of digital tech businesses across the country. Our research suggests five areas of focus for these efforts.

01 SKILLING UP A DIGITAL WORKFORCE
02 FOCUS ON FINANCE
03 DEVELOPING THE UK’S DIGITAL INFRASTRUCTURE
04 CULTIVATING CLUSTERS
05 DEVELOPING DATA
SKILLING UP A DIGITAL WORKFORCE

Around 40% of digital entrepreneurs say that they face challenges finding skilled digital workers. Young people are the digital workforce of the future and steps must be taken to equip them with the skills required for jobs in digital tech businesses. Here’s how:

• Introduce the younger generation to the possibilities of a career in digital, through initiatives such as Dorset’s annual ‘Digital Wave’ conference for schools
• Connect pupils and industry: for example, The Studio school and sixth form college in Liverpool offers students placements and mentorships in coding and entrepreneurship
• Expand apprenticeships into digital careers, learning from examples such as the NextGen Skills Academy, where leading employers in the visual effects and video games industry have designed higher apprenticeships, and from the social media apprenticeship scheme run by The Juice Academy in the North West

Digital businesses make considerable use of local universities to recruit talent, but entrepreneurs highlight that graduates sometimes lack, either the business skills, or the most up-to-date technical skills, needed to go straight into work.

Universities need to address these concerns by:
• Collaborating with businesses to respond to talent gaps, and using local employment demand data to shape courses
• Securing industry accreditation of courses
• Embedding digital skills such as quantitative analysis, data visualisation and computing into other disciplines

The ‘minimum viable product’ is more important for a digital startup than a ‘prototype’

To innovate, digital companies often need to prioritise salaries over capital expenditure

Company growth cannot be measured by job creation alone, since that will not take into account the use of freelancers

FOCUS ON FINANCE

Just under 40% of digital entrepreneurs surveyed say that they face challenges as a result of limited access to finance.

Encouraging and publicising private investment opportunities in the Digital Tech Economy would help to address this, particularly at later stage funding rounds, and particularly outside London.

Public sector funding schemes meanwhile, (whether local, national, UK or EU), have greatest effect when they take into account the following:
• The ‘minimum viable product’ is more important for a digital startup than a ‘prototype’
• To innovate, digital companies often need to prioritise salaries over capital expenditure
• Company growth cannot be measured by job creation alone, since that will not take into account the use of freelancers

DEVELOPING THE UK’S DIGITAL INFRASTRUCTURE

High-speed connectivity remains a priority for digital tech businesses. 28% of digital tech businesses in our Tech Nation 2016 survey reported digital infrastructure as a challenge.

Ofcom data on availability of superfast broadband to households demonstrates that broadband services are still unevenly distributed across the UK.

Better data on business access to broadband and other digital infrastructure would enable cities to ensure that companies get the connectivity they need in order to thrive and grow.

21. Challenges to growth according to digital tech businesses

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to talent</td>
<td>43%</td>
</tr>
<tr>
<td>Access to finance</td>
<td>39%</td>
</tr>
<tr>
<td>Low sector awareness</td>
<td>29%</td>
</tr>
<tr>
<td>Digital infrastructure</td>
<td>28%</td>
</tr>
<tr>
<td>Economic climate</td>
<td>27%</td>
</tr>
<tr>
<td>Commercial property</td>
<td>23%</td>
</tr>
<tr>
<td>Physical infrastructure</td>
<td>22%</td>
</tr>
<tr>
<td>Lack of advice &amp; mentorship</td>
<td>16%</td>
</tr>
<tr>
<td>Regulation</td>
<td>11%</td>
</tr>
</tbody>
</table>

Tech City UK, Nesta, Tech Nation 2016 Survey

TTWA figures are the average of the broadband coverage in the area’s postcodes. Data: Ofcom Infrastructure Report, 2015.
Throughout the country, policymakers must prioritise the development of their local clusters. This means fostering the development of the whole innovation system – from talent and research to finance, infrastructure and collaboration – as noted in Tech Nation 2015 and a number of Nesta’s reports on the topic.

Strategies should include:
- Listening to businesses in the cluster, small and large alike, and encouraging collaboration between corporates and startups
- Supporting local networks and anchor institutions such as universities, to increase the visibility of clusters and their individual businesses, in order to better publicise their needs
- Investing in attracting and retaining talent, thereby encouraging loyalty from local graduates and young entrepreneurs
- Involving digital tech businesses in wider initiatives to promote innovation at a local level

The Tech City UK Best Practice series will highlight other methods through which clusters around the UK have been nurtured successfully.

Good quality data is key. Without it, local and national policymakers cannot make informed policy decisions or analyse their impact.

However, the Standard Industrial Classification (SIC) codes used in official statistics struggle to keep speed with dynamic sectors like the Digital Tech Industries. Addressing this is a priority for Professor Charles Bean’s on-going review of UK economic statistics. Without a better SIC we cannot make robust comparisons over time.

In the meantime, however, policymakers need to make good use of alternative classifications – as shown in this report.

The Open Data Institute is already championing innovation in industry and society through open data. A growing body of evidence points towards the economic benefits of open data, and the trend of public and private organisations opening up their data sets should be encouraged to continue.
In Tech Nation 2016, digital tech clusters have been identified based on quantitative indicators such as the density of digital tech businesses within an area (GrowthIntel), economic performance and growth rates (ONS and other data sources), and the level of community activity (Meetup). This has been supplemented by qualitative insight such as the existence of networks and supporting organisations engaged with local tech businesses, the presence of startup/entrepreneurial communities and participation in the Tech Nation interviews and survey conducted for this report.

Digital tech businesses are concentrated in clusters across the country. The following pages profile 27 of these clusters, identifying the conditions for growth driving the individual success stories of each and every one.

**EAST OF ENGLAND**
- Cambridge
- Ipswich
- Norwich

**LONDON & SOUTH EAST**
- Brighton
- London
- Oxford
- Reading & Bracknell
- Southampton

**THE MIDLANDS**
- Birmingham
- Leicester
- Worcester & Malvern

**NORTH OF ENGLAND**
- Hull
- Leeds
- Liverpool
- Manchester
- Newcastle & Durham
- Sheffield & Rotherham
- Sunderland

**NORTHERN IRELAND**
- Belfast

**SCOTLAND**
- Dundee
- Edinburgh
- Glasgow

**SOUTH WEST**
- Bournemouth & Poole
- Bristol & Bath
- Exeter & Newton Abbot
- Truro, Redruth & Camborne

**WALES**
- Cardiff & Swansea
A region known for agriculture, energy and high technology, the East of England is also notable for its research excellence. It is home to Cambridge, arguably the oldest technology cluster in the UK, alongside two of the largest collections of research parks in the UK in both Cambridge and Norwich, and BT’s Global research park in Ipswich. Driven by Cambridge, the region continues to have strengths in high technology and hardware. These leading clusters are supported by industrial parks in Southend and Brentwood, and technical services in Harlow and Bishop’s Stortford.

**NOTABLE CLUSTERS**

1. Cambridge
2. Ipswich
3. Norwich

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**IN NUMBERS**

**DIGITAL TECH ECONOMY JOBS**

152,136

**PROPORTION OF JOBS IN THE EAST OF ENGLAND WITHIN THE DIGITAL TECH ECONOMY**

5.2%

**DIGITAL GVA**

£4.6bn

**DIGITAL CONTRIBUTION TO REGIONAL GVA**

5.3%

**DIGITAL DENSITY**

18.3%

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*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ARM/ESID)*
One of the oldest and most well-established clusters in the UK, Cambridge has produced 15 digital tech companies worth over a billion dollars. It is the third most densely populated cluster of digital tech businesses in the UK, and a top ten cluster for digital employment and productivity.

Although it has growing specialisms in IoT & connected devices and Software development, Cambridge also has an established history in cyber security, hardware, electronics and data, highlighted by the large numbers of R programmers based in the area (according to Github data).

Digital tech businesses benefit from a highly-skilled talent pipeline from the University of Cambridge and a wide-reaching support community. Organisations like Cambridge Network (School for Scale Ups) and Cambridge Wireless also support growing startups, as do Agritech-East, Cambridge Cleantech and One Nucleus.

Small businesses are benefitting from the growing number of Ideaspace incubators, the University’s hub for early stage innovation, the St John’s Innovation Centre (Europe’s first incubator) and the Judge Business School’s Accelerate Cambridge. Meanwhile, leading corporates such as Amazon, HP, Huawei and more recently Apple have also established a presence there.

“The lot of serendipity happens around Cambridge – you bump into someone in a coffee shop and people just talk about their businesses; it’s probably one of the best network communities anywhere”

CHARLES COTTON
Cambridge Phenomenon
Ipswich is a growing digital cluster encompassing new startups such as ITO World, Sharedband and Silicon Safe, as well as more established tech companies like HTK and Smart421. Ipswich has strengths in a number of sectors, including Digital advertising & marketing, Telecommunications & networking, Fintech and Photonics.

BT has a research centre in the area, which has helped to attract talent, some of whom have left to start or join new digital tech businesses nearby. BT shares its campus with companies including Cisco, Huawei and Ericsson, and has strong links with leading universities including Cambridge and MIT.

Community engagement has helped drive the growth of Ipswich’s digital industry. The IP Network and SyncIpswich hold regular Meetups, while the Eastern Enterprise Hub provides resources for aspiring entrepreneurs. Innovation Martlesham also houses digital tech businesses including Nokia, CIP Technologies and Zog Energy.

University Campus Suffolk works with partners across the country to provide STEM skills development and meet employer demand.

ITO World specialises in the provision of high quality, public transport data feeds that power the major journey planning and navigation apps and data visualisation software.

Data is collected through ticketing systems, sensors attached to vehicles, traffic signals, surveys, focus groups and social media. All of this can help us understand how the transport system operates and how people behave.

Ipswich has been key to our success. It has given us low cost offices and close proximity to universities and London. We have quick access to international markets and have been able to recruit excellent people, while the local digital tech community and BT’s R&D campus have provided skilled talent at senior levels.

“There’s telecoms here, there’s big data, there’s Fintech; there’s quantum technology. There’s lots happening here and a lot of it is absolutely world class.”

IAN BUXTON
Chair, Innovation Martlesham
Known for its thriving agriculture, food and energy industries, Norwich is an early-stage cluster, exhibiting growing strengths in Digital advertising & marketing as well as Telecommunications & networking.

Local successes include mobile payment business Proxama, artificial intelligence company Rainbird, and location technology entrepreneurs Axon Vibe. Norwich’s leading benefit, however, is its access to talent. The area has the third highest concentration of science and research parks in the country and two leading universities. Norwich University of the Arts provides a strong supply of graduates in video games art, design, digital photography, and film. The University of East Anglia, meanwhile, turns out graduates in a range of subjects including computer science, software engineering and film, television and media studies.

Meetup groups include Hot Source, Norfolk Developers and SyncNorwich, which now claims over 1,000 members. Co-working spaces such as Whitespace are providing affordable space for startups, while the challenge of access to finance is slowly being addressed with schemes such as Grants4Growth.

At Rainbird, we’ve developed an award-winning Artificial Intelligence technology, which helps experts take scarce human knowledge on any subject, and encode it in a software system to make that knowledge accessible to many just when they need it. The technology handles uncertainty and is powerful enough to provide solutions even in the absence of data.

Norwich is a fantastic city to live and to prototype new innovations, with great talent flowing from its two universities (UEA & UEA). It’s why we’re headquartered here, and have invested in supporting the local tech community, co-founding Norfolk Developers and Whitespace.

NEIL GARNER
Founder, Proxama and Whitespace

At Rainbird, we’ve developed an award-winning Artificial Intelligence technology, which helps experts take scarce human knowledge on any subject, and encode it in a software system to make that knowledge accessible to many just when they need it. The technology handles uncertainty and is powerful enough to provide solutions even in the absence of data.

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Founder, Proxama and Whitespace
London & the South East has led the UK’s growth into a Tech Nation. From the original ‘tech belt’ in Berkshire to the creative tech centre of Brighton, the region has long played host to multinationals and fast-growing companies alike – from Google, Microsoft, Cisco and Amazon, to Future Fifty’s Deliveroo, TransferWise and Peak. Tech hubs across London have attracted a broad range of high tech and digital tech companies, while the digitally dense areas of Reading & Bracknell and Brighton & Hove are supported by growing clusters Southampton and Guildford. Other notable hubs include Wycombe, Slough, Milton Keynes, Swindon and Luton.

**IN NUMBERS**

**DIGITAL TECH ECONOMY JOBS**
619,722

**PROPORTION OF JOBS IN LONDON & THE SOUTH EAST WITHIN THE DIGITAL TECH ECONOMY**
7%

**DIGITAL GVA**
£59bn

**DIGITAL CONTRIBUTION TO REGIONAL GVA**
12%

**DIGITAL DENSITY**
20%

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABS/BSD)*
A large digital creative industry has cemented Brighton’s status as a leading cluster. It has one of the most dense populations of digital tech businesses in the UK and the largest digital workforce within non-digital industries.

Digital technology success stories include Brandwatch, a social media monitoring company that raised $33 million in 2015, Brilliant Noise, and Crunch Accountancy.

The talent pool from local industry is often cited as a leading benefit by businesses in the area. The University of Sussex also generates talent, while the Sussex Innovation Centre encourages the development of young entrepreneurs.

Over 80% of workers cite the community as a major benefit, as the city hosts a number of industry events including Develop, dConstruct and the Brighton Digital Festival. It is also home to organisations and co-working spaces that foster growth such as MDHUB and The FuseBox, a Barclays Eagle Lab, and NatWest’s Hatch.

Wired Sussex, in particular, has been pivotal in establishing a cooperative data centre that helps businesses access high-speed broadband across the cluster.

We have created our own technology and developed a range of technology courses that teach a mix of professional 3D design software, basic electronics and the coding language C++. We want everyone to be able to design, code and print their own products.

Being based in Brighton has been key to our growth. The city is close to London and full of creative businesses. A huge range of great networking events make connecting with them easy. Originally, Wired Sussex supported us and their accelerator program, FuseBox24, gave us free space and mentoring. Both Brighton and Sussex universities help young companies access graduates for reduced commercial rates, so talent is never an issue.

“Someone once said that collaboration is one of Brighton’s biggest competitive advantages and I think that’s absolutely right”

PHIL JONES
CEO, Wired Sussex

**CHALLENGES**

- Weak digital infrastructure: 38%
- Access to commercial property: 36%
- Limited access to finance: 34%

**% of digital tech businesses**

**BENEFITS**

- Access to graduate-level talent: 78%
- Access to local networks: 78%
- Positive cluster brand: 72%

**% of digital tech businesses**

**NOTABLE SECTORS**

- Digital Advertising & Marketing
- Gaming
- App & Software Development
- Data Management & Analytics

**TECH CITY UK IN PARTNERSHIP WITH NESTA**

@TECHCITYUK / @NESTA
The home of 13 tech ‘unicorns’ ($1bn valued businesses), the capital tops the Tech Nation rankings for levels of digital employment, average salary in digital tech businesses and growth in GVA from the Digital Tech Industries.

Support for London’s digital businesses comes from a wide range of venture capital firms as well as a growing number of incubator and accelerator options, including Seedcamp, Entrepreneur First, Upscale, MassChallenge, Collider, Startup BootCamp, Ignite, Wayra, Techstars, Microsoft Ventures, Future Fifty and the London Stock Exchange’s ELITE.

Over 90 co-working spaces provide homes for startups, including Central Working, Level39, Trampery, Second Home, TechHub, White Bear Yard, HereEast, WeWork and Warner Yard. Tech hotspots include East London’s Tech City, King’s Cross, Camden, and Tech City Croydon.

Among London’s digital tech superstars are Transferwise, which is changing the world of finance, Deliveroo, currently disrupting the global e-commerce industry and Unruly, now dominating the ad tech scene.

With an array of community organisations including Coadeic, Innovate Finance, Open Data Institute, FabLab, 3beards, Tech London Advocates and Tech City UK, as well as a colossal Meetup network membership of over 100,000, the London digital tech ecosystem is the beating heart of the UK digital sector.

“In many ways, London is a natural home for our business: having maintained its position as the leading global financial centre for several centuries.”

RHYDIAN LEWIS
CEO, RateSetter

In the urban environment, wind and solar energy are inefficient. Our tiles, however, are perfect for this environment, harnessing energy from constant footfall.

We are based in Kings Cross, a thriving epicentre of technological growth from which we can be connected to Europe within hours via Eurostar. Many of our global clients travel through Kings Cross on a regular basis as a result.

London is a tremendous city that pioneers innovation and our location remains pivotal to Pavegen’s entrepreneurial journey.

It is our aim to become an integral part of urban infrastructure. When we scale our new product, Kings Cross Station would be the perfect place to deploy our technology.

LAURENCE KEMBALL-COOK
Founder
Pavegen

Notable Sectors
- Fintech
- Social Networks
- Digital Advertising & Marketing
- Digital Media & Entertainment

Challenges
- Limited access to finance: 41%
- Access to commercial property: 38%
- Weak economic climate: 22%

Benefits
- Access to local networks: 69%
- Access to commercial property: 64%
- Access to graduate-level talent: 52%
A major hub for research, Oxford has produced a number of highly successful startups including DeepMind, BioCarbon Engineering, Natural Motion and Sophos, which had the largest IPO in UK history last year at a £1bn valuation.

Oxford has a history of expertise in Healthtech and Edtech and still has the largest Meetup groups in these sectors in the UK. It specialises in Cyber security, App & software development and Enterprise software & cloud computing.

Oxford businesses have a strong international focus with 40% of their customers based outside the UK. As a growing cluster, it has the second highest demand for digital tech jobs, and the second highest concentration of digital tech employment.

With University of Oxford and Oxford Brookes University nearby, the cluster’s digital tech businesses are the most likely to cite talent from universities as a leading benefit. Local networks are also important, such as the Oxford Startups Meetup, Digital Oxford, the Said Business School’s Oxford Launchpad, and Isis Innovation.

There is a growing need to understand how digital tech is impacting our lives. Research on the use and effects of digital media is booming. Our startup allows researchers to draw on a large participant pool instantly and to find the right participants fast, for any type of online research.

Being based in Oxford has been useful in three ways. We’ve benefited from valuable discussions with students and faculty at the University of Oxford and Oxford Entrepreneurs. Being part of Oxford’s Startup Incubator connected us with potential investors and to trusted law and accounting firms. Finally, working from the Said Business School’s Oxford Launchpad has led to very fruitful introductions.

“Unique to Oxford is the availability of talent, the quality of life that you can offer people, connections with universities that allow really different, special collaborations.”

JIM MOODIE
Founder, Edspire and BPM Logic, and organiser of Oxford Startups Meetup

Weak digital infrastructure 33%
Low supply of affordable property 33%
Limited access to finance 30%

74% Access to local networks
61% Access to graduate-level talent
59% Access to business support

% of digital tech businesses

Digital Tech Economy Jobs

24,680

Advertised Digital Salary

£47,498

Digital Density¹

19%

Digital GVA²

£1.2 billion

Digital Growth

+32% Employment 2011-2014
+42% Turnover 2010-2014
+19% GVA 2010-2014

CASE STUDY

Ekaterina Damer
Co-founder
Prolific Academic

1 Digital tech businesses as % of total businesses
2 Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source:ABS/BSD)
Reading & Bracknell continues to score highly on a number of key economic indicators: it has one of the largest digital tech workforces and some of the highest salaries in the country, as well as the highest density of digital tech businesses.

Reading is developing specialisms in Enterprise software and cloud computing, as well as Data management and analytics. Notable tech startups include Fairsail, Altitude Angel, Blue Sense Networks, and Fantoo.

The cluster is driven by international talent, with 29% of businesses stating they employ non-EU citizens – the highest figure in the UK. The University of Reading and a high level of experienced industry talent have also made the cluster attractive internationally. It has a reputation for innovation in science and enterprise and recently received funding for a multi-million pound big data analytics centre, created to address environmental problems.

Incubators and collaboration hubs are helping the community. Co-working space GROW@GreenPark hosts tech events like the Festival of Digital Disruption, while local platform ConnectTVT advocates for the growth of digital companies and workers in the region through initiatives and Meetup groups.

DataSift provides technology allowing you to capture, analyse and act on all types of human generated data – from social networks, blogs, news articles, likes and discussions.

We have been in Reading for 8 years and our first round of funding came from Finance South East. The University’s Enterprise Centre had contractual terms that were perfect for a startup and was well connected with organisations like Business Link.

Reading is well connected but without the high costs of London. Thanks to Oracle and Symantec, there is a very large skilled workforce and talent pool while the University means we are connected to the next generation of stars.

“I think there hasn’t been very much in terms of getting the digital community together. We’re setting up digital collectives which will be for like-minded people that want to work together and drive change.”

LOUIZE CLARKE
Founder, ConnectTVT

Tim Barker
CEO
DataSift

Limited talent supply
38%

Limited access to finance
38%

Low sector awareness
27%

% of digital tech businesses

Access to
commercial property
77%

Access to
local networks
71%

Access to
graduate-level
talent
56%

% of digital tech businesses

Digital Tech Economy Jobs
40,440

Advertised Digital Salary
£51,576

Digital Density¹
23%

Digital GVA²
£6.4 billion

Digital Growth

+19% Employment
2011-2014

+23% Turnover
2010-2014

+40% GVA
2010-2014

Notable Sectors

- Cyber Security
- Enterprise Software & Cloud Computing
- Data Management & Analytics
- Digital Media & Entertainment

Challenges

Notable Universities & Colleges
Bracknell and Wokingham College
University of Reading

Notable Companies
Cisco
Huawei
Microsoft

1 Digital tech businesses as % of total businesses
2 Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source:ABS/BSD)
With an impressive 180% growth in average turnover between 2010 and 2014, and over 80% of digital tech businesses trading overseas, Southampton is now a rapidly growing cluster. Its growing specialisms include Digital media & entertainment, Hardware & devices, and Data management.

One of the cluster’s key assets is the University of Southampton. Its Science Park provides workspace for digital tech and science businesses and hosts The Catalyst Centre, which offers additional support for entrepreneurs.

The university is a founding member of the SETsquared Partnership, ranked by UBI Global as the leading University Business Incubator. Part of a wider network within the UK, the organisation helps entrepreneurs, academics, and early stage startups grow into successful commercial businesses. Southampton Solent University also supports students starting their own businesses.

Events and Meetups for members of the digital tech industry abound, ranging from monthly programming socials to Startup Weekend, while recently opened Venture Coworking provides space for early stage startups.

Nquiringminds is an IoT company developing SmartCities technologies. In November 2015, we were shortlisted in the inaugural Innovate UK Small Business Innovation Awards for our Open City Data IoT Platform (OCDP) that we are currently working with Southampton City Council, Liverpool City Council and Cambridge County Council.

Our location has helped us on this path to success. The University of Southampton is among the top 15 research-led universities in the UK. Through its SETsquared centre, we’ve been introduced to partner companies and received mentoring. It helps with everything from grant applications to business review panels and provides vital support to the digital tech community here.

“Southampton is well connected both physically and electronically. The extensive road, motorway, rail, ferry and airport links mean that mainland Europe and the rest of the UK are within easy reach, as well as nearby national parks; it makes Southampton very attractive, pleasant and rewarding”

ALAN SCRASE
SETsquared at the University of Southampton Business Incubation Manager

Ntíl Alloitt
CEO & Co-founder
Nquiringminds
As the birthplace of the industrial revolution, the Midlands has a long history in innovation and continues in the Digital Tech Economy; pioneering telecommunications, leading in the automotive industry, developing the jet engine, and contributing to integrated circuit and semiconductor research. With local universities providing a strong supply of talent, Birmingham leads the region. Yet digital tech is making its mark across the region; Great Malvern's cyber security centre, Leicester's digital expertise, Nottingham's early stage tech community, and Leamington Spa's growing gaming hub – 'Silicon Spa'. Available property, university talent and a growing number of networks are enabling growth across the region.

IN NUMBERS

DIGITAL TECH ECONOMY JOBS
206,433

PROPORTION OF JOBS IN THE MIDLANDS WITHIN THE DIGITAL TECH ECONOMY
4.4%

DIGITAL GVA*
£6.4bn

DIGITAL CONTRIBUTION TO REGIONAL GVA
4.4%

DIGITAL DENSITY
16.4%

NOTABLE CLUSTERS
9 BIRMINGHAM
10 LEICESTER
11 WORCESTER & MALVERN

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABS/BSD)
The UK’s second largest city, Birmingham is in the top five employers of digital talent. With a history of advanced manufacturing, Birmingham is now building emerging specialisms including Digital advertising & marketing and Enterprise software & cloud computing.

The city’s affordable property and local talent pool are key, enabling home-grown startups to flourish while also attracting major companies, such as ASOS, to the area. The Custard Factory creative quarter, and the area of Digbeth in which it is set, provide a growing hub for businesses. In March, the Innovation Birmingham Campus for the tech and startup community will also open iCentrum, a new £8m development to showcase collaborative technology.

Support from local networks, such as Silicon Canal, is strong, with 82% of survey respondents ranking it as a key benefit, while events like hackathon Launch48 provide support and mentorship.

Businesses in Birmingham are also the second most likely in the UK to source their talent from local universities, which include University of Birmingham, Aston University and Birmingham City University.

“The message we need to continue to spread far and wide is that startup cash goes a lot further in Birmingham, and the local skills pool makes it an obvious choice to base a tech business.”

DR DAVID HARDMAN MBE
CEO of Innovation Birmingham

Majestic is a specialist marketing search engine which maps the internet and how pages link together.

Being in Birmingham, and in particular based in the Innovation Birmingham campus, has had immense benefits for us.

We have close ties with the local universities, helping us to recruit the best of the UK’s graduating developer talent.

We have also been able to collaborate on European and privately funded research.

Birmingham’s great rail links to London and airport connections to most European capitals has also proved useful, while being here has improved staff retention rates and the quality of their work/life balance.

DIXON JONES
Marketing Director
Majestic

**NOTABLE SECTORS**

- ENTERPRISE SOFTWARE & CLOUD COMPUTING
- DIGITAL ADVERTISING & MARKETING
- ONLINE GAMBLING
- TELECOMMUNICATIONS & NETWORKING

**CHALLENGES**

- Limited access to finance: 39%
- Low sector awareness: 28%
- Weak economic climate: 22%

% of digital tech businesses

**BENEFITS**

- Access to commercial property: 85%
- Access to local networks: 82%
- Access to graduate-level talent: 60%

% of digital tech businesses

**DIGITAL TECH ECONOMY JOBS**

36,768

**ADVERTISED DIGITAL SALARY**

£41,538

**DIGITAL DENSITY**

18%

**DIGITAL GVA**

£1.13 billion

**DIGITAL GROWTH**

- EMPLOYMENT: +15%
- TURNOVER: +17%
- GVA: +31%

**NOTABLE UNIVERSITIES & COLLEGES**

- ASTON UNIVERSITY
- BIRMINGHAM CITY UNIVERSITY
- UNIVERSITY OF BIRMINGHAM

**NOTABLE COMPANIES**

- ASOS
- HSBC
- VIRGIN MEDIA
A newcomer to the Tech Nation list, Leicester exhibited nearly 30% growth in digital employment. The city’s history in textiles, hosiery and manufacturing has established a flourishing creative sector, which has contributed talent to the evolving tech ecosystem.

Leicester’s success stories include public sector CMS provider Jadunet, audience polling system ParticiPoll.com and mobile market research app CrowdLab.com. IBM also recently located their Client Innovation Centre in the heart of the city.

Their growth has been supported by local networks and organisations such as Leicester Tech Startups, a group created by entrepreneurs who meet regularly to showcase products and exchange ideas. New co-working spaces continue to appear to support businesses, including the Dock, and De Montfort University’s new co-working space.

A reliable stream of talent is emerging from the city’s universities, including De Montfort University, Loughborough University and the University of Leicester, ranked in the top 1% of universities worldwide. The University stages events for aspiring entrepreneurs and contributes a significant number of graduates to technology companies.

ParticiPoll lets you drop audience polls into existing PowerPoint presentations. Audience members vote by visiting the presenter’s personal voting URL, then the results appear live in the presentation.

ParticiPoll was one of the first companies to be born of Leicester’s digital tech startup community, which we helped found in 2013. Networks of other entrepreneurs were pivotal in helping us to work out, quickly, which direction to take the company in.

We have had a huge amount of advice, inspiration and moral support from fellow businesses. I think that is the city’s key strength. The universities and Leicester City Council have also been very helpful with work spaces, funding and encouragement.

“The city council just get it in Leicester. With a City Mayor there’s strong leadership and some really dedicated officers who know how important it is to get startups access to the right kind of funding.”

JIM WILLS
Co-founder, Crowdlab

DIGITAL TECH ECONOMY JOBS
21,273
ADVERTISED DIGITAL SALARY
£38,293
DIGITAL DENSITY¹
15%
DIGITAL GVA²
£386 million

DIGITAL GROWTH
+29% EMPLOYMENT 2011-2014
+63% TURNOVER 2010-2014
+50% GVA 2010-2014

NOTABLE SECTORS

- E-COMMERCE & MARKETPLACE
- ENTERPRISE SOFTWARE & CLOUD COMPUTING
- SOCIAL NETWORKS
- FINTECH

¹Digital tech businesses as % of total businesses
²Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source:ABS/BSD)
Worcester & Malvern – sometimes referred to as ‘Cyber Valley’ – is a leading cluster for the development of cyber security products and services, influenced by its close proximity to GCHQ in Cheltenham and the SAS in Hereford.

The cluster recorded a 71% increase in employment between 2011 and 2014 – the second highest growth rate in the UK. Productivity in the area is also high, with a 48% growth in turnover and 56% growth in GVA during the same period.

A number of the cluster’s cyber security companies began as spinouts from QinetiQ, the privatised arm of the Government’s Defence Evaluation and Research Agency, including Deep-Secure and D-RisQ.

The digital tech community is supported by organisations such as Key IQ Ltd, which runs a co-working space encouraging networking and collaboration. The Malvern Cyber Security Cluster, a group made up of more than 80 small companies, also cooperate on initiatives that improve the cyber security of local enterprises and raise awareness of relevant issues among young people.

Deep-Secure designs software that enables the exchange of very sensitive information between computer networks of different security levels.

Worcestershire benefits from good road and rail links with London, Birmingham and Manchester, enabling customers to reach us easily. Malvern’s cluster, meanwhile, possesses a diversity of technology expertise. The Malvern Cyber Security Cluster, for instance, involves 80 SMEs cooperating together.

It is also a great place to live – an Area of Outstanding Natural Beauty, home to a vibrant theatre, good restaurants, shops and close to the historic city of Worcester.

“Having a concentration of tech small companies in one place like Malvern allows them to network with each other. They form trusted partnerships where they can discuss, share and learn from each other.”

EMMA PHILPOTT
Founder, UK Cyber Security Forum
Once a key driver of the industrial revolution, the ‘Northern Powerhouse’ has proven itself as a leader in digital innovation; from Alan Turing at the University of Manchester producing the world’s first programmable computer to the creation of Sage, the UK’s only FTSE 100 Technology company. Home to seven leading clusters, the region has a range of sector expertise, from games in Liverpool and Healthtech in Leeds, to E-commerce in Newcastle and software development in Hull. Growing communities can also be found in areas such as Bradford, York and Cheshire, home to the UK’s fastest supercomputer.

**IN NUMBERS**

**DIGITAL TECH ECONOMY JOBS**

283,515

**PROPORTION OF JOBS IN THE NORTH OF ENGLAND WITHIN THE DIGITAL TECH ECONOMY**

4.2%

**DIGITAL GVA**

£9.9bn

**DIGITAL CONTRIBUTION TO REGIONAL GVA**

5.2%

**DIGITAL DENSITY**

16.6%

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABARESSD)
HULL

With an established track record in software development, hardware, and publishing, Hull’s current strengths include App & software development, E-commerce and Data management & analytics.

The strong digital infrastructure provided by the KCOM Group has been key to the success of Hull’s diverse digital tech businesses, from locally established firms like Trident and Ebuyer, to early stage companies such as Frillo, LabelWORX and Sypro.

The cluster’s startup community is small but growing, with digital tech businesses in the area having been boosted by increased access to loans and support from local incubators, such as the Centre for Digital Innovation (C4Di).

Measures are also being put in place to address the challenge of accessing finance. The Hull Business Development Fund provides up to £25,000 for businesses able to provide a sustained benefit to the local economy. The Youth Enterprise Bank, meanwhile, provides grants to aspiring entrepreneurs aged 19 or younger.

"I think Hull has amazing possibilities: we’ve got the best connectivity in the country, an amazing start up hub and cost of buildings is very affordable. And it’s just a beautiful part of the world to live in."

JOHN CONNOLLY
MD, CD4I

Label Worx is the world’s largest digital distributor of Dance & Electronic music to iTunes, Beatport, Spotify, Amazon, Google Play and more.

Being based at the C4Di in Hull has allowed us to expand rapidly as the rent, living costs and wages are considerably less than they would be if we were operating from London.

Instead, we’ve been able to invest in well experienced staff, system developments and cutting edge technology to ensure our business is the best it can be.

Operating from the heart of Hull strengthens our company, allowing us to grow faster than other businesses with far higher operating costs.

NOTABLE UNIVERSITIES & COLLEGES
HULL COLLEGE
UNIVERSITY OF HULL

NOTABLE COMPANIES
EBUYER
PWC
TRIDENT

Limited access to finance 34%
Low sector awareness 32%
Weak economic climate 25%

% of digital tech businesses

DIGITAL TECH ECONOMY JOBS
6,070
ADVERTISED DIGITAL SALARY
£37,258
DIGITAL DENSITY1
16%
DIGITAL GVA2
£189 million

DIGITAL GROWTH

EMPLOYMENT
+2%
2011-2014

BUSINESS
+24%
2010-2014

GVA
+14%
2010-2014

NOTABLE SECTORS
• E-COMMERCE & MARKETPLACE
• APP & SOFTWARE DEVELOPMENT
• HARDWARE, DEVICES & OPEN SOURCE HARDWARE
• DATA MANAGEMENT & ANALYTICS

1 Digital tech businesses as % of total businesses
2 Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source:ABS/BSID)
With a wealth of graduates from the city's numerous universities and education institutions, Leeds has a talent pool almost unrivalled in the UK. Between 2010 and 2014, the cluster experienced the highest advertised salary growth in the UK, at 29%.

According to Leeds Data City, there are over 3,500 digital organisations in the area, with specialisms including Digital marketing and advertising, and E-commerce. Leeds has over 2,000 data scientists and is home to the Leeds Institute for Data Analytics (LIDA). It has clear expertise in healthcare in the NHS spine project and HSCIC.

It is also home to the Northern Internet Exchange, IX Leeds, which makes Leeds the only internet independent city in the UK outside London. Last year, Google opened its first ever Digital Garage in Leeds, supporting over 3,000 businesses in 7 months. Leeds was also among 3 cities to share £11m in government funding to develop technology hubs.

The cluster's leading businesses include Rockstar Leeds, which worked on the 54 million copy selling Grand Theft Auto V, and Sky Bet, which employs over 700 people.

"The biggest drawback is the amount of profile that we have nationally – we're nowhere near recognised as Bristol and Manchester and Birmingham, but that is starting to change."

AMY DE BALSI
Founder, Leeds Herd

Cocoon has designed a single device to protect your whole home, across different floors, all from one device. This also removes the need for customers to install additional motion sensors, keypads, or camera systems.

Being based in the North of England means that we have access to a wealth of engineering talent that we simply wouldn't get elsewhere in the UK. The combination of high-quality skills provision and a more relaxed quality of life makes day-to-day life in the office more enjoyable and creates a fantastic company atmosphere. This is really important to us and our team.

Limited talent supply 60%
Limited access to finance 49%
Low sector awareness 34%

% of digital tech businesses
Starship is a digital media, entertainment and technology company. We decided to settle in Liverpool for a number of reasons: the depth and breadth of the talent pool, low business overheads, cost of living, quality of life, three universities and the fact that it is an established centre of excellence for software development within the games industry.

Even though we had to build a completely new development studio from the ground up, the team we were able to recruit in the city has a formidable track record, decades of individual experience, phenomenal technical skills and are incredibly talented.

Liverpool's gaming heritage, which stretches back to Psygnosis, and later Sony, is central to the cluster. The city's introduction of co-working spaces have helped the cluster to grow, with IoT & connected devices, App & software development and E-commerce among its specialisms.

Liverpool's commercial and residential property rents are among the lowest in the country, making it real value for money for businesses. The Baltic Triangle, home to industry-focused school and college The Studio, is enjoying a revival as a hub for entrepreneurs.

The University of Liverpool and Liverpool John Moores University attract some of the UK’s top talent, producing capable and employable graduates.

Tech and science incubators include the Innovation Park, Science Park, Merseybio and Launch 22 as well as Santander’s recently opened incubator for rapidly growing, small businesses. Liverpool Vision has supported digital companies, helping to set up Baltic Creative CIC, and networking initiatives such as kin2kin network, and others including Creative Kitchen (lead by Studio Mashbo), DoES Liverpool, and the eHealth Cluster.

“"The city’s continually being redeveloped and re-energised. There’s a large student population, so there’s a large graduate pool. We just need a smash hit to put us back on the map”

MATT SOUTHERN
Founder, Mint Games
Manchester has established itself as one of the top five clusters in the UK, with the second highest GVA growth and digital employment over 50,000. It was recently awarded £10m as Innovate UK’s IoT City Demonstrator (in partnership with Cisco).

Manchester's specialisms include Edtech, e-commerce and adtech, and historically, digital entertainment. Global digital agencies located in Manchester include Amaze and Building Blocks, while leading companies include online car booking service rentacars.com and Northern Stars winner Peak.

Support organisation Manchester Digital, and events such as Ladies that UX, the weekly Friday Drinkabout MCR and the Lean Conf have fostered this active community, complementing the city's academic specialisms in materials science and computer science.

Rise, The Sharp Project, Innospace, the Landing, Together and SpaceportX provide space and assistance for startups, while MediaCityUK also contributes to Manchester’s future growth plans. The recent injection of funds from Government will help fund the building of Forward Manchester, creating a support hub for software engineers & tech entrepreneurs.

Wakelet is an online platform enabling you to organise any content on the internet, and to curate stunning, shareable collections. We help people to take control of the content that interests, inspires and excites them.

With its entrepreneurial culture, Manchester makes sense for us. We were able to secure our first round investment of £1.1m from angels, led by Manchester-based and self-made business people.

The city has a rich history of innovation. The current energy and vibe in Manchester, and its increasing openness to explore new approaches, has made it a great place to develop interesting partnerships.
With the second highest salary growth of any city in the UK at 26.6%, Newcastle & Durham continues to build on its tech history; the technological institution, Sage, is still driving employment and innovation in the area.

In addition to long established digital tech companies, Newcastle & Durham has produced Reframed.tv and Leaf.fm, both of which were finalists of the recent Northern Stars competition. Newcastle-based Moltin just raised $2 million from US VCs.

The area’s benefits for digital tech businesses include the high level of talent available. This is coupled with good support from the co-working space Campus North, the angel-led accelerator programme Ignite and venture capital firm Northstar Ventures, which has over £95m under management.

Further support comes in the form of Dynamo North East, The North East Technology Fund and Newcastle Science Central’s office spaces, called The Core.

Digital tech businesses in this cluster are more likely than those in any other to receive support from an accelerator, and the second most likely to receive mentoring support.

“We are very well served by universities here so as much as recruitment is always an issue for a business there are a lot of talented people in the area”

Paul Fellows
COO, Performance Horizon Group
Sheffield & Rotherham’s strengths are built on expertise in Data management & analytics and Telecommunications & networking, with recently established specialisms in Hardware, IoT and E-commerce.

The cluster has an established support network, with organisations such as Dotforge delivering tech-for-good accelerators in Sheffield, Leeds and Manchester. Maker and hack culture is prominent in Sheffield with makerspaces such as ROCO and Access Space bringing digital technologies to a centuries-old heritage of craft and making.

Workspaces range from community co-working at Union St to space at Electric Works. The Sheffield City Region Enterprise Zone is ranked the UK’s top enterprise zone for modern manufacturing and technology, while new industry association Sheffield Digital exists to support digital tech companies and workers.

The positive momentum in South Yorkshire’s largest cluster has been recognised by the UK Government. In the 2015 Budget it was one of three cities to share £11m in funding dedicated to building technology hubs.

The cluster has an established support network, with organisations such as Dotforge delivering tech-for-good accelerators in Sheffield, Leeds and Manchester. Maker and hack culture is prominent in Sheffield with makerspaces such as ROCO and Access Space bringing digital technologies to a centuries-old heritage of craft and making. Workspaces range from community co-working at Union St to space at Electric Works. The Sheffield City Region Enterprise Zone is ranked the UK’s top enterprise zone for modern manufacturing and technology, while new industry association Sheffield Digital exists to support digital tech companies and workers.

The positive momentum in South Yorkshire’s largest cluster has been recognised by the UK Government. In the 2015 Budget it was one of three cities to share £11m in funding dedicated to building technology hubs.

“The community of startups Sheffield is maturing. 3 of the 10 Northern Stars are from the city, which demonstrates that there is a real depth of talent and commitment to building compelling new businesses.”

EMMA CHESHIRE
CEO, Dotforge

THE FLOW

We are best known for delivering the world’s most advanced telematics data management solutions through device-agnostic predictive analytics and digital end-user services, all with a view to making vehicles safer and cheaper for all.

Since we began in 2012, The Floow has grown from a team of 3 to more than 60 expert scientists, engineers, designers and support staff.

Our success is driven in part by our location. In Sheffield, we have access to 2 universities renowned for their digital and scientific innovation. The outstanding talent available locally has proved critical.

Sheffield is also a growing hub of digital tech activity and so is well placed to support high-growth companies like The Floow.

DR SAM CHAPMAN
CIO & co-founder
The Floow

NOTABLE SECTORS

- E-COMMERCE & MARKETPLACE
- HARDWARE, DEVICES & OPEN SOURCE HARDWARE
- APP & SOFTWARE DEVELOPMENT
- ENTERPRISE SOFTWARE & CLOUD COMPUTING

CHALLENGES

Limited access to finance 36%
Weak economic climate 36%
Low supply of affordable property 34%

% of digital tech businesses

BENEFITS

Access to graduate-level talent 67%
Access to commercial property 62%
Access to business support 53%

% of digital tech businesses

TECH NATION 2016 / TECH CITY UK IN PARTNERSHIP WITH NESTA

DIGITAL TECH ECONOMY JOBS
14,313
ADVERTISED DIGITAL SALARY
£42,058
DIGITAL DENSITY1
18%
DIGITAL GVA2
£273 million

DIGITAL GROWTH

+19% PRODUCTIVITY3 2010–2014
+3% EMPLOYMENT 2011–2014
+45% TURNOVER 2010–2014

NOTABLE UNIVERSITIES

SHEFFIELD HALLAM UNIVERSITY
SHEFFIELD UNIVERSITY

NOTABLE COMPANIES

HSBC
PLUSNET (BT)
WANDISCO

1 Digital tech businesses as % of total businesses
2 Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABS/BSD)
3 Digital sales per worker

TECH NATION 2016/ TECH CITY UK IN PARTNERSHIP WITH NESTA

@TECHCITYUK / @NESTA
Sunderland has enjoyed steady growth, with employment rising by almost 17% since 2010. In addition to a long-standing specialism in App & software development, it has growing expertise in Hardware, Games and Telecommunications & networking.

The local software scene can be traced back to 1996 with the creation of Domain Names, a company that grew to become the largest domain provider in Europe.

Much of the cluster’s recent growth stems from the establishment of Sunderland Software City in 2009. A joint partnership between the private, public, and education sectors, it has already supported over 400 businesses and aims to create more than 2,000 jobs by 2020.

Opening in 2015, the North East & Tees Valley Digital Catapult Centre is helping businesses increase efficiency and productivity.

Sunderland has benefited from the presence of companies such as Geek Talent, Epic Games, Technically Compatible and United Software, while the University of Sunderland’s Hatchery acts as a startup incubator for students and graduates.

“There are lots of incentives to set businesses up within the Sunderland Software Centre where we are. The council is very pro-software, pro-digital businesses.”

DOMINIC MURPHY
Managing Director, Geek Talent

Our product set contains a recruitment platform for companies, a careers portal and a labour market intelligence platform. We analyse hundreds of data points from millions of people across multiple social sites to understand the real time labour market.

We have received amazing support from Sunderland Council, Sunderland Software City and the community of companies we are part of in the Software Centre. Dynamo North East has made us part of a growing digital tech community, collaborating to raise the profile of the industry.

Having recently been one of the Tech North Northern Stars, we look forward to gaining further support to help us launch globally.

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Managing Director, Geek Talent

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SUNDERLAND
NORTH OF ENGLAND

NOTABLE UNIVERSITIES & COLLEGES
CITY OF SUNDERLAND COLLEGE
UNIVERSITY OF SUNDERLAND

NOTABLE COMPANIES
EPIC GAMES
TECHNICALLY COMPATIBLE
UNITED SOFTWARE

DIGITAL TECH ECONOMY JOBS
3,675

ADVERTISED DIGITAL SALARY
£38,999

DIGITAL DENSITY1
12%

DIGITAL GVA2
£107 million

DIGITAL GROWTH
+17% EMPLOYMENT 2011–2014
+44% TURNOVER 2010–2014
+29% GVA 2010–2014

NOTABLE SECTORS
TELECOMMUNICATIONS & NETWORKING
GAMING
HARDWARE, DEVICES & OPEN SOURCE HARDWARE
APP & SOFTWARE DEVELOPMENT

1 Digital tech businesses as % of total businesses
2 Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source:ABS/BSI)
Rising from a strong industrial heritage in shipbuilding and aerospace, Northern Ireland is entering the next chapter of its history of innovation with digital technology. Outside of London and the South East, Digital Tech Industries are contributing the highest proportion of GVA to this area's economy. With excellent talent from local universities, low overheads and available business support, Northern Ireland is creating an environment for digital tech businesses to thrive. Belfast continues to be the leading cluster, closely followed by a fast growing cluster in Derry, alongside smaller communities in Newry and Omagh.

**In Numbers**

**Digital Tech Economy Jobs**

24,741

**Proportion of Jobs in Northern Ireland within the Digital Tech Economy**

3.1%

**Digital GVA**

£1bn

**Digital Contribution to Regional GVA**

5.4%

**Digital Density**

16.6%

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABS/ BSD)*

**Notable Clusters**

- **Belfast**
Belfast is Northern Ireland’s leading digital technology cluster. Digital Tech Industries contribute 5.4% GVA to the region’s economy; the second highest proportion in the UK.

The cluster has developed specialisms in App & software development, E-commerce & marketplace, and Digital media & entertainment, and is also seeing significant developments in Data management & analytics and Cyber security, with companies such as RepKnight and Analytics Engines.

Belfast’s digital community is cited as its leading strength, with networks including NISP Connect and Innovation Ulster. Other strengths lie in affordable property spaces, such as the Northern Ireland Science Park and Farset Labs, and the strong talent pipeline generated by Queen’s University and the University of Ulster, which have facilitated the impressive growth of businesses such as Kainos.

Access to finance across the cluster is improving through the work of local angel network Halo, and funds such as TechStart NI, Invest NI and the Invest Growth Fund. Belfast also has one of the highest numbers of digital tech businesses operating within traditional industries.

RepKnight’s location is of vital importance to our success, providing us with the ideal ecosystem in which to run a cybersecurity company.

Being based in both Belfast and London allows us to capitalise on two key sources of talent and support the growth of our company.

Our network of research and development staff at CSIT in Queen’s University, Belfast, is an important source of technical talent while London’s status as a digital tech hub provides us with a wide range of skills and expertise.

In the future, our dual locations will allow us to manage our growth and development both flexibly and dynamically.

“There’s now a vibrant tech community bringing skills and experiences from the rest of the UK, Ireland and the US – people are coming back here with ten, twenty years’ significant experience.”

STEPHEN MCKEOWN
CEO, Analytics Engines

Limited talent supply
40%

Limited access to finance
49%

Low sector awareness
46%

% of digital tech businesses

Access to local networks
54%

Access to commercial property
46%

Access to graduate talent
44%

% of digital tech businesses

JOHN REID
CEO
RepKnight

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Access to graduate talent
44%

% of digital tech businesses
Traditionally an economy dominated by heavy industries such as shipbuilding, steel and petroleum, Scotland’s rising digital tech scene is notable for its sector diversity and the emergence of two billion dollar companies, Skyscanner and Fanduel. With a thriving community, great talent, and continued growth, Edinburgh leads as Scotland’s digital tech centre. Glasgow’s growing pool of software developers continues to draw major corporates, while Dundee has consolidated its position as a leader in the UK’s games sector. Aberdeen is also benefiting from recent public investment in support centres and broadband.

IN NUMBERS

DIGITAL TECH ECONOMY JOBS
101,397

PROPORTION OF JOBS IN SCOTLAND WITHIN THE DIGITAL TECH ECONOMY
3.9%

DIGITAL GVA*
£1.5bn

DIGITAL CONTRIBUTION TO REGIONAL GVA
2.2%

DIGITAL DENSITY
16.6%

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABS/BSD)

NOTABLE COMPANIES

adimo

FanDuel

M Squared

Skyscanner

Tvsquared

vivomation

SCOTLAND

NOTABLE CLUSTERS

DUNDEE

EDINBURGH

GLASGOW
Dundee, the birthplace of iconic games Lemmings and Grand Theft Auto, continues to punch above its weight as a digital tech cluster. At 129%, it had the third highest growth in turnover in the UK, while its GVA grew by 42%.

Dundee’s growing specialisms are in Hardware, App & software development, as well as Gaming, where companies like Outplay Entertainment, Tag Games and YoYo Games continue to complement high-growth Digital Media & Entertainment firms like Brightsolid, eeGeo and Waracle, and established companies such as DC Thomson and NCR.

The strength of the cluster is underpinned by education, with the University of Abertay, which was the UK’s first university centre of excellence for computer games education, and Duncan of Jordanstone College of Art & Design.

Beyond gaming, Dundee hosts the annual NEoN Digital Arts festival. Last year, the event showcased digital and electronic art from Japan, China, Hong Kong, Korea and Taiwan. Digital tech businesses in Dundee have, on average, 11% of their customers based in Asia.

“At Vivomotion, we create stunning animations to illustrate scientific concepts. We benefit greatly from being located in Dundee. First, Vivomotion received startup funding from Dundee City Council as well as support from The University of Dundee and Business Gateway. There is also an existing client base here within the life sciences sector. For us, this has lead to new international clients. Dundee has two leading universities involved in life sciences, as well as the James Hutton Institute which is the UK’s leading facility for agricultural research. There is a strong creative sector too, with Dundee being awarded UNESCO City of Design status last year. We create jobs that cross the life sciences and creative sectors in a city that has expertise in both.”

ALISON HENDERSON
CEO, Dundee & Angus Chamber of Commerce
The Scottish capital is a leading UK tech cluster, home to billion dollar companies such as Skyscanner and Fanduel, along with rapidly growing startups like TV Squared and Administrate.

The city saw the fifth highest growth in digital employment (2010-2014) and had considerable growth in average digital salary. International tech companies, such as Amazon, Cisco, Oracle, Microsoft and IBM, have now also created bases in Edinburgh.

Edinburgh’s strengths in academia and software, and excellent local networks, have created a stimulating environment for startups to grow. Over 2,630 people regularly attend technology Meetups in the city, and it has one of the largest active Github developer communities.

Incubators such as Codebase have helped to support the startup community. Edinburgh businesses are more likely than others to take advantage of local business and technical support.

Edinburgh’s rapid digital growth has led to skills shortages, despite access to top universities and colleges being a key benefit.

“Edinburgh’s got an amazing quality of life, a good university base, it’s not prohibitively expensive, there’s a really active angel community... all of those things boil down to a pretty unique platform for launching companies.”

JOHN PEEBLES
CEO, Administrate

Being in Edinburgh has given FanDuel the support, guidance and funding opportunities we needed to establish ourselves and grow. In the early stages of developing our product and launching the business, the University of Edinburgh was a great source of support. Today, it continues to provide great talent for us. We were hosted within the University’s Edinburgh Technology Transfer Centre until 2012, and benefited from contacts made through the Informatics Ventures programme.

Our first round of funding was provided by 2 Scottish investors: Pentech Ventures and the Scottish Investment Bank. Now, as an established businesses, we enjoy sharing our experience and learning with the next generation of digital tech startups.

NOTABLE SECTORS

FINTECH
E-COMMERCE & MARKETPLACE
DIGITAL ADVERTISING & MARKETING
ENTERPRISE SOFTWARE & CLOUD COMPUTING

CHALLENGES

Limited talent supply 47%
Limited access to finance 38%
Weak economic climate 32%

% of digital tech businesses

BENEFITS

Access to local networks 87%
Access to commercial property 85%
Access to graduate-level talent 81%
Glasgow's transformation from industrial powerhouse to leading digital technology cluster is highlighted by the development of the Fairfield Offices in Govan – now home to Rookie Oven, and one of several locations in the city providing a home to a new breed of digital tech startups.

There are a number of thriving developments that illustrate Glasgow’s vibrancy; STV and BBC in Pacific Quay, Axis and Clyde Space in City Park, JP Morgan and Morgan Stanley in the International Financial Services District, ISO Design and Adimo in the Merchant City.

Local networks, as well as a strong Github online developer community, have also created a talent pipeline for companies, with 77% of Glasgow companies citing that they rely on self-taught programmers as a talent source.

The city’s universities, including the University of Strathclyde, University of Glasgow, and Glasgow School of Art, are central to providing a strong supply of talent, while the University of Strathclyde particularly excels in supporting homegrown startups, ranking 7th in the UK for company spin-outs.

Adimo makes brand marketing shoppable. FMCG brands spend over half a trillion dollars on marketing and promoting their products, driving people to websites where their products can’t even be purchased. We solve this by connecting any form of marketing directly to a shopper’s online supermarket basket – increasing click-through rates and providing a seamless path to purchase.

Creativity thrives in Glasgow and we’ve benefited from significant cost savings and great talent from Glasgow and Strathclyde Universities, and the local arts scene. More recently, we’ve been part of a growing tech scene, meeting up with fellow founders to support each other and share knowledge.

"I’d say there has been a cultural change across technology. There’s more activity in the community, more people"  
MICHAEL HAYES  
Founder, RookieOven
The economy of the South West has traditionally been very diverse, ranging from a strong tourist and food industry across Cornwall, Devon and Somerset, to an industrial heritage in aerospace and silicon chips in Bristol. Bristol & Bath is the leading cluster in the region with digital expertise continuing to focus on software, gaming, media and its roots in hardware & devices. Bournemouth & Poole and Exeter & Newton Abbot both have specialisms in Digital Advertising & Marketing and E-commerce is growing. In addition, a number of major corporates, in mobile technology and electronics, can be found in Swindon.

**NOTABLE CLUSTERS**

- **BOURNEMOUTH & POOLE**
- **BRISTOL & BATH**
- **EXETER & NEWTON ABBOT**
- **TRURO, REDRUTH & CAMBORNE**

**IN NUMBERS**

**DIGITAL TECH ECONOMY JOBS**

135,713

**PROPORTION OF JOBS IN THE SOUTH WEST WITHIN THE DIGITAL TECH ECONOMY**

5.2%

**DIGITAL GVA***

£3.3bn

**DIGITAL CONTRIBUTION TO REGIONAL GVA**

4.2%

**DIGITAL DENSITY**

117.3%

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source:ABR/ESID)
Bournemouth & Poole is one of the top 10 clusters in the UK for employment growth and has the third highest density of digital tech businesses.

The cluster’s strengths lie in its digital creative industry; App & software development and Data management & analytics, as well as a strong agency community working in Digital advertising and marketing.

These sub-sectors are supported by a steady supply of digital talent from local industry, while creative companies, including RedWeb and Sunseeker, act as hubs for local creative talent. Major corporations, including Nationwide, Barclays and JP Morgan also have a presence.

Local universities are also key. The highly acclaimed National Centre for Computing Animation at Bournemouth University produces VFX graduates, who have gone on to work on award-winning films and video games.

Bournemouth boasts a high quality of life, and hosts events for the digital community such as Meetdraw, Silicon Beach, and Digital Wave. It has co-working spaces such as by-the-sea and the Factory Studios. The council is active in the tech community with Bournemouth Borough Council winning Digital Council of the Year in 2015.

As a digital tech business we are not too reliant on infrastructure so choosing Bournemouth, which has one of the best coastlines and lifestyles in the UK, made sense!

We work with UK organisations like Mind, RNLI and Lloyds Banking Group, but 80% of our business is overseas, with clients like the American Red Cross, Nordstrom, FRC and ASPCA.

Sourcing talent can be a challenge. To combat that we run courses, free of charge, at our local university, teaching students exactly what’s happening in the industry. We offer internships and jobs to those that shine. Our Head of iOS came through this program, so it has worked pretty well.

“It’s just a fantastic place to live, and I don’t believe that geographic location is a barrier to working with international clients any more, at all.”

MIKE HAWKYARD
MD, Amuzo
Bristol & Bath has continued to grow impressively; turnover has increased by 53%, and it is recognised by Centre for Cities and McKinsey & Company as one of the two globally significant digital tech clusters in the UK, including over 60,000 digital workers in the broader region.

With a history in aerospace and digital software, the cluster’s specialisms now include Telecommunications & networking, Gaming, Virtual reality, and Cloud computing. Aardman, JUST EAT, IMDb, Oracle, IBM, Sony and Hewlett Packard have all been attracted by the strong digital ecosystem.

Local networks TechSPARK and High Tech Bristol & Bath are thriving; 81% of local business owners stated collaboration as a benefit, while 5,000 people regularly attend tech Meetups in the area, the third most in the UK.

Hubs like Bristol Games Hub, Engine Shed, Bristol & Bath Science Park and the Bath Guild are also supporting the growth of digital tech businesses. The Bath & Bristol SETsquared programmes generated over £48million of investment in 2015 and were named the world’s best university incubator by UBI Global.

XMOS is a leading supplier of multicore microcontroller microprocessors, at the cutting edge of internet connected devices.

Our semiconductor products are used by customers across the globe in a range of applications from consumer audio products to robotics and automotives, where the XMOS XCORE processors are supporting the next generation of real-time networking systems in cars.

Being based in Bristol, we are part of a large community of micro electronics and software engineers. We also have close links with the local universities. In fact, the technology behind XMOS was originally developed within Bristol University. We are one of the university’s most successful spin-outs to date.

感触

“Our pool of talent has grown as major tech firms have chosen to invest in the region over the last few years, so the recruitment of senior people has become easier.”

NICK STURGE
Centre Director, Engine Shed (and SETsquared)
Digital Tech Industries are central to Exeter’s economy. Between 2010 and 2014 it experienced a 161% growth in its digital tech employment, the highest in any cluster.

The city scored highly on productivity during that period, with digital tech businesses reporting a turnover growth rate of 52%, while GVA grew by 84%. Local success Crowdcube has successfully funded over 345 companies.

Exeter Science Park provides space for digital tech businesses, while The Generator is Devon’s first and biggest co-working space. Local support organisations and networks contribute to Exeter’s success. Meetup groups include Digital Exeter and Exeter Web Meetup, while Koncept works with early stage entrepreneurs and startups to create usable products. Ignite Students’ Guild, based at the University of Exeter, works with students to help turn their ideas into startups.

Crowdcube is the world’s first and leading investment crowdfunding platform. Since 2011, over £135m has been invested in more than 350 raises from a crowd of 250,000 people. By opening up equity investment to everyday investors we enable tech businesses to reach hundreds of potential investors.

For us, our location has helped us attract top talent; it offers employees both a better work-life balance and a challenging and rewarding career in an innovative and growing business. That alluring mix has enticed top talent from the likes of Google, eBay, Octopus Ventures, KPMG, Amazon and Goldman Sachs, as well as Devon’s top local talent, and post-graduates from the University of Exeter.

“\nThe nature of the community here in the South West lends itself to exciting collaborations and partnerships across sectors and industry that is developing the perfect environment for the creation of innovative new business.\n”

NEIL FINNIE
Founder, Corkscrew

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CROWDCUBE
While Truro, Redruth & Camborne is an early stage cluster, between 2010 and 2014 overall digital turnover rose by 153%. Early analysis indicates a growing expertise in Data management & analytics, Hardware & devices, Edtech, and App & Software development.

The area has a history of innovation such as Goonhilly Earth Station, which received the first transatlantic TV images in 1962.

Access to superfast broadband is key to the cluster’s potential today, with Cornwall having the most extensive commercial and residential broadband of any rural location within the UK.

The introduction of superfast broadband meant we could locate our cutting edge digital tech business on a beach in Newquay and enjoy the benefits of a stunning view, a highly motivated and creative workforce, and go surfing on a Friday! Access to local networks is key to the cluster’s potential today, with Cornwall having the most extensive commercial and residential broadband of any rural location within the UK.

Cornish companies also report benefiting from access to local networks, such as Software Cornwall, a community of digital tech businesses that work closely with local colleges and universities to design courses that match their industry needs. Other initiatives include Agile on the Beach, an annual two-day conference that brings together the cluster’s digital tech community.

Local success stories include Bluefruit, a software development company looking to address the skills gap by supporting local code clubs for kids. It provides free training courses for 15-18 year olds along with work experience and apprenticeship schemes.

“A rural location has traditionally been seen as a weakness. Cornwall is dissolving that urban myth, driven by superfast connectivity, a pipeline for delivering tech skills and a strong collaborative community.”

BELINDA WALDOCK
Co-Founder Software Cornwall, Agile on the Beach Organiser, Author of Being Agile in Business

We are the UK’s number 1 rewards-based crowdfunding platform, with an online community of over 350,000.

Crowdfunder was founded in Cornwall thanks to the support of Plymouth University, a leading educational player in the county and a founding partner.

The introduction of superfast broadband meant we could locate our cutting edge digital tech business on a beach in Newquay and enjoy the benefits of a stunning view, a highly motivated and creative workforce, and go surfing on a Friday!

Limited access to finance 48%

Low sector awareness 52%

Limited talent supply 68%

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Low sector awareness 52%

Limited talent supply 68%
Alongside Wales’ key sectors of energy, advanced manufacturing and professional services, digital technology has made its mark. A leading life sciences hub with a thriving creative industries ecosystem, Wales’ expertise spans software, electronics, digital media and entertainment and is home to three market leaders – Confused.com, moneysupermarket.com and GoCompare.com. Low cost of living and a strong talent pool have helped support the sector, as well as growing support from the Welsh government. Digital infrastructure initiatives are creating vital conditions for growth.

**IN NUMBERS**

**DIGITAL ECONOMY JOBS**

43,342

**PROPORTION OF JOBS IN WALES WITHIN THE DIGITAL ECONOMY**

3.2%

**DIGITAL GVA***

£0.6bn

**DIGITAL CONTRIBUTION TO REGIONAL GVA**

2.3%

**DIGITAL DENSITY**

15.4%

*Total output (goods or services) minus value of inputs e.g. cost of production, taxes, subsidies (Source: ABS/BSD)

**NOTABLE CLUSTERS**

CARDIFF & SWANSEA
Cardiff & Swansea, the two main clusters in Wales, featured in the UK’s top 10 clusters for digital salary growth and GVA growth.

The cluster has emerging specialisms in Cyber security, App & software development, alongside a foundation in E-commerce, Fintech and Sportech. Startups to watch include Pwinty, a photo printing API, the e-learning company Noddlepod, and E-commerce business Veeqo.

Local spaces like Welsh ICE, Indycube and GloWorks have been vital to the success of growing startups, as has TechHub Swansea, which arrived in 2013. The emergence of local networks like Cardiff Start and the support of industry groups such as united.diff and Games Dev South Wales, have further helped to foster the entrepreneurial community.

Cardiff’s three universities provide digital tech businesses with an established pipeline of talent, with 57% of local businesses noting this as a key benefit. Recognising the importance of digital, the Welsh Government has also been active in supporting the Digital Tech Industries through programmes such as Finance Wales Tech Seed Fund and Accelerated Growth Programme.

“With the right balance of good infrastructure, good skill base, Cardiff is positioned to be a leading place for technology businesses”

OWEN DERBYSHIRE
Founder, Properr

Nudjed is a unique surveying and analysis tool that uses behavioural psychology models to predict potential behaviour change in populations and allows clients to create wellbeing programmes that make health improvement more likely.

We are currently working with a number of NHS, local authority and Public Health organisations and we have found that there are many benefits to being based in Cardiff.

There are lots of active, supportive communities of entrepreneurs. Organisations like Cardiff Start and Welch ICE have been incredibly valuable to us and the Welsh Government is very supportive of new business, with various technology funds, tax incentives and graduate employment schemes designed to help startups to succeed.

“With the right balance of good infrastructure, good skill base, Cardiff is positioned to be a leading place for technology businesses”

owen derbyshire
Founder, Properr
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 specialisms that are at the beating heart of the UK digital economy.

In this section we examine 16 digital sectors, and highlight the notable areas of expertise within the UK based on data from GrowthIntell. We provide overviews alongside case studies of UK companies leading within the digital sectors.

- APP & SOFTWARE DEVELOPMENT
- CYBER SECURITY
- DATA MANAGEMENT & ANALYTICS
- DIGITAL ADVERTISING & MARKETING
- DIGITAL MEDIA & ENTERTAINMENT
- E-COMMERCE & MARKETPLACE
- EDTECH
- ENTERPRISE SOFTWARE & CLOUD COMPUTING
- FINTECH
- GAMING
- HARDWARE, DEVICES & OPEN SOURCE HARDWARE
- HEALTHTECH
- IOT & CONNECTED DEVICES
- ONLINE GAMBLING
- SOCIAL NETWORKS
- TELECOMMUNICATIONS & NETWORKING
App & Software Development includes the development of software applications for consumers, web development, design, and software for devices that range from smartphones to TV setup boxes.

The key capabilities driving this sector include machine-to-machine communications, systems design and integration, mobile and tablet development and SaaS/web services. It’s top clusters are Brighton, Bournemouth & Poole, Oxford, Bristol & Bath and Reading & Bracknell.

The UK’s expertise in software development and data science is producing lucrative B2B retail development and SaaS/web services.

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Lost My Name is an award winning startup at the intersection between storytelling, engineering, digital and print. 2015 was the second successive year of significant growth for us, selling over 1m books globally. Our first title is now available in 9 languages and has sold in 165 different countries. Our success caught the eye of Google Ventures in June, and we raised $9m to develop new titles and further accelerate our global growth.

**Lostmy.name**

**ASI SHARABI**
Co-founder

**FlashSticks®** is an example of old learning methods meeting new. Printed language Post-it® notes are combined with the latest augmented reality and object recognition technology, to provide language students with a dynamic and immersive learning experience. Scan any random object and you will see it recognized and translated into 40 different languages. Scan a FlashSticks® language note, and a tutor will pop up to help you pronounce the word.

**FlashSticks®**

**VEEJAY LINGIAH**
CEO

The UK is producing world leaders in Digital Media & Entertainment. Mixcloud, Resident Advisor and Mixmag attract vast musical audiences across the globe, while the MailOnline, The Guardian and BBC News have millions of online readers each month.

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 Manchester, home to the oldest television studios in the UK, as well as ITV and the BBC, and Reading & Bracknell, Brighton, London and Cambridge.

**DIGITAL MEDIA & ENTERTAINMENT**

**NEWCASTLE & DURHAM**
**SHEFFIELD & ROTHERHAM**
**BOURNEMOUTH & POOLE**
**MANCHESTER**
**EDINBURGH**

**EXPERTISE FOUND IN:**

**READING & BRACKNELL**
**BRIGHTON**
**LONDON**
**CAMBRIDGE**
**MANCHESTER**

The UK is producing some top players in this sector, such as Deliveroo, Just-Eat and Skyscanner. Prompted by this success, vertically aligned providers are also emerging. Forward Partners, for instance, invests in E-commerce & Marketplace startups while John Lewis’s JLabs accelerator supports retail technology companies.

Top clusters in this field include Newcastle & Durham, Sheffield & Rotherham, Bournemouth & Poole, Manchester and Edinburgh.

Recognising the sector’s significance, The Government recently introduced revisions to its Digital Marketplace, allowing businesses to sell services to public sector organisations simply and efficiently.

**E-COMMERCE & MARKETPLACE**

**NEWCASTLE & DURHAM**
**SHEFFIELD & ROTHERHAM**
**BOURNEMOUTH & POOLE**
**MANCHESTER**
**EDINBURGH**

**EXPERTISE FOUND IN:**

**READING & BRACKNELL**
**BRIGHTON**
**LONDON**
**CAMBRIDGE**
**OXFORD**
**BIRMINGHAM**
**GLASGOW**

Valued at £45bn (London & Partners)¹, Edtech is the use of technology to improve learning and promote education and is one of the UK’s fastest-growing digital tech sectors.

Ten of the fastest growing Edtech companies in Europe are from the UK, including eSchools, Persistent and ReMe. Clusters specialising in the field include Cambridge, Brighton, Manchester, Liverpool and Newcastle & Durham.

Its growth is supported by the presence of well-established education companies, such as Pearson and Knewton, and the £900m spent by UK schools on education technology annually.² The introduction of early years coding skills into the school curriculum has also aided Edtech, while EdTech UK accelerates the UK’s global position.

**EDTECH**

**Cambridge**
**Brighton**
**Manchester**
**Liverpool**
**Newcastle & Durham**

**EXPERTISE FOUND IN:**

**READING & BRACKNELL**
**CAMBRIDGE**
**OXFORD**
**BIRMINGHAM**
**GLASGOW**

As well as improving enterprise productivity, increasingly enterprise software is transforming the way businesses work. London-based Huddle, for example, is innovating project management and collaboration between teams and with their clients.

The capital aside, the UK’s top clusters for this sector are in fact Reading & Bracknell, Cambridge, Oxford, Birmingham and Glasgow.

Gartner forecasts that total spending on enterprise application software will reach $201bn by 2019. Cloud applications, meanwhile, will account for 90% of worldwide mobile data traffic by 2019, up from 81% at the end of 2014.³ Growing pressure on firms to compete on a global scale and against emerging technologies is driving this growth.

**ENTERPRISE SOFTWARE & CLOUD COMPUTING**

**READING & BRACKNELL**
**CAMBRIDGE**
**OXFORD**
**BIRMINGHAM**
**GLASGOW**

**ASIA SHARABI**
Co-founder

**VEEJAY LINGIAH**
CEO

Peak is a mobile cognitive training platform with 7 million global players. We partner with scientists from leading universities and private laboratories to bring their research to a much wider audience, including the University of Cambridge and Yale University. Our platform also helps scientists gain valuable feedback through gameplay data, which could eventually lead to deeper or wider research.

TransferWise is an online international money transfer platform. Every month, £500m is transferred through TransferWise, by people across the world. The impact of technology on the financial sector means that consumers now have a real alternative to banks. In the UK, two thirds of consumers say they would consider using tech providers for financial services. We expect a massive shift in consumer behaviour in the next 5 years.

Open Source Hardware refers to machines and devices whose design has been released to the public to allow consumers to modify them as they wish.

Hardware specifically refers to the physical products and parts of a computer or device, such as RAM, circuit boards and audio equipment.

Clusters with emerging specialisms in hardware include: Reading & Bracknell, Manchester, Bournemouth & Poole, Cambridge and Sheffield & Rotherham.

Cambridge in particular has produced a number of leading hardware companies, including ARM, the designer of semiconductors, and Raspberry Pi, the famed creators of the palm-sized computers used for learning programming.

The Gaming sector is spread across many platforms, from consoles and PCs to mobile platforms, and currently contributes £1.72bn to the UK economy.

Some of the world’s most successful video game franchises and companies have come from the UK, including Tomb Raider and Grand Theft Auto. Currently, the sector’s strongest clusters are Brighton, Liverpool, Newcastle & Durham, Oxford and London.

Growth is driven by the high number of specialist gaming courses in the UK, high-calibre university graduates, a strong creative industry and video games tax relief.

In the next few years we will see a rise in virtual and augmented reality. By 2018, the games market will be worth $108bn globally.

The UK is a FinTech world leader, with the sector estimated to be worth £20bn in annual revenues. Over half of European FinTech unicorns are UK based, including TransferWise, Funding Circle and GoCardless.

The sector cuts across areas including peer-to-peer lending, data analytics, currency exchanges, mobile payments & security and identification.

Whilst clusters specialising in this area include Glasgow, Edinburgh, Manchester and Leicester, the strength is driven by London.

The world’s leading finance capital creates optimum conditions for FinTech companies, with a supportive regulatory environment and Government policy and initiatives like Innovate Finance driving growth.

Healthtech falls into four main categories:

- telehealthcare,
- mHealth,
- health analytics and
digitalised health systems.

With top performing clusters in Cambridge, Reading & Bracknell, Edinburgh, Oxford and Glasgow, Healthtech is central to the delivery of the Government’s NHS policy agenda and key to realising its Five Year Forward View.

Several Healthtech accelerators launched last year, including Wayra’s Velocity Health and the Dotforge accelerator. The number of health apps in the UK has more than doubled in the last two and a half years to over 100,000, but opportunities still exist to accelerate the adoption of secondary care electronic health records, mHealth and data analytics.


1 Landscaping UK Tech, UK Trade & Investment & Ernst & Young Report 2014


3 2015 Global Games Market Report, Newzoo

4 Digital Health in the UK: An industry study for the Office of Life Sciences, Deloitte, Sept 2015

5 Connected health: How digital technology is transforming health and social care, Deloitte, 2015
Buddi provides remote monitoring technology to show how and where people are. We operate in 2 distinct markets – criminal justice and health. In the former, we deliver a platform through which offenders can be managed and tracked while in the community. In the latter, we provide a service enabling older people to raise an alarm, at any time of the day or night, if they need help.

While the social media market is currently dominated by US giants – Facebook, Twitter, WhatsApp and LinkedIn – many UK businesses are focusing their attention on shaping our offline social lives through technology. Examples of this include the going-out planner YPlan, the events platform Fatsoma and the ticket outlet, Skiddle. Two UK alternatives to Tinder have also launched: Bristlr and Double. The top performing clusters in this sector are Newcastle & Durham, Cardiff & Swansea, Brighton, Bournemouth & Poole and London.

The Internet of Things (IoT) is the network of physical objects containing embedded technology to communicate, sense or interact with each other or the external environment. It spans sectors including healthcare, energy and greentech, security, research and transport.

The Government has pledged to invest £10bn in IoT and innovation while there are specialist clusters in Cambridge, Liverpool, Edinburgh, Sheffield & Rotherham and Manchester. Notable companies include the innovative cleantech business Pavegen and Cocoon, which produces a connected security device.

With Gartner predicting that 6.4bn connected “things” will be in use in 2016, IoT has massive potential both in the UK and around the world.

Relish offers flexible contracts and plug & play broadband, delivered the next working day. Take the Arancini Brothers business, for example. When they experienced connectivity issues, our super-fast wireless service was delivered within 24 hours, set up quickly and helped to boost their sales by 39%. With no need for a landline and installation, they were even able to take their Relish Hub with them when they moved.
This appendix summarises the methodology we followed to do all this. We start by describing the unit of geographical analysis we have used to bound digital tech clusters across the UK.

**GEOGRAPHY**

The starting point for defining our areas geographically are the Office for National Statistics’ 2001 Travel to Work Areas (TTWAs) we use the 2001 TTWAs instead of the recently released 2011 TTWAs because the latter are still subject to revision and some of the datasets we use are not yet available for this geography). In three cases, we draw on Tech City UK’s local knowledge to combine TTWAs for presentation purposes – Bristol & Bath, Cardiff and Swansea, Bournemouth and Poole. Bristol & Bath very much identify as one community, with many organisations operating across both cities, and the area’s inward investment agency, Invest Bristol & Bath promotes them together. In Cardiff and Swansea, relative proximity means that the digital communities work closely together. In Bournemouth and Poole, MeetDraw, the largest community group, the local council and university all oversee both areas together and the companies in each tend to associate with each other.

**THE CORE BUSINESS DATASET**

The core business dataset contains information about UK digital businesses, and was created by GrowthIntel (GI) using two complementary classification approaches:

- A supervised training approach where around 10% (32,000) of the businesses in the initial dataset were manually assigned into one of 44 “GrowthIntell Sectors” defined by GrowthIntel. The outcomes of this manual labelling exercise were then used to model the probability that non-labelled businesses belong to a GrowthIntell sector, using as predictors features extracted from the text in their websites.

- An unsupervised text clustering approach that extracted “tags” about businesses’ areas of activity from the text in their websites. The analysis revealed 500 topics. A business was tagged with one of these topics if the topic scored above a minimum threshold based on the presence of related words in the business’ website. Just over half (228) of these topics described a business’ industrial activity, and 49 were digital. Many of the topics captured the geographical area where a company operates.

We used the tags extracted in the clustering analysis as the primary means for identifying digital tech businesses in the dataset, and classifying them into digital sectors. GrowthIntell sectors played a complementary role in this process, and were also used in the analysis of digital intensity/disruption in non-digital sectors.9 The process to do this was as follows:

- Any business that had been assigned at least one digital tag was defined as a “digital tech business”. This led to the identification of 58,000 digital tech businesses out of a total of 320,000 businesses.

- We mapped the 49 digital tags resulting from the clustering analysis to a list of digital tech sub-sectors based on Tech Nation 2015. We allocated each business to the digital tech sub-sector where it had the highest aggregated score (based on the sum of the scores for the tags in each of the tech sub-sectors).

- In three cases, we used combinations of GrowthIntell sectors and business tags to classify businesses into tech sub-sectors: businesses with at least one digital tag and the GrowthIntell sectors Education, Finance, or Pharmaceuticals-Biotech were respectively classified into “Edtech”, “Fintech” and “Healthtech.”

The core business dataset also includes information about whether a company is involved in E-commerce or an App Store, based on the content and technologies in the company website. We have used some of this information to analyse the adoption of digital technologies by companies in different sectors (pages 104-113).

**RATIONALITY**

Rigorous measurement and mapping are a crucial way to raise awareness and recognition of new and innovative industries in the eyes of stakeholders – be they investors, collaborators, customers, educators or policymakers. It is why our two organisations – a national tech cluster development agency and an innovation charity – have joined forces to produce this report.

One important challenge we face is the difficulty of measuring a dynamic sector like digital tech. The Standard Industrial Classification (SIC) codes underpinning the official economic statistics – and used to derive the employment, productivity and value added estimates in this report – allow. We have used a “big data” method to create a “core business dataset” based on a picture of digital tech than official data sources provide. The process to do this was as follows:

- Any business that had been assigned at least one digital tag was defined as a “digital tech business”. This led to the identification of 58,000 digital tech businesses out of a total of 320,000 businesses.

- We mapped the 49 digital tags resulting from the clustering analysis to a list of digital tech sub-sectors based on Tech Nation 2015. We allocated each business to the digital tech sub-sector where it had the highest aggregated score (based on the sum of the scores for the tags in each of the tech sub-sectors).

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The core business dataset also includes information about whether a company is involved in E-commerce or an App Store, based on the content and technologies in the company website. We have used some of this information to analyse the adoption of digital technologies by companies in different sectors (pages 104-113).

**METHODOLOGY**

**ECONOMIC STATISTICS**

The main public source of business financial data in the UK is Companies House. Unfortunately, its coverage of key measures such as Employment, Turnover, Profits or Costs of Materials for smaller businesses is low because businesses with less than 50 employees are exempt from reporting their full financials.

We accessed data about these important measures of economic performance from official ONS datasets:

- The Annual Population Survey (APS)4: APS is a household survey with information about respondent’s occupation (SOC) and industry of employment (SIC). We used it to estimate employment in the Digital Tech Industries and the Digital Tech Economy. There were two reasons for using it over other official sources of employment data, such as BSD or ABS. First, we wanted to capture digital embeddedness, the phenomenon of digital experts working in non-digital industries, consistent with Tech Nation 2016’s focus on the digitalisation of the wider economy. Second, we wanted to measure freelancers and self-employed workers, an important component of the digital workforce which is not measured in SIC-based business surveys. We obtained the APS via the DCMS5.

- The Business Structure Database (BSD)6: An administrative dataset including SIC, location, employment and turnover data for all UK businesses registered for PAYE/VAT. The BSD and ABS micro-data required for the project was accessed by Frontier Economics, one of our data partners, in the first half of 2014.


We queried these datasets with a list of digital SICs and SOC codes adopted from techUK/Nesta’s Dynamic Mapping of the Information Economy. This report follows a rigorous methodology to identify digital occupations in the SOC codes, and then calculates a digital intensity measure at the SIC level to identify digital tech SICs.8 Digital intensity corresponds to the share of digital workers working in an industry (SIC). Tables 1 and 2 and various other tables in the SOCs and SICs we have used in our analysis.
As a consequence of this, it is not possible to produce digital tech GVA per worker (i.e. labour productivity) measures at the local level (the ratio of digital GVA to local digital employment would simply return regional digital GVA per worker). We have instead used turnover per worker from BSD as a proxy for local labour productivity in the Digital Tech Industry.

OTHER DATA

- Online job ad data (Burning Glass): The Burning Glass dataset we have accessed contains detailed information about job ads posted online in the UK between 2012 and 2015, including location (using TTWA 2001 codes), role, occupation (coded as SOC codes and using Burning Glass’s more detailed occupational classification), industry of advertiser (only available for around half of job ads in the 2015 period), and salary. We have defined digital job ads as those that are either in a digital SOC (see Table 1), or not in a digital SOC, but in a Burning Glass occupational code that has more than 60% of its digital job ads in a digital SOC.11
- Online software development activity (GitHub): We have scraped GitHub’s open API to access data about recently active (January 2014–June 2015) 16,650 UK-based developers. Our dataset contains information about their location (in ~30% of cases), the repos (projects) they are involved with and key metrics about those repos, including their number of collaborators, and their programming languages. We have used those metrics to quantify levels of online collaboration in clusters, and to allocate developers to their “dominant” programming language (based on the distribution of lines of code they have contributed to repos with different programming languages). We then combined the local and national distribution of developers specialising in different programming languages to generate local indices of programming language specialisation.
- Local industry networking (Meetup): We have scraped data about tech meetup groups and tech meetup members/ attendees from Meetup’s open API, focusing on public groups.12 We have used an unsupervised clustering analysis of group’s topics to classify them into areas of activity (i.e. tech specialisation), and their location to allocate them into TTWAs. We have also used location data about Meetup users to generate counts of unique residents in an area interested or involved in tech topics.

SURVEY DATA

The Tech Nation 2016 Survey was conducted between 15 September 2015 and 11 October 2015. The survey received 1797 complete responses. We use postcode data to identify the TTWA of respondents in 1705 cases.

QUALITATIVE INTERVIEWS

We undertook 42 in-depth telephone interviews with digital businesses (mainly founders/CEOs) and organisations supporting digital businesses, such as networks, membership organisations, incubators and inward investment agencies. We carried out the interviews in two waves. In the first wave, we drew our sample from Tech City UK’s contacts and aimed to complete at least one interview in all the clusters identified in the first Tech Nation report. In the second wave, we focused on five areas that represent a spread across the UK and included clusters with different characteristics (Belfast, Bristol and Bath, Cardiff, Edinburgh and Liverpool). Within these, we selected a sample of digital businesses from among respondents to the Tech Nation Survey. Respondents were stratified by area and company size (micro, small, medium and large), and then a random selection of respondents was chosen to approach for interview. Interviews lasted around 30 minutes and aimed to generate a deeper understanding of the characteristics of digital clusters and communities and how they operate. We explored digital businesses’ relationships in and outside their cluster, how they find talent, where they get new ideas from, the benefits and drawbacks of the area as a location for digital businesses and their views and ideas on what could be done to better support digital businesses.

TABLE 1: DIGITAL SOC CODES10

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1136</td>
<td>IT and telecommunications directors</td>
</tr>
<tr>
<td>2133</td>
<td>IT specialist managers</td>
</tr>
<tr>
<td>2134</td>
<td>IT project and programme managers</td>
</tr>
<tr>
<td>2135</td>
<td>IT business analysts, architects &amp; system designers</td>
</tr>
<tr>
<td>2136</td>
<td>Programmers &amp; software development professionals</td>
</tr>
<tr>
<td>2137</td>
<td>Web design &amp; development professionals</td>
</tr>
<tr>
<td>2139</td>
<td>IT &amp; telecommunications professionals not elsewhere classified</td>
</tr>
<tr>
<td>3121</td>
<td>IT operations technicians</td>
</tr>
<tr>
<td>5242</td>
<td>Telecommunications engineers</td>
</tr>
<tr>
<td>5245</td>
<td>IT engineers</td>
</tr>
</tbody>
</table>

TABLE 2: DIGITAL TECH SIC CODES10

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5821</td>
<td>Publishing of computer games</td>
</tr>
<tr>
<td>5829</td>
<td>Other software publishing</td>
</tr>
<tr>
<td>6101</td>
<td>Wired telecommunications activities</td>
</tr>
<tr>
<td>6120</td>
<td>Wireless telecommunications activities</td>
</tr>
<tr>
<td>6130</td>
<td>Software telecommunications activities</td>
</tr>
<tr>
<td>6190</td>
<td>Other telecommunications activities</td>
</tr>
<tr>
<td>6201</td>
<td>Computer programming activities</td>
</tr>
<tr>
<td>6202</td>
<td>Computer consultancy activities</td>
</tr>
<tr>
<td>6203</td>
<td>Computer facilities management activities</td>
</tr>
<tr>
<td>6209</td>
<td>Other IT &amp; computer service activities</td>
</tr>
<tr>
<td>6311</td>
<td>Data processing, hosting &amp; related activities</td>
</tr>
<tr>
<td>6312</td>
<td>Web portals</td>
</tr>
<tr>
<td>9511</td>
<td>Repair of computers &amp; peripheral equipment</td>
</tr>
</tbody>
</table>

Where possible, we have used these datasets to produce estimates of employment, turnover, and digital tech GVA at the national and local levels. One barrier to doing this with digital tech GVA is that ABS data is not available at the TTWA level. We address this by estimating digital GVA per worker at the regional level, and scaling this up, for the areas (TTWAs) available at the TTWA level. We address this by using the Digital Tech Industry.

1 The dataset to train the model was a combination of the test data delivered by secondary data partners (CrunchBase, AngelList, DealRoom.co, Invest NI, and Leeds Data City) and GrowthWright’s own data pulled from business websites. The total corpus size was just over 40,000 documents.
2 Many of the topics captured the geographical area where a company operates.
3 GrowthWright sectors played a complementary role in this process, and were also used in the analysis of digital intensity (as measured in non digital sectors).
4 We obtained the APS via the DCMS. https://discover.ukdataservice.ac.uk/studies/?sn=2000002
6 The BSD and ABS micro-data required for the project was accessed by Frontier Economics, one of our data partners, in the fall of 2014.
7 https://discover.ukdataservice.ac.uk/catalogue/?sn=6697
8 https://discover.ukdataservice.ac.uk/catalogue/?sn=6697
9 Digital intensity corresponds to the share of digital workers in an industry (SIC).
10 It should be noted that the SIC code 6312 (Web Portals) was not included in the techUK/Nesta report. The reason for this is that there were not enough companies with that SIC code in the ABS sample to estimate the digital intensity of the sector.
11 Government Office Regions do not perfectly overlap TTWAs – for example, the London TTWA is larger than the London GOR because it captures a commuter belt beyond London’s administrative boundaries. We have addressed this issue by allocating each TTWA to the GOR where it has a majority of postcodes, based on the NSG’s (National Statistics Postcode Lookup) dataset.
12 The reason for doing this is to include in our analysis job ads in digital occupations as defined by Burning Glass which might not be captured in the SOC’s coarser occupational classification.
13 http://www.meetup.com/meetup_api/
Digital tech business – Company that provides a digital technical service/product (including hardwar...
We believe the UK is the best place to start and grow a digital business. Through dedicated programmes, we support the digital technology sector’s need for skills, infrastructure, and investment. We gather and share vital information, which informs policymakers. Tech City UK is a hybrid organisation sitting between the tech community and government. We give digital entrepreneurs a national and local voice. Our work accelerates the growth of digital businesses, in London and across the UK, at all stages of their development. You can see our work in action with Future Fifty, Digital Business Academy, Tech Nation, Upscale, the Tech City UK, Cluster Alliance and HQ-UK; and Northern Stars, developed & launched by our sister team, Tech North.

PROGRAMME OVERVIEW

**Digital Business Academy:**
An online academy to help you start, grow or join a digital business.

**Future Fifty:**
A concierge service for growth stage businesses facilitating access to UK government and private sector expertise.

**Tech Nation 2016:**
An annual report outlining the depth and breadth of the UK’s digital ecosystem.

**Tech Nation Alliance:**
A network of startup community leaders from cities across the UK.

**HQ-UK:**
An outline of UK’s holistic tech offer for international businesses looking to move to the UK.

**Tech Nation Visa Scheme:**
Tech Nation Visa Scheme: A dedicated Visa Scheme to attract digital expertise from all around the world.

**Upscale:**
A network of founders scaling fast, scaling together coached by world-class Scale Coaches.

**We Are Tech North:**
Accelerating growth of digital businesses in the North of England through championing the sector.
IN PARTNERSHIP WITH

Nesta... NESTA is the UK’s innovation foundation. We help people and organisations bring great ideas to life. We do this by providing investments and grants and mobilising research, networks and skills. We are an independent charity and our work is enabled by an endowment from the National Lottery. Nesta is a registered charity in England and Wales 1144091 and Scotland SC042833. www.nesta.org.uk

SUPPORTED BY CORE PROJECT PARTNERS

GrowthIntel GROWTHINTEL powers B2B trade by turning primary source unstructured data into predictive go-to-market intelligence. Its platform uses NLP, data science and machine learning to build a personalised recommendation engine that delivers the most sophisticated available overview of your addressable market. Thousands of brand new prospects, each with a known likelihood of conversion. They were recently chosen to join Upscale, Tech City UK’s six-month programme to support the next generation of UK scale-up digital businesses. www.growthintel.com

CrunchBase CRUNCHBASE is the leading platform to discover innovative companies and the people behind them. Founded in 2007 by Mike Arrington, it began as a simple database to track startups covered on TechCrunch. Today, CrunchBase delivers market insights to millions of users and businesses around the world. The CrunchBase dataset is constantly expanding through contributions from its community of users, investment firms, and network of global partners. CrunchBase accelerates innovation by bringing together data on companies and the people behind them. www.crunchbase.com

ANGELLIST ANGELLIST is a platform for startups to raise money and find talent. In 2015, AngelList helped 498 startups raise over $900m. Additionally, 16,000 companies and 250,000 candidates used AngelList Talent to hire or look for startup jobs. www.angellist.com

DealroomDealroom is a data-driven marketplace for venture capital, connecting founders with investment professionals while enabling better and faster investment decisions. We use algorithms, machine learning, web crawling and natural language processing to track over 500,000 companies and 4K investors in Europe and beyond. The aggregated data is augmented by 6,000+ contributors: founders, VCs, accelerators, governments and tech journalists. www.dealroom.co

BURNING GLASS Technologies delivers job market analytics that enable evidence-based policy decisions. Burning Glass’ artificial intelligence technology analyses hundreds of millions of job postings and real-life career transitions to provide insight into labour market patterns. This real-time strategic intelligence can reveal which jobs or specific skills are most in demand, and the career directions that offer the highest potential. www.burning-glass.com

FRONTIER ECONOMICS is Europe’s leading economic consultancy, and with offices in Brussels, Cologne, Dublin, London and Madrid it is one of the largest. We advise clients on matters of competition, public policy, regulation, and strategy, across the range of economic activities in the public and private sectors, including energy, financial services, healthcare, media, retail, technology, telecommunications and transportation; among others. www.frontier-economics.com

THE DATA CITY is a not-for-profit membership organisation, designed to enable organisations and individuals to use technology for the benefit of cities. Conceived by an ever-growing coalition of the willing across the public and private sector, the Data City represents a ‘new way’ for cities to be smart in how they adopt technology ensuring mutual benefit for citizens, suppliers and the local companies. www.datacity.org

DEALROOM helps technology entrepreneurs and organisations scale through purpose, people and platforms. We enable them to build reputations, influence and value; discover new models, products and revenue streams; and develop their culture, capability and talent. www.wearedealroom.com

SEVEN HILLS SEVEN HILLS is Britain’s leading campaigning company. Launched in 2010 by Michael Hayman MBE and Nick Giles, the firm was founded to generate momentum for Britain’s explosive growth companies, entrepreneurs and mission-based businesses. It is recognised as one of the UK’s fastest-growing communications businesses and was named Global Corporate Agency of the Year by communications industry monitor The Holmes Report. The founders are also co-authors of the Penguin bestseller: Mission – How The Best In Business Break Through. www.wearesevenhills.com

INVEST NORTHERN IRELAND INVEST NI is the regional business development agency designed to grow the local Northern Ireland economy. We do this by helping new and existing businesses to compete internationally and by attracting new investment to Northern Ireland. Invest NI offers the Northern Ireland business community a single organisation providing high-quality services, programmes, support and expert advice. www.investni.com
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.
“GREAT DISCOVERIES AND IMPROVEMENTS INVARILY INVOLVE THE COOPERATION OF MANY MINDS.”

ALEXANDER GRAHAM BELL