

# CORNWALL'S 21<sup>st</sup> CENTURY ENGINEERS

A PFA RESEARCH STUDY INTO THE IT & DIGITAL SECTOR

NOVEMBER 2015

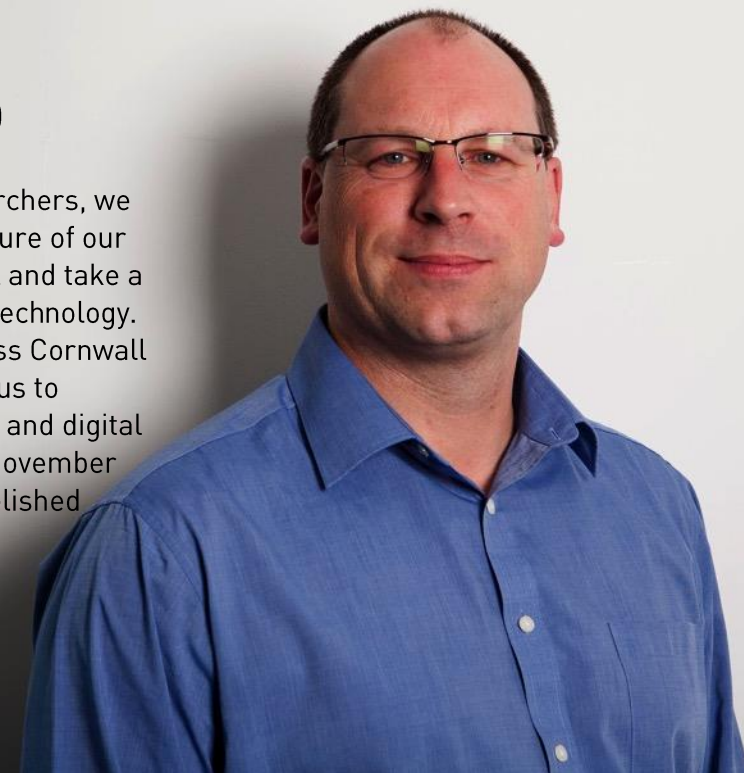


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## FOREWORD

As market researchers, we know that the future of our industry is digital and take a keen interest in technology. So, when Business Cornwall magazine asked us to investigate the IT and digital sector for their November 2015 issue, we relished the opportunity.



With tech giants leading our global economy, Information and Communications Technology (ICT) is equally ever-growing in importance to our future prosperity here in Cornwall. As well as fuelling economic growth and employment, a dynamic and energetic ICT industry can provide opportunities to other business sectors, the public sector and to consumers.

We looked at what exactly defines the digital sector and interviewed some of our local 'Captains of Industry'.

In this report, we reveal what we discovered about this dynamic sector, showcase just a few of the many amazing projects being carried out today in Cornwall and share some fascinating insights into what the future holds in this fast paced industry.

A handwritten signature in black ink, appearing to be 'P. S. A.' followed by a long horizontal stroke.

## WHAT DEFINES THE DIGITAL SECTOR?

A recent report released by the Office for National Statistics<sup>1</sup> explores the digital sector as an extension of the ICT sector, defining the Digital Economy as the following components:

- e-commerce / e-business (the trading of goods or services over computer networks such as the internet)
- supporting infrastructure (hardware, software, telecommunications)<sup>2</sup>.

The report examines how the traditional definition of Information and Communication Standard Industry Classification (SIC) codes is not broad enough to give an adequate representation of economic activity within the digital sector. For example, publishing is not traditionally a digital business area, but many publishing companies are now partly or solely operating online.

The report outlines a wider set of SIC codes proposed by the Organisation for Economic Co-operation and Development (OECD) and further expanded by UK government which comprise the broad concept of the digital economy – see Tables 1 & 2 opposite.

The ONS also highlight the fact that a business may still not be classified as digital but may employ staff in a role that would be considered as digital.

The key message when attempting to define the digital sector is that some traditional industries are becoming digital businesses and the IT sector is changing very fast. Consequently, it is hard to define the sector exactly.

<sup>1</sup> What defines the Digital Sector? October 2015

Table 1: SIC codes the OECD considers to encompass the concept of the digital economy.

SIC code	Description
26.1	Manufacture of electronic components and boards
26.2	Manufacture of computers and peripheral equipment
26.3	Manufacture of communication equipment
26.4	Manufacture of consumer electronics
26.8	Manufacture of magnetic and optical media
46.5	Wholesale of information and communication equipment
58.2	Software publishing
61.1 – 61.9	Telecommunications
62	Computer programming, consultancy and related activities
63.1 – 63.9	Information service activities
95.1	Repair of computers and communication equipment

Table 2: SIC codes proposed by UK government, expanding on the OECD definition in an effort to better define the Digital Economy.

SIC Code	Description	Proposed By
58.1	Publishing activities	Department for Business, Innovation And Skills (BIS)
59.1 – 59.2	Motion picture, video and television programme production, sound recording and music publishing activities	BIS
60.1	Radio Broadcasting	Department For Culture, Media and Sport (DCMS)
60.2	Television programming and broadcasting activities	DCMS

<sup>2</sup> Mesenbourg, 2001



## WHAT DOES DIGITAL CONTRIBUTE TO OUR ECONOMY?

The approximate Gross Value Added (aGVA) of the industries included within the UK digital sector was estimated to be £110 billion in 2013, with turnover of £204 billion, making up 9% of aGVA and 6% of turnover in the UK non-financial business economy.

This proportion has remained constant since 2008, suggesting that the economic downturn had a similar impact on the digital sector than it did on the rest of the non-financial business economy.

Small and medium enterprises (SMEs) contributed a third of total turnover within the digital sector.<sup>3</sup>

### Digital business numbers

In 2015, the digital sector totals just over 206,000 enterprises and the South West accounts for nearly 8% with 15,765 enterprises or 16,600 local units (sites belonging to enterprises)<sup>4</sup>.

Comparable figures are not available for Cornwall, however in a recent report by Software Cornwall, secondary data analysis indicates that in 2014, Cornwall had an estimated 525 information economy enterprises, which has risen from 445 in 2011, giving a growth of 18% in three years.

### Employment

According to the Business Register and Employment Survey (BRES) employment in the digital sector reached a record high in 2013, with 1.3 million people working in its industries, accounting for approximately 6% of total UK employment during 2009 to 2013. Across the UK as a whole, this is a growth of 4.5% from 2009.

Equivalent figures are not available for Cornwall & Scilly, however BRES data suggests that local technology companies alone employed over 2,200 people in 2013 - an increase of over 60% since 2009.

### Connectivity

Superfast broadband is a key infrastructure for the digital sector and in particular helps Cornish businesses be productive and compete in the global arena. The Superfast Cornwall project has rolled out superfast broadband to over 95% of premises in Cornwall and, according to the Superfast Cornwall evaluation, it is estimated that over 12,000 businesses were connected as of March 2015.

Whilst it is acknowledged that these businesses will cover the full range of sectors, the economic impact figures give an interesting insight into the benefit that this type of technology can bring. It is estimated that 2,025 net FTE<sup>5</sup> can be attributed to being connected to superfast broadband, equating to £91.8m in net GVA.

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<sup>3</sup> Source: UK Non-Financial Business Economy, 2013 Revised Results

<sup>4</sup> Source: Office for National Statistics UK Business: Activity, Size & Location, 2015

<sup>5</sup> Full-time equivalent employee (may be made up of several part-time employees)

## WHAT ARE THE EXCITING INDUSTRY DEVELOPMENTS?

The Captains of Industry were asked for their insights into what eye-opening things are currently happening in the IT and digital sector.

The consensus was that it is a fascinating time as digital products and services permeate into many aspects of day to day life.

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*“The digital sector is becoming all-encompassing, so we are seeing interesting developments in everything from the rise of drones, to wearable workforce tracking technology, to autonomous cars to augmented and virtual reality, to machine-to-machine healthcare delivery, to live-streaming video (e.g. Periscope), alternative project funding models (e.g. Kickstarter, Patreon) and telepresence robots.”*

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**Cloud** is still huge, with a continuation of the trend towards systems that help people work better, are easier to use and at a lower cost and with greater reliability.

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*“We are also seeing more and more apps based on web pages (rather than windows or mac) which is a great thing allowing for more connected systems right down to rapid growth of the ‘the Internet of Things’ which is slowly gaining traction.”*

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The rapid growth of the ‘Internet of Things’, where devices are inter-connected and can communicate with each other is a key theme that many people mentioned.

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*“The future is the physical web and video. The physical web is a subset of the Internet of Things.*

*We’re working with Google on a couple of different beacons, which will take off where QR codes and near field communication (NFC) have not. The simplest way to explain them is like a digital QR code, a little tag or ‘beacon’ that broadcasts a URL; so as someone walks past a shop that has a beacon, it can show an advert on your mobile or give you a link.*

*What it actually does is join the real world to the digital world. You can also set up beacons in stores in a network; to create a sort of mini GPS network in store; so as you walk up to rack of clothing it can show you information on that product, or push a video to you - the online mobile experience is aligned with the offline world. From a search point of view, it allows us to show search results based on beacons that are nearby; so if you’re in a town and you want to know which shops sell a particular item, the beacons will help you find it.”*

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‘Big data’ and data analytics is another growth area in global tech as companies seek to capture and analyse data at speed and use the information to improve business performance.

**Agile software development** was mentioned as an exciting movement in changing the way people work as Cornwall takes a lead by hosting the annual large 'Agile on the Beach' conference.

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*"Agile on the Beach now is a very highly regarded conference which brings not only people to Cornwall, but most importantly the cutting edge of knowledge development."*

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Finally, there is a massive amount of 'convergence' in digital services as the platforms are innovating and seeking to replicate the best technologies of their competitors.

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*"Leading the pack is Facebook, who are relentlessly building in their competitors strengths within their own product. Payment integration and the drive of platforms to host content and lower links out will see interesting moves to sell products direct to consumers on the platforms themselves."*

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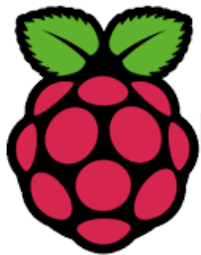
Contributors also raised concerns about the speed at which the sector is developing new products and services and whether regulation and security will be able to keep up adequately.

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*"Lots of developments are exciting, lots are unsettling. Regulators may not be able to keep up with developments. Security and privacy will become even more important than they are today."*

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RaspberryPi



## WHO'S SETTING THE AGENDA?

Unsurprisingly, the key movers and shakers internationally, according to the respondents, are deemed to be Amazon, Google and Facebook.

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*"Globally: Amazon, Google, DJI, Facebook (with Oculus Rift). Nationally: ... it seems disproportionately London-focused, apart from the cluster of hardcore tech companies around Cambridge (e.g. Arm) and digital media companies in Bristol (e.g. Aardman). The electronics cluster around Torbay looks interesting. Locally: Headforwards, Headcastlab, Antimatter Games, Made Open, FoAM Kernow, fffunction, Hootvox, Firetext..."*

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The Raspberry Pi foundation was noted as one of the big things that is causing lots of spin off ideas and products that could present opportunities for Cornwall, e.g. in hardware platform development:

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*"Raspberry Pi circuit boards are produced in Wales; there's no reason why the next thing couldn't be made in Cornwall."*

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Locally, Software Cornwall, is working to connect and promote the digital engineering cluster in Cornwall:

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*"Software Cornwall are working hard to establish a community of digital engineering organisations to help represent the sector and drive forward investment in a new generation of digital engineering in the county."*

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## WHAT ARE THE GROUND-BREAKING PROJECTS IN CORNWALL?

It is clear that Cornwall is host to a great number of **pioneering digital projects** with small businesses reaching out globally with their innovative products and services.

This is set against a backdrop of world class digital connectivity - fibre broadband coverage in Cornwall at 95% with ultrafast 100+Mbps (Fibre to the Premises) broadband covering 30% of Cornwall.

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*“The benefits of high fibre reach is attracting an increasing number of people to the area, either to work for themselves, remotely, or for the growing businesses in Cornwall.”*

*“Cornwall is developing some ground-breaking expertise in clean-tech, digital animation, games and digital craft.”*

*“There are some really amazing e-health and Internet of Things products emerging at the moment, renewables tech companies and games start-ups are starting to gain traction too. There are some real hidden gems, who operate globally and virtually from Cornwall.”*

*“We’ve got a great video production community in Cornwall – the likes of Pixel Rain, Studio Wallop and Dogbite are producing really good, world class stuff... we’re really lucky to have these resources in Cornwall.”*

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Some examples of ground-breaking work going on in Cornwall's leading tech companies today are:

- Web developer, **UKNetWeb**, is continually working on a cloud based software solution with John Lewis.
- Software developer, **Headforwards**, is working on cloud technologies that run the largest collection of datacentres in Europe, and the second largest globally. The growth of the company has been impressive since its set up in Spring 2011, now employing 57 people.

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*"Much of cloud technology development utilises high end web skills, so the focus on improving skills in this area is really paying off for us".*

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- **NCI Technologies** operates globally, providing IT support to customers in America, Canada, South Africa, Spain, Netherlands and Australia. Their focus on schools has forged steps in special needs provision using robotics.

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*"Both onsite installs and remote support has proved amazingly cost-competitive globally and with the expertise from staff far exceeding some companies local to those customers, it has proved very beneficial to all."*

*"Robotics and the introduction of them into special needs has played a great part in understanding and adapting to different needs."*

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- **SCSLhealth**, a leading provider of software to the health industry, have developed INRstar, software designed to help clinical staff within the NHS and beyond monitor and manage patients that suffer with long term conditions. The firm works with over 2,700 GP surgeries, hospitals and pharmacies across the UK.

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*"From our perspective it is all about Digital Health... basically a patient focused approach that will drive cost benefits into the NHS and improve patient outcomes and choice."*

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- **DM Orthotics** are 3D scanning limbs to make customised clothing.
- **Natural Generation** is using cloud technologies for remote centralised monitoring of wind and solar farms.
- **Mojo Maritime** are developing energy systems based upon the power of waves using CAD design and modelling of energy.
- **Bluefruit** is developing embedded software that is widely used in the scientific, industrial, automotive and aerospace industries.
- **Falmouth University** are focussing on games development with the Alacrity graduate programme.
- The iconic **Goonhilly Earth Station** is host to a data centre with Government standard security including 24/7 site security, on-site power back up and data connectivity second to none.



## WHAT'S THE VISION FOR THE FUTURE?

### Cornwall as a centre for digital excellence

The industry 'Captains' were adamant that Cornwall has a flourishing digital sector on which to build a prosperous future, by developing digital products that can be sold and managed over the internet.

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*"Cornwall had always been a leader in quality engineering and with strengthened foundations in skills, infrastructure and business investment the digital engineering sector could really explode in the county."*

*"Cornwall offers an environment where entrepreneurs are welcomed, nurtured (e.g. in the innovation centres) and encouraged... where we have a world-class broadband infrastructure, a culture of relaxed, creativity and experimentation, a natural tendency towards collaboration and ideas-sharing (since everyone knows everyone else), and a gorgeous landscape and seascape to provide inspiration."*

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### Skills are everything

The digital leaders could not stress highly enough the importance of skills development. Software Cornwall is working hard to optimise the pipeline for digital engineering skills, particularly in coding. Software engineers, testers, user experience, project management and Agile Management were also called for.

To meet the future needs, the Fibre Park Digital Academy is being developed to initially provide an industry focused educational facility that will enable higher quality courses, more industry relevant education, and improved work/learning experiences.

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*"The future is all to do with skills. If we can train more people, then those people will be the attraction to help grow, build and inwardly invest more business in Cornwall. More customers and businesses will then focus on Cornwall as being the honey pot where we have lots of talent."*

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The fast pace of change in the industry presents a huge challenge to education in keeping courses up to date with the latest in-depth industry knowledge. It was suggested that universities cannot react quickly enough to today's global fast-paced markets and that more apprentices and vocational training is the way forward. Other contributors mentioned the importance of people skills as well as technical ability, a willingness to experiment and the need to continually keep up to date.

The Software Cornwall report notes that "local recruitment agencies regularly report software development (and other advanced computing) vacancies to be one of the hardest to fill. This is not only the trend in Cornwall, but across the UK and globally".

In addition, according to Software Cornwall, businesses have noticed technical skills shortages in programming languages (such as Javascript, PHP, C#, C++, SQL, C and Python), also in specific techniques (e.g. Agile development), and other skills including; awareness of commercial software development, general understanding of the Linux operating system, and mathematics (Software Cornwall, 2015).

## Documenting the digital sector

The need for a better commentary of the digital sector in Cornwall, was mentioned, to document the innovative landscape so that talent and investment is attracted from outside. A comparison was made with the 'Wired' publication and the success of the media in Silicon Valley.

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*"Cornwall's technology sector needs a narrator, someone to document and bring together what's going on and show how exciting and appealing the scene is."*

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There was also a feeling that although lots of innovative, exciting and profitable work is being undertaken in the digital industry, there is still a need to fully recognise the sector as a vital part of Cornwall's economy and to continue investment in supporting infrastructure.

"Getting the 'powers that be' to understand that Cornwall is not just about tourism or food, if we want to lift the average salary level above the very poor position it is in now. Tourism and food are notorious for basic wage standards (not even Living Wage) and as long as this is the main focus then we will never get out of the rut of a low wage economy."

"We now need to consider better transport options for those businesses that do need to travel more because of the continuous growth in IT."

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*"Cornwall needs to be careful it doesn't find itself irrelevant. Our advantage was gained by being early innovators/adopters with a*

*perfect environment to test out the technologies and innovative new business practices. Many of these are now the norm, nationally and internationally and Cornwall needs to continue to push the boundaries to remain relevant."*

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When asked whether there is a magic ingredient, there were plenty of ideas suggested, focusing on Cornwall's unique strengths in the digital sector. A key theme was collaboration and idea-sharing, which already has a good track record in Cornwall.

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*"People and a connected Community - working together we are able to achieve so much more than individually."*

*"Money and to not be frightened of failure – if you fail fast and praise failure, you can achieve more, more quickly... it's understanding failure as part of the development process."*

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## CONCLUSION

Although it is hard to define the digital sector and also to source business data at a Cornwall level, the statistics and estimates clearly show that employment, growth and productivity in digital companies in Cornwall are very positive.

The key themes that have emerged in the digital world are the Internet of Things, big data, agile business and software processes, cloud computing and digital health. A few ground-breaking projects have been mentioned, but this simply scratches the surface of the astonishing work that is being undertaken by digital companies in Cornwall.

The Captains of Industry in the digital sector in Cornwall have called for Cornwall to be recognised and developed as a **Centre for Digital Excellence**. In addition, the industry is urged to continue to innovate and capitalise on Cornwall's advantages in the digital arena – world class superfast broadband, spirit of collaboration, and culture of entrepreneurship.

In order to achieve this vision, digital engineering skills are vital and it is imperative to bring employer businesses as close to education as possible to ensure Cornish companies can recruit and develop high quality staff.

Finally, there was also a call to promote the activities within the digital sector in a more integrated way to show just how exciting the Cornwall IT & digital sector is.

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*“Cornwall has always been a hotbed of world class engineering from tin, copper, clay mining to railway and marine engineering.*

*Digital is the new engineering revolution happening today in Cornwall!”*

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## ACKNOWLEDGEMENTS

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Toby Parkins – Headforwards, UKNetWeb

There are many more people we would have liked to have talked to, and we welcome further comments and requests for information related to this report.

Images: with thanks to **Headforwards** and **Invest in Cornwall**

### Sources of information

- What defines the digital sector? (October 2015) - Office for National Statistics
- Superfast Cornwall Evaluation Final Evaluation Report (2015) - SERIO and Buckman Associates
- Cornwall: A place to develop software - a review of the local software industry (2015) - The Cornwall College Group on behalf of Software Cornwall.

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