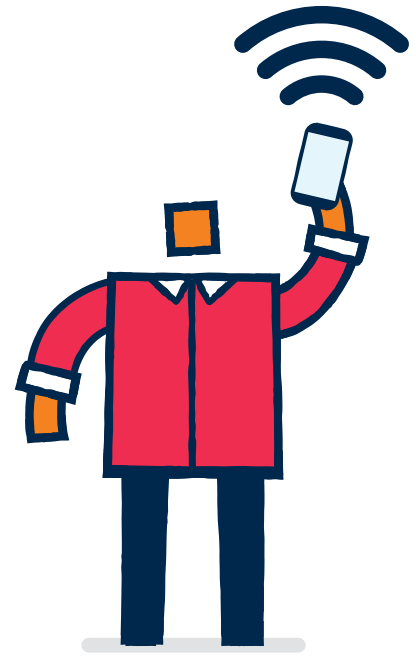


# How evolving technology has changed the way we work and communicate; and what the future holds.

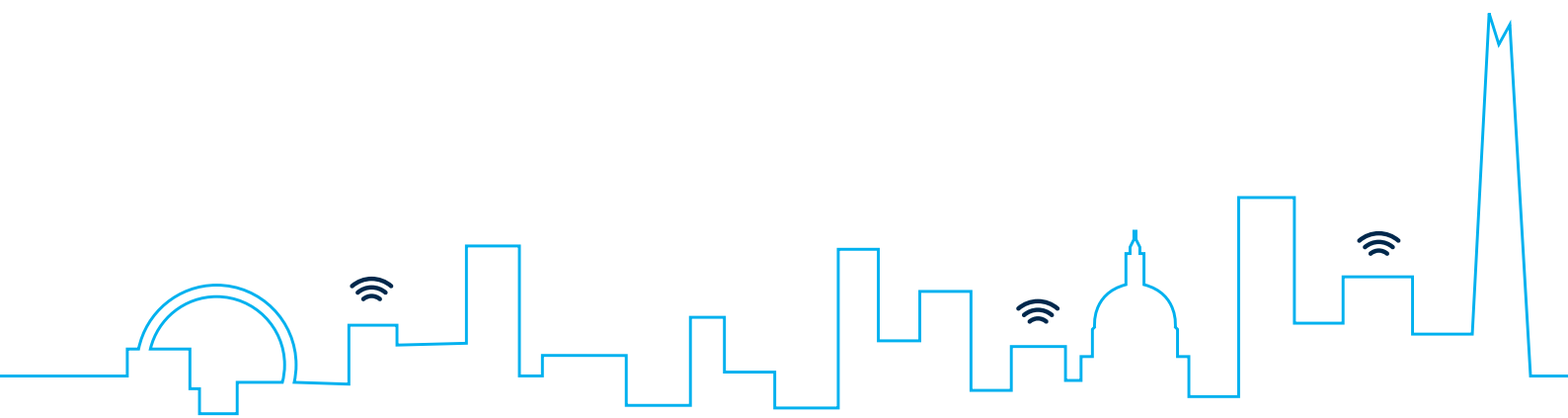


## Overview

This white paper describes how technology has changed in recent years for both consumers and businesses, with particular emphasis on the decline of the landline and increased internet reliance.

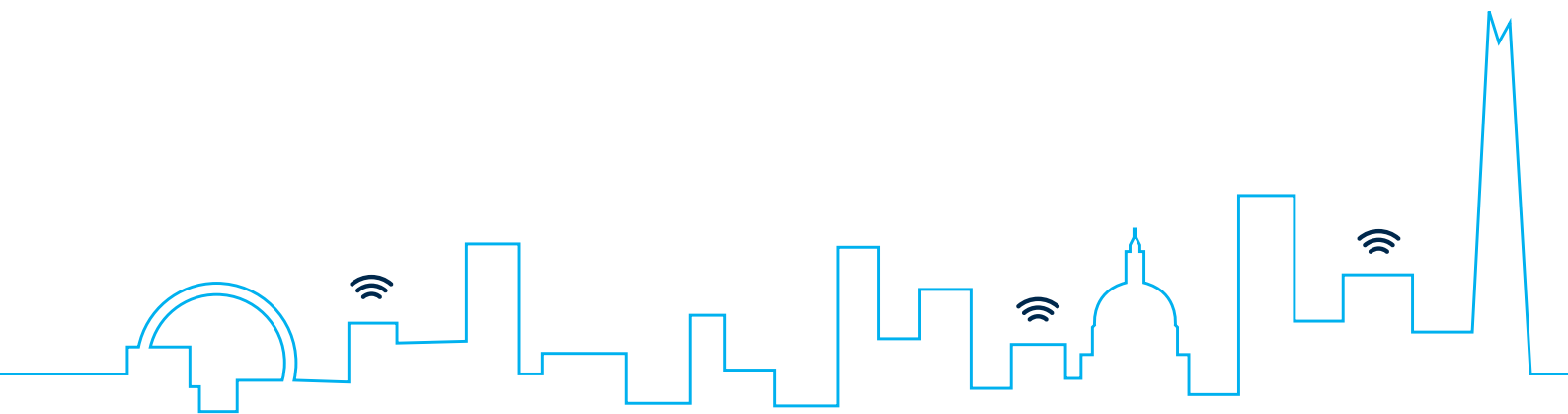
It also focuses on future technology and how this will change the way we communicate.

# Relish<sup>®</sup>



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# Death of the landline and the changing geography of the workspace

The landline will be non-existent in the office of 2025 and will be virtually extinct in the home. The workplace of the future will not take the form of an outdated central location, but workers will have the flexibility to work from home, or wherever there is a broadband connection.

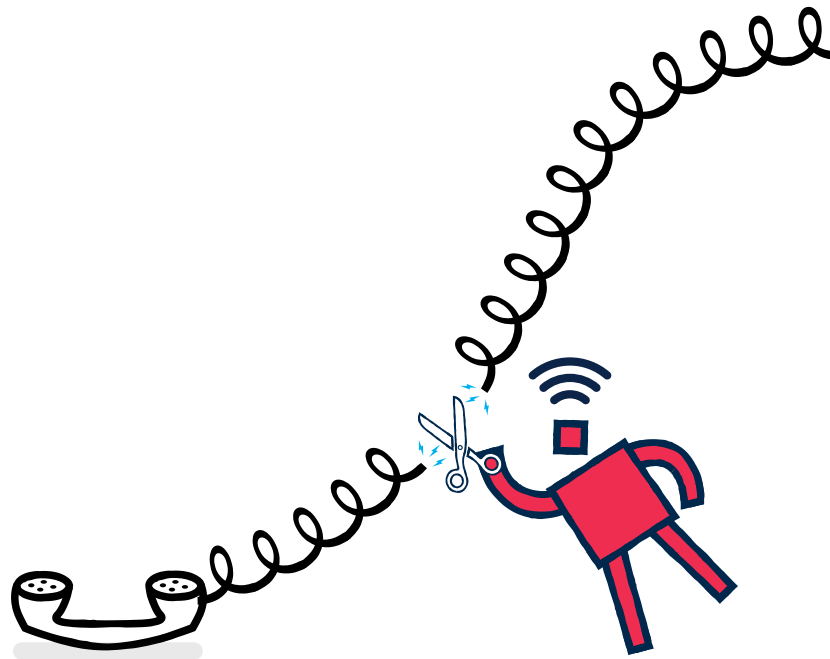
Since the introduction of mobile technology, businesses and homeowners have increasingly harnessed the opportunity to become more agile and flexible, and cut back on unnecessary costs. As a result, the need for landline telephones has dramatically declined.

A study by the Centre for Economics and Business Research found that landline usage in the UK has fallen dramatically in recent years, stating:

***“At the UK level, there has been a 33% decline in voice calls made from households’ landlines over the past five years.***

***“There has also been a 31% decrease in business voice call volumes at the same time.”***

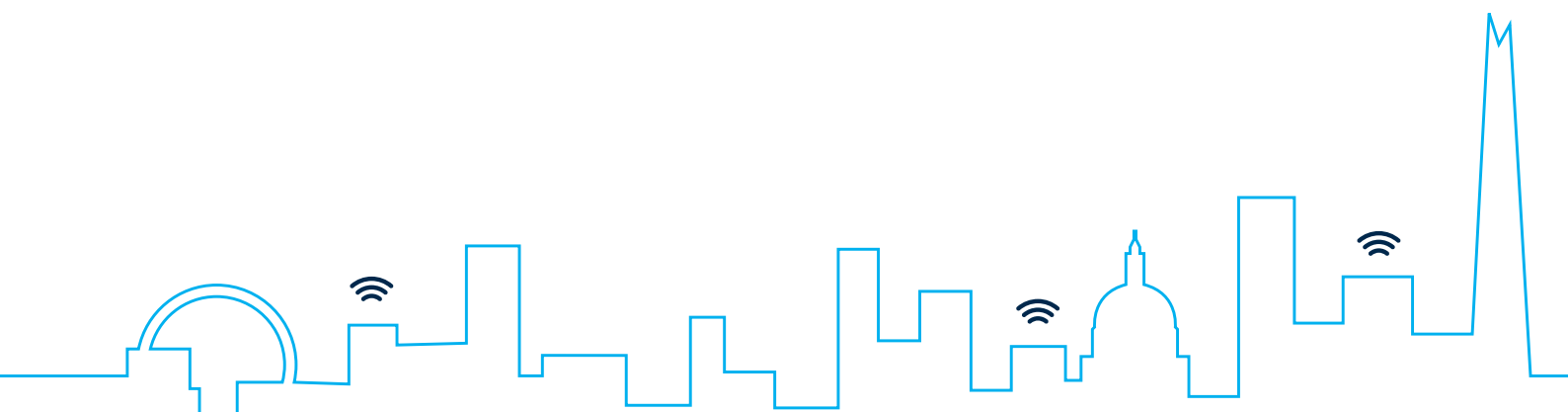
The number of business landlines has slightly declined by 12% as some businesses switch to alternative voice services such as VoIP and mobile<sup>1</sup>.



The report refers to a ‘landline tax’ being paid by customers who no longer use their landline to make phone calls but are limited by a lack of choice in the broadband market.

	2013	2014
Number of UK residential fixed landlines	24.4 million (end of 2012)	25 million (end of 2013)
Number of fixed landlines in the UK (including ISDN channels)	33.2 million (end of 2012)	33.4 million (end of 2013)
Proportion of adults who personally own/use a mobile phone in the UK	92% (Q1 2013)	93% (Q1 2014)
Proportion of adults who live in a mobile-only home	15% (Q1 2013)	16% (Q1 2014)

fig.1 Ofcom (2014) BARB Establishment Survey/Ofcom (2014). Facts & Figures.



## Landline vs Broadband

According to research by comparison site broadbandchoices.co.uk the cost of a broadband package has fallen by 58% over 5 years while the average cost of line rental has increased by 49%<sup>2</sup>. This has led to frustration among customers and has increased consumer demand for broadband-only packages from internet service providers, such as Relish, which do not require a landline.

Recent research by Relish, London's new broadband service that operates without the need for a landline, revealed that one in four Brits don't know their own home phone number while half of Brits only keep their home phone so that they can access the internet<sup>1</sup>.



Colm Sheehy, Senior Economist for The Centre of Economics and Business Research argues:

***"Having a wired phone in your house is completely pointless. It's amazing how far behind we are – technology has advanced but we're still living in the 90s in terms of infrastructure."***

Note: An average monthly price was calculated from the 10 cheapest packages in February 2009 (£9.05) and January 2015 (£3.76) demonstrating a fall in price of 58%. The line rental charges from all major providers were analysed in August 2009 and Feb 2015, revealing an average increase in price of 49%. Independent study of 2,000 UK line rental customers conducted on behalf of broadbandchoices.co.uk during March 2014.

## BT retail line rental price growth and CPI inflation, index 2004 = 100

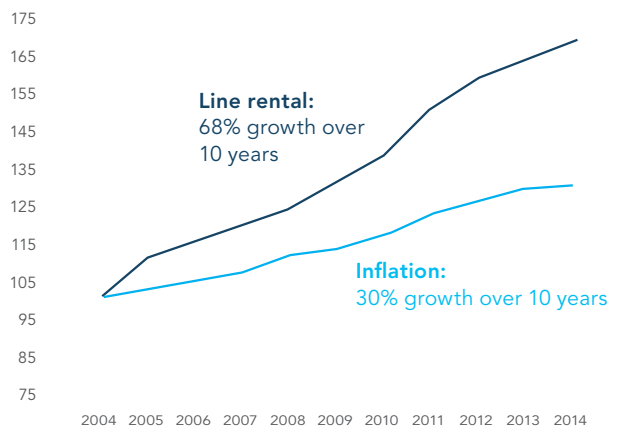


fig.2 CEBR (2014). The Landline Tax and other unnecessary costs on London households and businesses using fixed line broadband services.

## Residential consumers calling volumes and landline subscriptions, UK

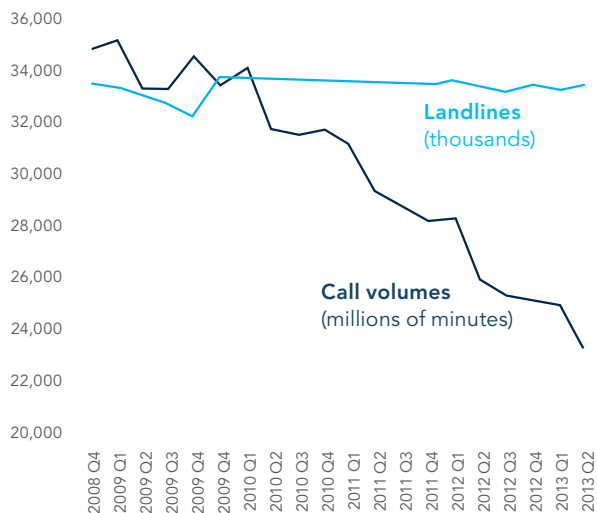
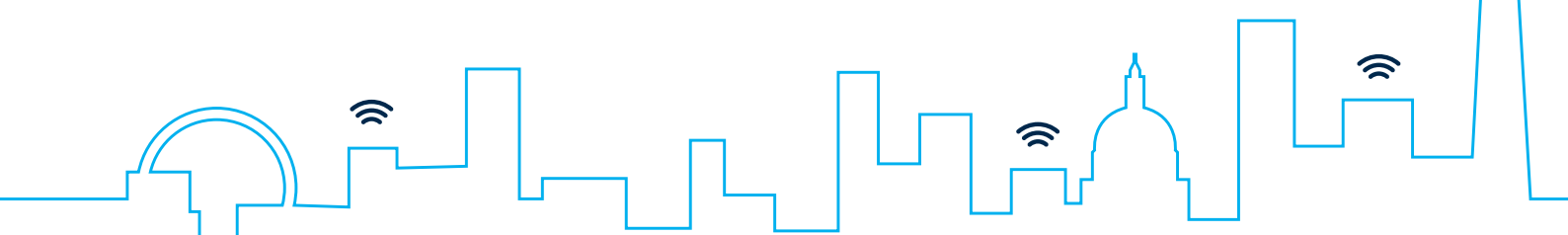


fig.3 CEBR (2014). The Landline Tax and other unnecessary costs on London households and businesses using fixed line broadband services.



# Death of the landline and the changing geography of the workspace

## The office of the future

In the future, businesses will slowly move away from the traditional central office, taking a more flexible approach.

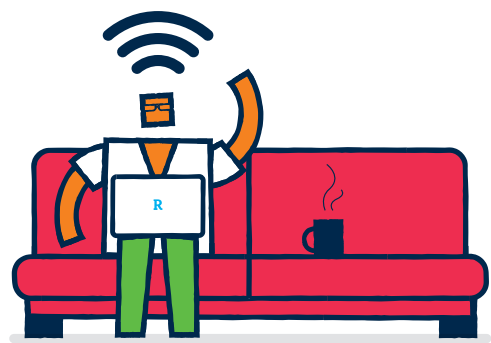
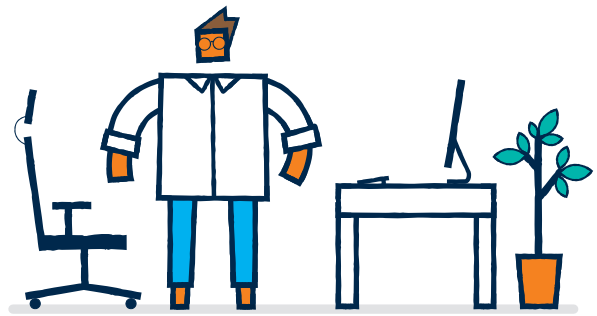
While in the past office rental firms have required tenants to take on a landline as part of the deal, this is rapidly changing to a more flexible approach.

Tristan Wilkinson, Associate at Digital Citizens explains:

*“The barriers to starting a business are as close to zero as they’re ever likely to be. The concept of a central office is breaking down and people want flexibility. Work is something you do, not somewhere you go.”*

Paul Dolman-Darrall, founder of online gaming consultancy Gamevy, explains:

*“The office as we know it is a relatively new, 20th century, concept. We all adapted to the miserable cubicle-based hell of the 80s then we moved to open-plan offices which are great for teamwork but not so good for concentration. Now we’re getting used to the idea that workers don’t necessarily need to be sat at the same desk all day.”*



Jenny Walton, Head of Communication Services, Media Trust agrees:

***“Instead of spending money on renting offices, companies are offering more flexibility and are letting people work from home or coffee shops or wherever is most suitable on a particular day. Hot-desking uses smaller spaces which saves money.”***

Will Harnden, Chief Marketing Officer at Relish comments:

***“The ability for start-ups to take on office space without having to pay for landlines that they don’t want or need will have a big impact on the way we work.***

***“We’re moving into a world where people’s jobs are more compartmentalised – rather than spending all day sat at the same desk – workers can go to the office for team projects and social interaction, work at home when it’s more convenient, or work in a private space when they need to concentrate. The office of the future is all about not being prescriptive and sticking to conventional methods of working for the sake of it.”***

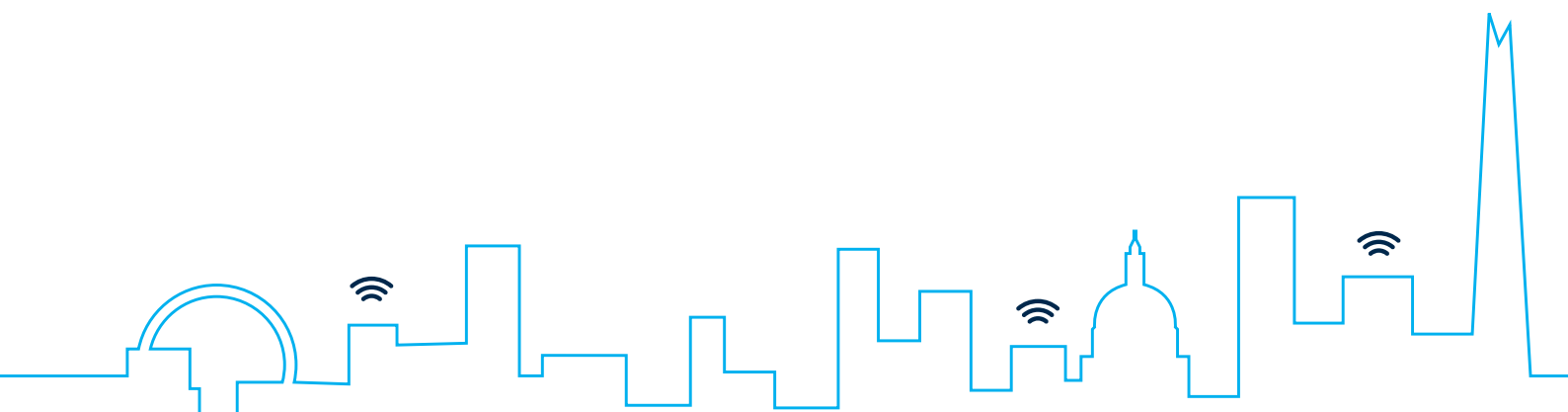
Working from home can potentially reduce spending in the long-run by decreasing office costs and potentially lowering staff turnover rates.

Research carried out by Ctrip – China’s largest travel agent – showed that the performance of home workers went up by 13% over the course of nine months<sup>3</sup>.

The successful trial led the company to offer the option of home working to all of its employees, however, half of the existing home workers chose to return to the office with the main reason cited as loneliness.

It was concluded that it was the most driven, high-performing employees that were willing to work from home, knowing that they could stay focused while away from the office.

While not suited to everyone, it’s clear that the option of home working is critical for retaining key employees and maintaining their productivity.



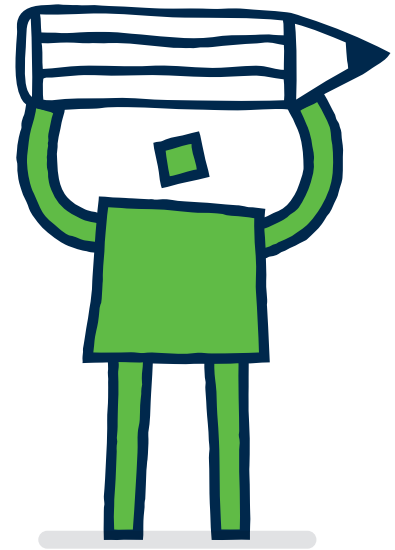
# 'Digital natives' and education

The exponential development of technology means that today's young adults – the 'millennials' – have a vastly different experience of technology than their parents and grandparents.

Tristan Wilkinson, Associate at Digital Citizens explains:

*"Expectations have changed as we're seeing the first generation of tech natives in their early 20s, who were born with broadband, hit the workplace and they're finding it to be very sterile. It's hard for businesses to attract talent with a traditional 9–5 working model, so we're starting to see the social impact."*

Offices and businesses need to adapt to catch up with the 'digital natives' who have been using the internet their whole lives and are much less tolerant with technology than the previous generation.



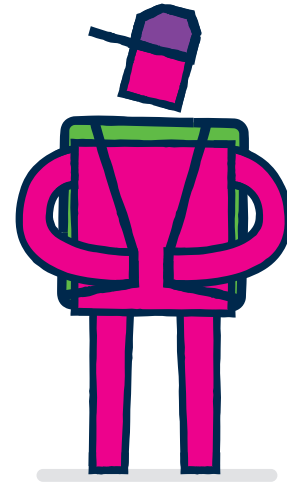


## Coding for Kids

The coding movement for children is rapidly gathering pace – there are numerous books, apps and online games appearing that help children to learn coding. While it's important that youngsters know how to use technology, coding skills also give them an advantage because they offer the ability to understand how products work and build their own.

There are various coding initiatives across the country, including Code Club UK – a nationwide network of free volunteer-led after-school coding clubs for children aged 9–11.

Taking the coding message into space, the Astro Pi competition launched in January 2015 with backing from the likes of the European Space Agency, Airbus and the UK Space Agency. Astro Pi is offering students the chance to devise and code their own app or experiment to run on a Raspberry Pi microcomputer, which will be taken to the International Space Station as part of British astronaut Tim Peake's mission in November 2015.



# 'Digital natives' and education

## National Curriculum updated for the digital age

Recognising the importance of digital knowledge in the workplace, learning to code is now obligatory in UK schools.

Lucy Lyall Grant, Trainer at digital transformation company Freeformers said:

*"The Government recently introduced coding to the computer curriculum for schools, which is going to have a huge impact on the way people think from a young age."*

While it's great news that a new generation will be suitably prepared for the digital workplace when they leave school, it provides a huge challenge to teachers who must prepare themselves to teach the new discipline.

This digital addition to the curriculum may also leave parents concerned that they might not be able to support their child or help with homework if their own online skills are lacking.

Not only does the existence of tech-savvy youngsters affect the nature of the workplace, it also means that the knowledge gap between old and young is getting bigger.

## Digital confidence score by demographic

	Below average (&)	Average (&)	Above average (&)
Total	26	46	28
Male	20	45	35
Female	31	46	22
6-11	14	59	26
12-15		42	55
16-34	9	48	43
35-54	27	51	22
55+	61	32	7
AB	20	46	33
C1	22	46	32
C2	29	47	23
DE	34	44	22

fig.4 Consumers' relationship with communications technology varies by age, with the highest levels of technological knowledge and confidence found among 14-15 year olds. The study, among nearly 2,000 adults and 800 children, finds that six year olds claim to have the same understanding of communications technology as 45 year olds. As age increases, consumers' Digital Confidence Score decreases, with 61% of over-55s registering a below-average score.

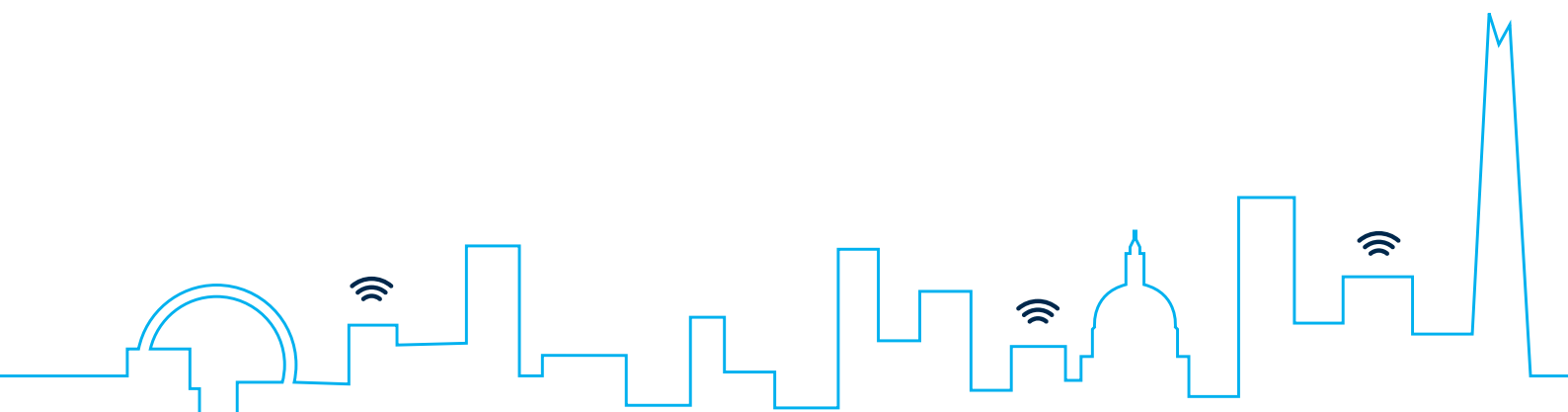
Ofcom (2014). Digital confidence score, by demographic.

## Bridging the digital knowledge gap

It would be incorrect and patronising to assume that all of the 'baby boomers' generation are less knowledgeable when it comes to new technology, but it is certainly an issue that needs to be addressed.

The new 'My Tech Family' initiative, backed by the Department for Culture, Media and Sport, was recently introduced in primary schools across the UK in order to tackle the concerns of parents over the rate at which technology is developing and creating a divide between generations.

The issue is also being addressed by communications charity Media Trust, which is working with Age UK to enhance digital inclusion among the older generation by training them up with digital skills.



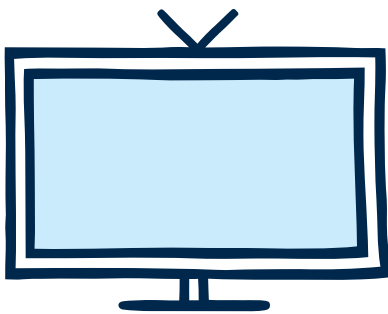
# Forms of communication that will become extinct

As discussed in Part 1, the death of the landline may well have an influence on the office of the future but what other forms of technology are set to disappear within the next 10 years?

Along with the office landline, the classic home telephone will disappear as mobile devices and video calling continue to grow in popularity. Voice only handsets have already been replaced by VOIP systems and headsets in many offices. But the conventional home phone might not be the only one on the way out.

Tushar Agarwal, Co-Founder of Hubble, a start-up that matches spare office space with the people that need it, predicts:

*“Mobile phones won’t exist by 2025. As seen in the Spike Jonze film ‘Her’, they’ll be replaced by small wearable devices. Consumer tech, such as smartwatches, will become commonplace in the work space. Everything is heading to the cloud.”*



## Changing TV habits

As many viewers transition to watching time-shifted TV using online catch-up services like BBC iPlayer, rather than live broadcasts, coupled with the rise of movie streaming services such as Netflix, the need for an actual TV is declining.

While most households won't be keen to ditch the TV just yet, student households and young adults in house shares may well find it economically advantageous to simply watch content on laptops and mobile devices rather than invest in a TV.

The proportion of households with digital TV dropped by 1% to 95% at the end of 2013, compared to the previous year, according to a BARB Establishment Survey <sup>4</sup>.

	2013	2014
Proportion of UK homes with digital TV	96% (Q4 2012)	95% (Q4 2013)
Number of minutes of TV people aged 4+ watch each day	4 hours 1 minute (2012 ave.)	3 hours 52 minutes (2013 ave.)

fig.5 Ofcom (2014) BARB Establishment Survey/Ofcom (2014). Facts & Figures.

## The demise of QWERTY?

Tristan Wilkinson, Associate at Digital Citizens predicts that the QWERTY keyboard will be the next technology to disappear, stating:

*“When voice and gesture commands get to the point where they’re 100% reliable, they’ll take over, though we’ll probably still need keyboards for large writing tasks.”*

This seems a fair assumption for mobile devices, where the QWERTY doesn’t really fit in, though for writing-based jobs, it’s hard to imagine any existing methods replacing the manual keyboard just yet.

## Social media

Along with physical products, it’s likely that the coming years will see the death of various other forms of communication such as social media sites. The likes of Facebook and Twitter may still exist in some form but will no doubt be joined or overtaken by emerging technologies. Instagram has already taken over from Facebook as the most popular social networking site for teens in the US, according to research by investment bank Piper Jaffray.

## Top 10 social platforms, changes in active usage in the last six months

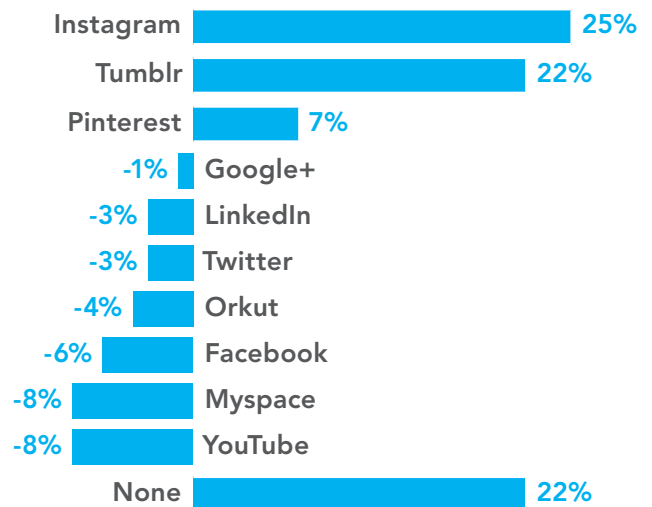


fig.6 The GlobalWebIndex Social Q2 2014 study found that Facebook has the most users but sees decline as picture and messaging apps boom.

GlobalWebIndex (2014). GlobalWebIndex Social Q2 2014 Study.

The change in these services also affects the hardware that’s used – for example, the rise of photo-sharing services like Instagram have no doubt helped to fuel the development of smartphone cameras, while messaging services such as WhatsApp are rapidly gaining ground over SMS text messaging.

# The maker movement and how it has changed the face of consumer electronics

The nature of the office is being directly influenced by the success of smaller start-up ventures at the cost of larger corporations – a trend which has been partly driven by the ‘maker movement’.

The maker movement refers to a rekindled interest in designing and creating hardware thanks to an increase in the availability of affordable raw materials and tools.

Laura Kirsop, Head of Code Club UK – a nationwide network of free volunteer-led after-school coding clubs for children – explains further:

*“The counter-cultural ‘maker movement’ in which individuals are designing and producing hardware and software thanks to low cost materials such as the Raspberry Pi mini-computer, has the potential to revolutionise our approach to technology and the way we work.”*

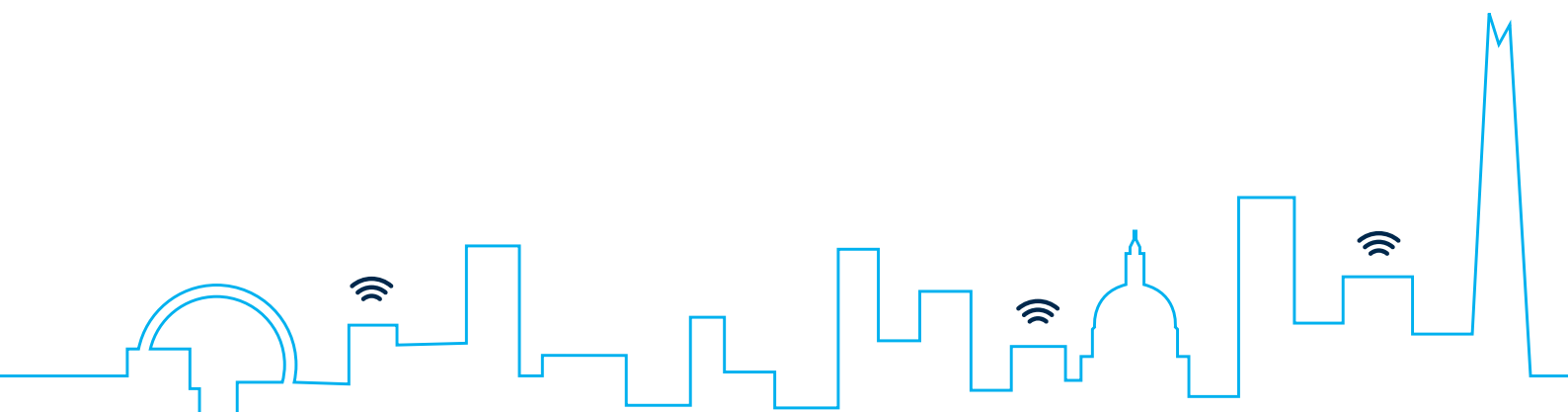
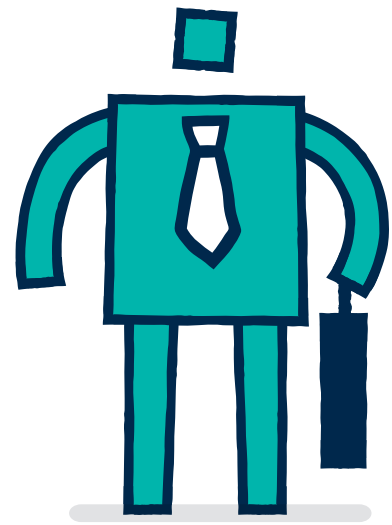
Applied Futurist Tom Cheesewright agrees, commenting:

*“The maker movement has already changed the face of the consumer electronics industry and will continue to do so. The real innovation in the fledgling wearable industry is coming from crowdsourced projects rather than big corporations.”*

## Influence on the corporate world

The movement also applies to sectors outside of technology, including success stories such as the peer-to-peer retail site Etsy which predominantly sells hand-made and vintage goods. In 2013, the company announced that annual transactions had hit the \$1bn mark<sup>5</sup>.

Inventors and start-up companies are increasingly looking to crowdfunding sites such as Kickstarter and Indigogo, rather than going to the bank for a loan.



## Alternative Source of Finance for SMEs in the UK

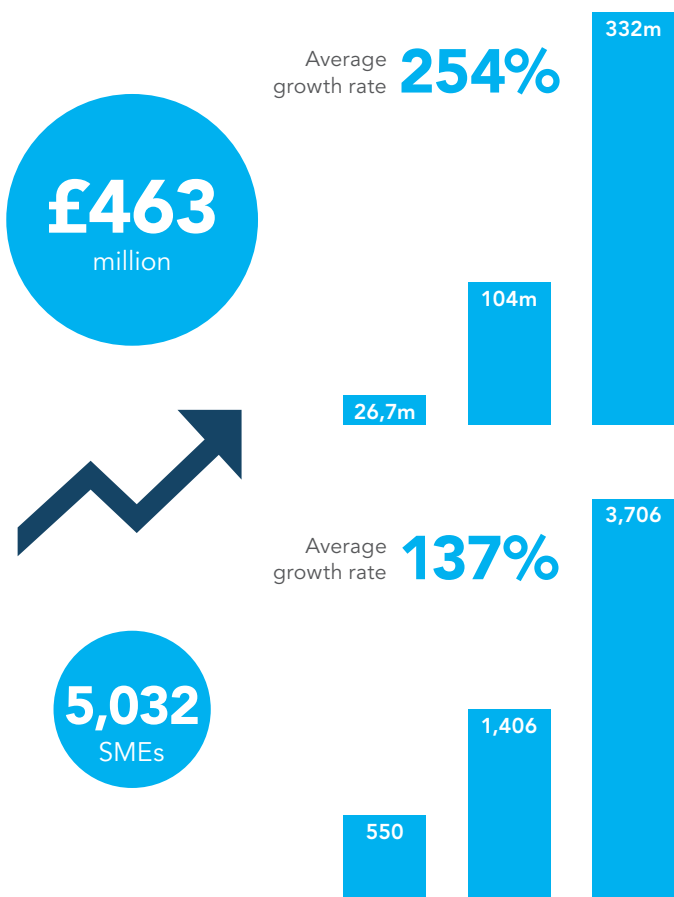


fig.7 The UK alternative finance market provided £463 million worth of early-stage, growth and working capital to over 5,000 start-ups and SMEs in the UK during the period 2011–13, of which £332 million was accumulated in 2013 alone.

Liam Collins, Richard Swart and Bryan Zhang. (2013). The Rise of Future Finance.

As well as providing places where makers can gather to hone their skills, share ideas and meet future business partners, the emergence of ‘maker spaces’ and ‘hack spaces’ for coders has also provided a prime recruiting ground for larger companies.

As Applied Futurist Tom Cheesewright argues above, much of the innovation in the technology world is coming from start-ups, which is where many larger corporations are looking when they need talented engineers and coders.

# 'Retro' re-evaluation and the value of social interaction

While the growing number of broadband-equipped locations outside of the office and more flexible working laws has meant more working away from the office, the importance of face-to-face interaction should not be underestimated.

While it's easy to get carried away with the futuristic idea of not going into an office between 9 and 5 everyday, this isn't always an ideal set-up. For example, younger and less experienced workers are likely to need more supervision and guidance, while not everyone's home environment is suited to remote working.

Samira Gazzane, Policy Manager, Broadband Stakeholder Group explains:

*"We need to address the negative social impact of working from home. Not everyone wants to bring their work home with them, especially if they have children at home."*

## Retro re-evaluation

As well as recognising the importance of social interaction, the rise of a digital-centric world has driven a re-evaluation of physical products, not least because of the privacy concerns that arise when so many of our interactions take place online.

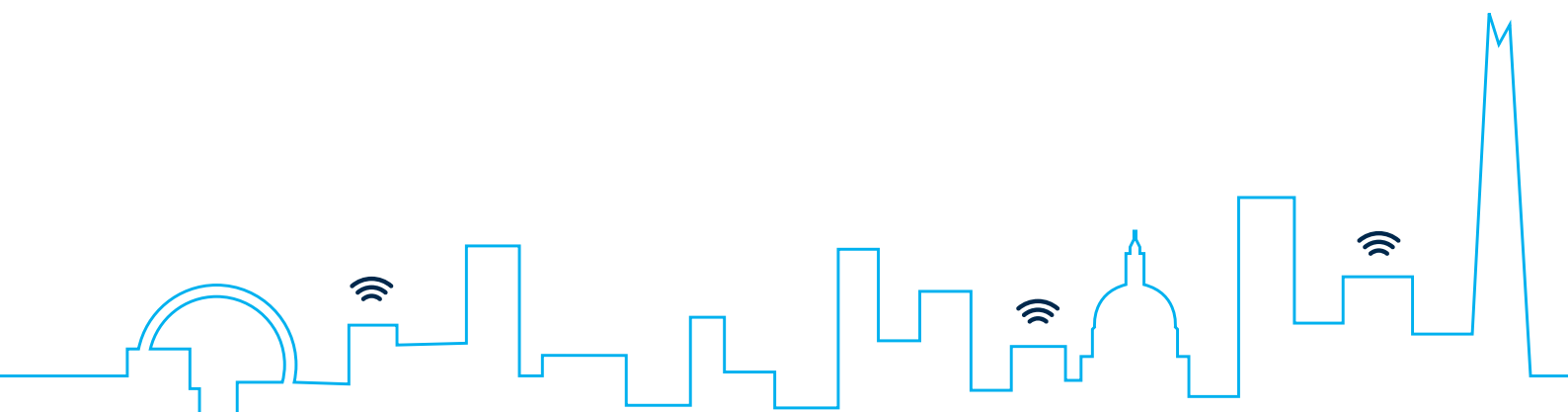
Hubble's Tushar Agarwal comments:

*"Vinyl has seen a massive comeback. As have physical notebooks from the likes of Moleskine, because people still like to use them. We're seeing people buying ebooks to read on their Kindles but also buying a physical copy to keep on their shelf at home."*

*"There's always a counter-culture and the same is true of tech. As devices get more advanced, there are people reverting to using older Nokia phones and Polaroid cameras."*

While this retro movement can be viewed purely as a fashion statement, it also shows that physical products are still important to people, no matter how advanced technology becomes. It could be argued that the more intangible these products and services become, the greater the need to have something physical to come back to.

Interestingly, Moleskine is an example of a company that markets itself on its retro aesthetic and is widely believed to be a long-standing 'heritage brand' when in fact it is a relatively new company that recognised the demand for this kind of physical products.





## 'Big' data

While, counter-cultural fashion is a key point, concerns over security also play a significant role.

Code Club UK's Laura Kirsop explains:

*"We're already seeing an undercurrent of people who are ditching apps and devices because they don't want companies having access to their data. The implications of mass data collection are huge."*

While the benefits that innovation, in particular wireless technology, provide are undeniable, the need for social interaction, concerns over privacy and the simple desire to not be 'plugged in' 24 hours a day are important issues to address.

## Reasons why social media users stopped using the services

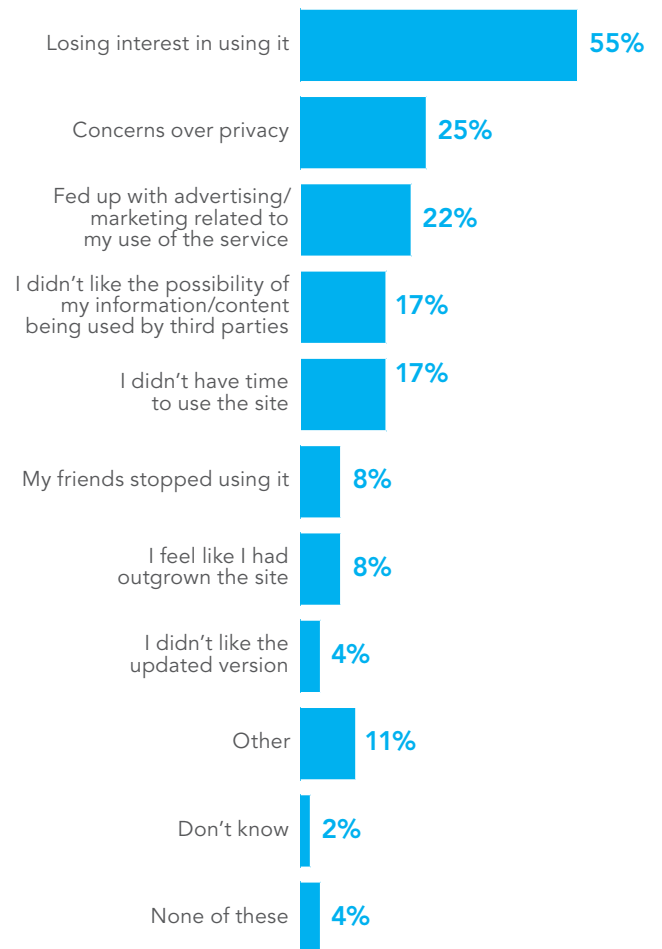


fig.8 "Social Media 2014" report shows that one in ten (10%) social media users stopped using Twitter and around the same proportion (9%) stopped using Facebook in the past year. The main reason for social media users stopping using services was a loss of interest (55%), followed by increasing concerns about privacy (26%). One in five (21%) say they were fed up with advertising and marketing strategies (21%) and one in six didn't like third parties having access to personal content (17%).

Andrew Farmer (2014). Social Media 2014.

# Future technologies and how they will shape the world of the future

While technologies such as the landline may be heaving their dying breaths, there are plenty of newer innovations set to take their place.

As discussed in Part 4, wearable technology is seeing an explosion in innovation, with smaller start-ups calling the shots. The CES consumer electronics show in January 2015 saw a huge number of wearable devices making their debut as the technology continues to gather pace.

## Wearable tech market growth forecast

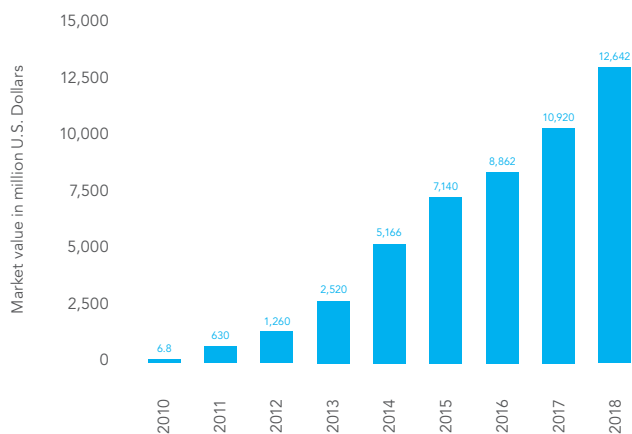


fig.9 From virtually nothing a few years ago, the market for wearable tech has exploded. The number of devices shipped is expected to rocket from about 33 million this year to more than 50 million next year, and to 148 million by 2019.

Unattributed (2015). Wearable device market value from 2010 to 2018.

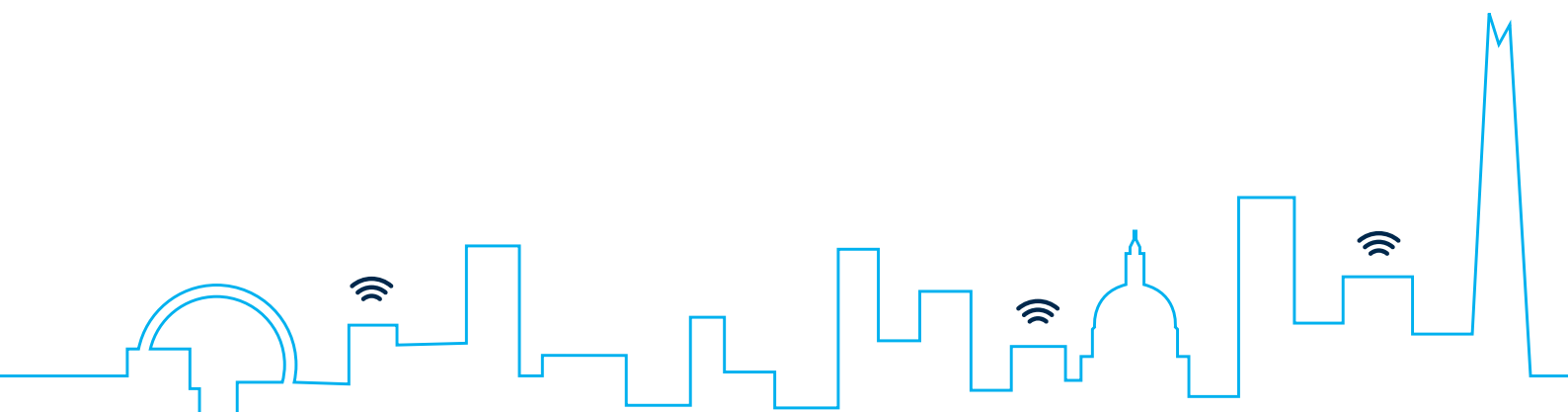
Google Glass – the head-mounted gadget, which some may argue was the ‘flagship’ product of the wearable movement – was recently pulled by its maker in its current guise, though Google has committed to developing a successor.

Wearable tech has proved to be hugely successful in the sports and fitness world, with amateur gym goers using a large variety of fitness trackers, while professional sports leagues are making use of various systems for developing tactics as well as keeping players safe from injury.

However, other devices such as the smartwatch, have had a somewhat lukewarm reception. All eyes are on the Apple Watch, due to land in April 2015, because Apple has an excellent track record of bringing new gadget formats to the masses.

Another area which is gradually gaining ground is 3D printing, the implications of which are game-changing. Tristan Wilkinson of Digital Citizens commented:

*“With the help of 3D printing, children are already thinking about physics and maths in a totally different way. And when you can email a part for a helicopter to Afghanistan, then things get really interesting.”*

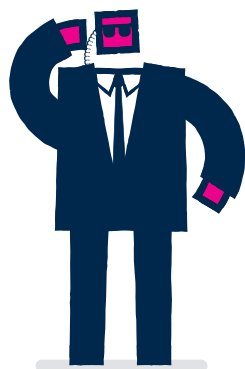


The US army is looking into 3D printers to produce food for soldiers on the front line, while NASA is also testing the technology in order to produce food for deep space missions. In November, the first 3D printer was flown into space to be used in the International Space Station, where it will primarily be used for printing tools and parts.

Along with 3D printing, virtual reality (VR) and augmented reality (AR) headsets are also set to gain ground in the coming years. Facebook recently acquired VR headset start-up Oculus, while Microsoft showed off its new HoloLens AR headset with an impressive demo of how it could be used to plan future missions to Mars.

With the rate of technological change accelerating, and with so many everyday tasks from retail to banking moving online, it's easy to get left behind. Half of UK consumers (48%) feel they do not have control over their online lives, according to a report by password manager and secure digital wallet, Dashlane (see note below)<sup>6</sup>.

Note: The #RestoreControl report is based on research conducted in December 2014 among 1000 UK consumers by independent research agency Redshift on behalf of Dashlane.



For both businesses and consumers, one of the key issues is that of privacy. Only recently, Samsung warned consumers not to discuss private details in front of its microphone-equipped smart TVs with many observers pointing out that its privacy policy was worryingly similar to the text of George Orwell's *1984* in which citizens are spied on via 'telescreens' in their homes<sup>7</sup>.

Online security, which is already hugely important, will become an even bigger issue in future as the value of the enormous amount of data from individuals becomes an increasingly valuable commodity.

The future will also see a shift in the crossover between work and social accounts. Currently, many digital accounts are used for both work and our personal lives, which is not an ideal situation. We'll see more work filters put in place along with the development of work-centric social networks, such as 'Facebook at Work', which is currently in testing phase.

Applied Futurist Tom Cheesewright says that as technologies develop there are three skills that will not be automated – the ability to curate, create, and communicate. With so much information now available, curation is essential and while algorithms can take this over to a certain extent, even these need to be produced by humans in the first place. The ability to create totally new ideas is also very much a human skill, as is the ability to communicate these ideas to colleagues and the outside world.

# Conclusion

Technological changes have already had a huge impact on the way we communicate and will continue to do so:

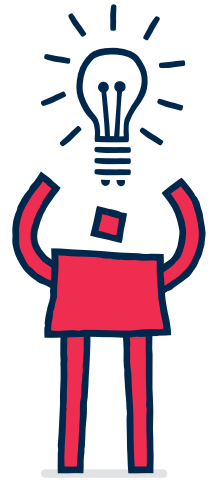
- Improved access to cheaper broadband, remote working and the recognition that flexible working positively effects productivity has led to changing workspace that no longer requires all employees to be at their desks 9–5, five days a week.
- Coding initiatives and change to the curriculum means that children are being taught digital skills from an early age so that they're ready to enter the workplace. 'Digital native' millennials who are starting work now are finding it hard to cope with ageing office infrastructure. Initiatives are in place to address the digital knowledge gap between generations.
- Along with the landline, home phones and eventually office phones may disappear as wearable technology becomes the norm. TV ownership has dropped for the first time as people move to mobile devices and streaming services. Online networks such as Facebook will inevitably be replaced by new services as technology such as voice recognition and gesture control improves.
- Large institutions will begin to crumble due to growing mistrust and bureaucracy hampering infrastructure change. Start-ups will continue to benefit from this and branch out into areas such as banking, which have traditionally been the domain of large corporations.

- The 'maker movement', and crowdfunding have helped to democratise the tech industry, with much of the innovation now coming from start-ups rather large consumer electronics brands – a trend which is set to continue.

- No matter how advanced technology becomes, there is still a desire for physical products, partly as a break from the increasingly connected world. Concerns over digital privacy and security also fuel a desire for 'retro' products.

- Current technology will be replaced and improved by wearable gadgets along with VR, AR and 3D printing, while social networks will evolve or be replaced by newer services that draw a line between work and personal. Online security and privacy will be the biggest challenge over the next ten years as our personal data becomes an increasingly valuable commodity.

While the nature of the workplace continues to change, the speed at which new technology and by extension, the way we communicate, is developing will rely heavily on the infrastructure being in place to support it.



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