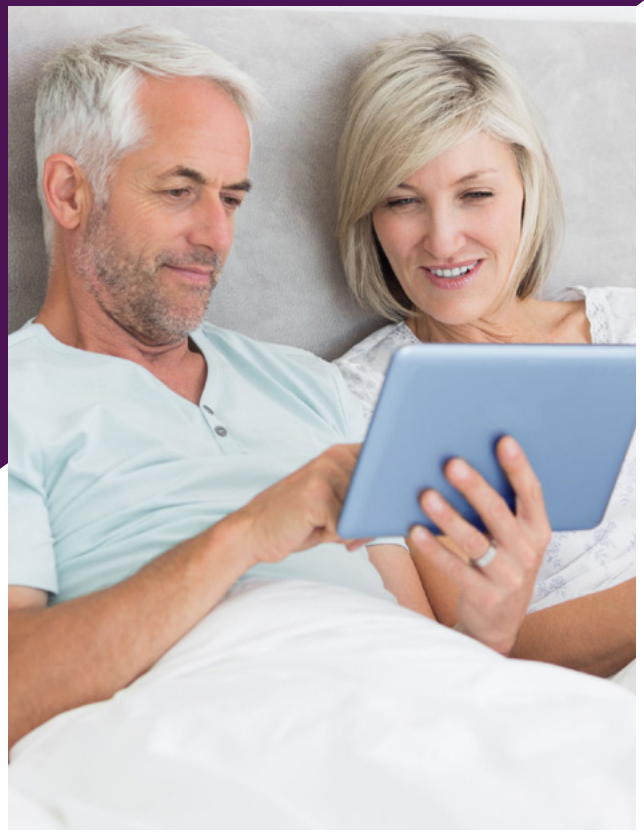
Innovate UK
Technology Strategy Board

Digital economy strategy

2015-2018

Executive summary

"Around 80% of smartphone users check their phone within 15 minutes of waking."



The internet in 1984 consisted of 1,000 computers hardwired together. Sir Tim Berners-Lee first coined www five years later, and a new industrial revolution began to take hold. By 2020, 30 billion devices will be wirelessly connected, supporting a global digital services market worth as much as the entire UK economy. And we are only at the beginning.

This is also a human revolution. Around 80% of smartphone users check their phone within 15 minutes of waking. For 80% of them, it's the very first thing that they do. And they do it 150 times a day.

However, the internet, mobile connectivity and computing capabilities are developing more quickly than businesses can adapt. Roughly 90% of the data in the world was created in the last two years: the digital world is perennially new.

Being at the forefront of this wave of digital innovation is essential for business and key to the UK's competitiveness.

Our digital economy programme will commit £15m a year to support innovative business projects and a further £15m a year as core funding to support the Digital Catapult centre, the Open Data Institute and Tech City UK, each of which has a role in delivering the objectives of our strategy.

Our Strategy

This is a strategy to help UK businesses to innovate by using digital technology.

Innovate UK will work with companies to understand how this technology can help them to innovate to serve current and future customers better, and how they can develop and build their confidence in new digitally-enabled ways of doing business.

We have supported, facilitated and co-funded innovation in the digital economy since 2007, and with a specific digital programme since 2009.

We have five objectives:

Encouraging digital innovators

We will help digital innovators in early-stage companies to articulate and develop their ideas, establish their businesses and make connections to potential partners and lead customers in industry and government. We will also help innovators in established companies across the economy to adopt digital solutions, and to learn from other sectors.

Focus on the user

We will champion digital innovation approaches that centre on users' needs, to ensure that solutions are well fitted to the markets they address. These needs centre on trust, access and convenience of use, so we will help businesses to inject this thinking throughout their design processes.

Equipping the digital innovator

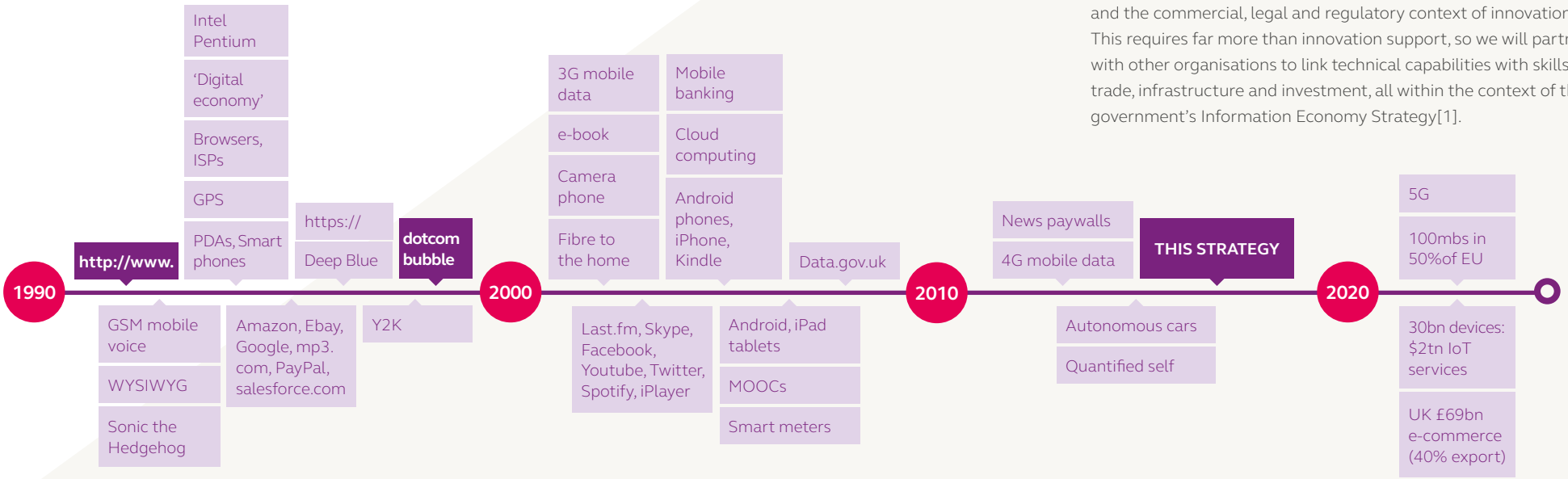
We will equip individual innovators with technical and business expertise and resources, and help them to develop new capability if necessary. Of particular importance are the technical toolkits to manage transactions and move data safely and smoothly, and to link the physical and virtual worlds.

Growing infrastructure, platforms and ecosystems

We will work across industries to develop and consolidate structural foundations for the digital economy, to encourage investment and guide innovators as they enter the market. We will support interoperable infrastructure and software platforms, build digital ecosystems and help them to scale.

Ensuring sustainability

We must ensure that innovations in technology are used well and can succeed sustainably. We need to understand social impact and the commercial, legal and regulatory context of innovation. This requires far more than innovation support, so we will partner with other organisations to link technical capabilities with skills, trade, infrastructure and investment, all within the context of the government's Information Economy Strategy[1].



Why is digital economy **a priority** for us?

"We will soon be connected to the internet everywhere we go, all of the time."

The internet, computing and mobile communications have a transformative effect on how all businesses succeed. The impact of digital platforms, products and services will go far beyond the information and communications technology (ICT) sector.

By innovating in the UK, and establishing new ways to use this technology in all business sectors, we have the opportunity to position UK companies to grow and to succeed on a global stage.

We can already see the physical world being overlaid with intelligence – with machines sharing information about their status and surroundings, and automatically adjusting to improve our human experience and services. We can see an explosion of data: about our surroundings, services and products on offer; about the knowledge of others; and about ourselves. We can see new capabilities to connect and exploit this data to derive new knowledge and to make better decisions. We are also experiencing a growing clamour for our attention, as information, social contacts, media, advertising and services press in on our privacy and our personal time.

The change is happening so quickly that we cannot see more than a few years into the future. We can anticipate, however, that most of us will soon be connected to the internet everywhere we go, all of the time.

The UK advantage

Software, IT and telecoms services together generated 4.2% of UK gross value added (£59bn) in 2011 and provided 885,000 jobs. We have 107,000 software businesses, and are the world's number two exporter of telecoms services (£5.4bn) and number three in computer services (£7.1bn) and information services (£2bn)[1].

The UK has world-class strengths in communications, especially wireless technologies; software development, computing and data analysis; cyber security; and user experience and service design.

The world imports the UK's expertise – services dominate our trade balance – and the world imports our culture. We are number two in the global export trade in film, television, music, books, news and education. Our total creative industries exports (£17.3bn) are the highest per head in the world. And even though 7.8m UK adults have never used the internet (half of them for reasons of disability), the UK population is the world's most advanced adopter of online retail and the digital economy. Together, these capabilities give the UK an early lead in the digital economy. This is an opportunity for us to take a commanding position in shaping the 21st century.

What are the **challenges** for the digital economy?

"New digital businesses with great ideas and products are appearing all the time."

New digital businesses with great ideas and products are appearing all the time. But ideas are not enough. Small businesses need concentrated support if they are to scale, and we need a long-term strategy and unprecedented cross-industry collaboration to establish new supply chains and business methods.

Establishing digital businesses

Low set-up costs and continual technical advances drive a very short product cycle and a vibrant culture of start-up digital businesses. But there are challenges with commercialising and scaling up businesses from this fragmented base.

Low working capital

Young companies have low working capital, affecting their resilience and ability to build the relationships they need in order to break into a complex and competitive market.

Skills shortages

The forces that create a dynamic and fast-moving innovation culture also create skills shortages, particularly as innovation gains pace.

Hearing new ideas

With more than 200 smart-home demonstrators in the UK and more than 3,000 e-health applications on the European market[2], how can the new ideas of a small, unknown company be heard?

Intellectual property

The cost and sluggishness of protecting intellectual property contrast with the speed of technology change, leading small companies to look for competitive advantage through agility and know-how instead of through long-term strategies such as patent registrations or diversification.

Tribal boundaries

Successful digital businesses fuse technical expertise with creative flair and an understanding of their customers. However, this fusion means erasing the tribal boundaries between 'geeks' and 'luvvies'. These cultural divisions within the digital community can be as hard to overcome as the gaps in understanding between technologists and their clients.

Funding support

Support from government, investors and clients can be less agile than the companies themselves, and is often designed around traditional innovation models and linear product development processes. The drag of this support on companies' time and resources can even outweigh the value on offer.

Scaling up

Go big or go home

Digital platforms often succeed based on the size of their user base. This pressure to 'go big or go home' tempts businesses to scale up customer numbers rapidly, often before business structures are properly in place.

Investor confidence

With a short product cycle, rapidly evolving technology and markets, and high churn of companies, the digital industry lacks a coherent strategic roadmap, challenging confidence in long-term investment in digital capability.

Long-term strategy and the need for cooperation

The platforms, systems and supply chains that underpin the digital market require a longer term investment and innovation strategy, and a broad-based cross-industry collaborative approach.

Confidence to adapt

A move to digital methods can be deeply disruptive of existing business methods and commercial models and lead to a reluctance to innovate, even though this can lead to being overtaken by those who are less cautious and are willing to move more quickly.

Connected networks

It is difficult to change only one part of a connected business network, so commercialising digital technologies increasingly requires collaboration across traditional sector boundaries.

Investing in infrastructure

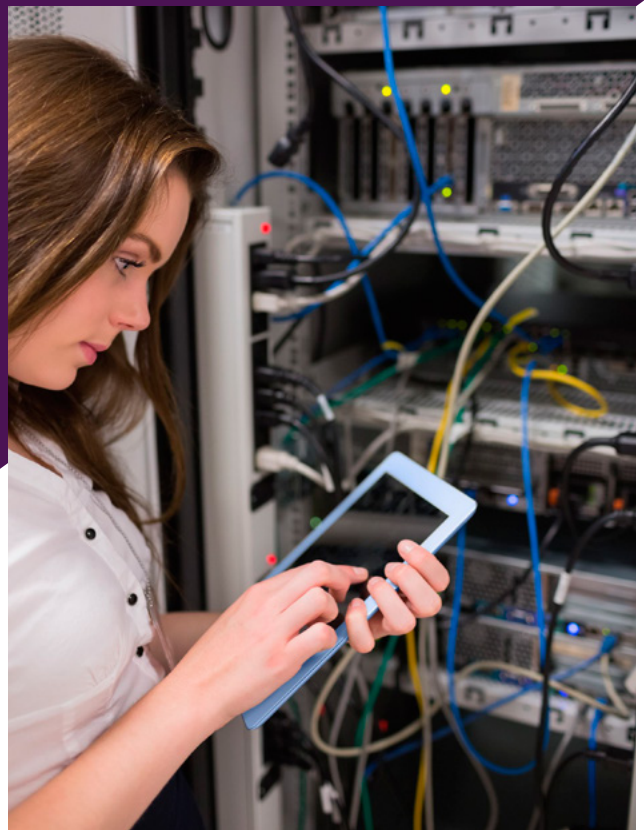
Digital infrastructure investment requires long-term planning and confidence in future revenues from a very unclear commercial market, so the supply of digital connectivity tends to lag behind demand.

Digital inclusion

This tension in infrastructure investment leads to unequal internet access between affluent, urban populations and areas where the investment case is weaker. This is compounded by social divisions to create an excluded population of the digitally disadvantaged. This is a significant emerging social challenge.

What are the **opportunities** for UK business?

"There are opportunities for businesses to connect to us in ways that have never been possible."



Digital technology can offer businesses huge reductions in costs; massive trading volumes with low transaction costs; instant global market reach and contact throughout their customers' daily routine; and insight into customer needs and a direct and personal relationship with them.

The rapidity of change makes it difficult to predict what might become available more than a few years ahead. Nevertheless, our dialogue with UK businesses identifies the current trends creating opportunities for those with the appetite to innovate.

Mobility

We are in contact with the internet continually during our daily lives through our smartphones and computing devices. These are growing in their capabilities, both in data handling and in the functionality with which they link us to our surroundings, and we are using them to manage our lives. This creates opportunities for businesses to connect to us in ways that have never before been possible.

'Internet of things'

The 'internet of things' describes the trend for physical objects to be more and more connected and linked electronically. The physical world will increasingly be managed digitally. We are creating smarter environments and smarter objects that are becoming responsive to their context and our needs. New business models, applications and services are emerging in energy management, e-health delivery, traffic management and more, and the added value of 'internet of things' services could reach as much as $2tr a year, with 30 billion objects connected by 2020[3]. This drives demand for components, devices, wireless connectivity, middleware and decision support tools.

Enterprise services

The long-term trend for businesses to outsource and sub-contract non-core activities has been given new impetus by internet business services, now offered through the cloud. As caution around data risks and the ceding of control is overcome, and the benefits of cost and service availability are demonstrated, traditional enterprise structures with office staff are giving way to a distributed workforce and systems of delivery contracts. Business-to-business online service providers are flourishing.

Data

We, and every business that serves us, have access to more data than ever before. We are just beginning to explore the possibilities to mine and interlink these data streams to create new knowledge and insight. The opportunities for businesses to benefit are particularly striking. Data is predicted to create more than $300bn of value in the next decade[4], and European countries could witness annual productivity gains of €255bn in the public sector alone.

Different industry sectors ride each of these waves at different times, depending on the nature of their businesses and the needs of their customers. The creative industries led the way in the emergence of the digital economy, and online commerce has since grown to rival them in importance. Ahead, we see opportunities for more industries: data in health, connectivity in transport, control systems in energy, online public services, and the list goes on. The evolution of the digital economy is in full swing.

Case study

Cheshire Bespoke

Cheshire Bespoke Ltd is developing smoother ways for businesses and customers to carry out transactions online in the clothing and fashion industry, with support from Innovate UK.

The bespoke tailoring and manufacturing business worked with a number of partners on a successful 'Fashioning metadata production tools' project and is now continuing that collaborative work with a new project 'Fashioning digital production tools', after winning funding in our 'Frictionless commerce – transaction in a digital landscape' collaborative R&D competition.

Cheshire Bespoke is working with Tailor Made, a business with extensive knowledge in body scanning and made-to-measure clothing, and they hope to demonstrate the potential of digital tools in producing flexible and diverse clothing.

The work could ease the cost and production constraints holding back clothing manufacturing in the UK and lead to new digital tools that will benefit manufacturers, retailers and consumers.

Our digital economy **strategy**

> "We will work across industries to develop and consolidate the foundations of the digital economy, so that innovators can enter the market with confidence."

Innovate UK has supported, facilitated and co-funded innovation in the digital economy since 2007 and with a specific digital programme since 2009. We support businesses where there is a clear market for them, and we target barriers and issues that companies find difficult to solve on their own.

Our 2015-2018 innovation strategy has five objectives.

Encouraging digital innovators

We will aim to understand and support digital innovators whatever the business circumstances that surround them, helping them to develop confidence and connect to their customers.

Focus on the user

We will champion approaches to digital innovation that centre on the needs of users, to ensure that solutions are well fitted to the markets they address.

Equipping the digital innovator

We will equip individual innovators with the technical and business expertise that they need, and drive the development of new capability where it is needed.

Growing infrastructure, platforms and ecosystems

We will work across industries to develop and consolidate the foundations of the digital economy, so that innovators can enter the market with confidence.

Ensuring sustainability

Digital is not just technology. We will work across boundaries to link technical capabilities with an understanding of social impact and the commercial, legal and regulatory context of innovation.

Encouraging digital innovators

Innovate UK's support strategy begins with our customers.

The potential power of the digital economy should tempt us to revisit every service, every supply chain, every channel to customers. But not all businesses have the knowledge and confidence to innovate with this technology. We see two main constituencies of digital innovators: the technical expert providing technology and digital solutions, and the digital champion driving change through an established business. These groups differ in company scale and in agility of action; this is a major theme underlying our strategy.

We will:

- ensure that business support, encouragement and investment is available to those developing digital ideas
- help early-stage digital businesses to connect to established businesses and potential lead customers in industry and government
- help established companies find the innovators who can help them develop digital solutions, including bringing digital expertise to bear on Innovate UK's activity in health and care, transport, energy, built environment and creative industries
- help these digital innovators to drive change, whilst managing risk to existing business flows
- encourage innovators in different sectors to share knowledge, develop common approaches and translate and reuse experience from other industries.

Case study

IC tomorrow: Second Sync

Our IC tomorrow programme combines project funding and business support to help digital innovators in early-stage companies to develop ideas in collaboration with established companies that want their input as they digitise.

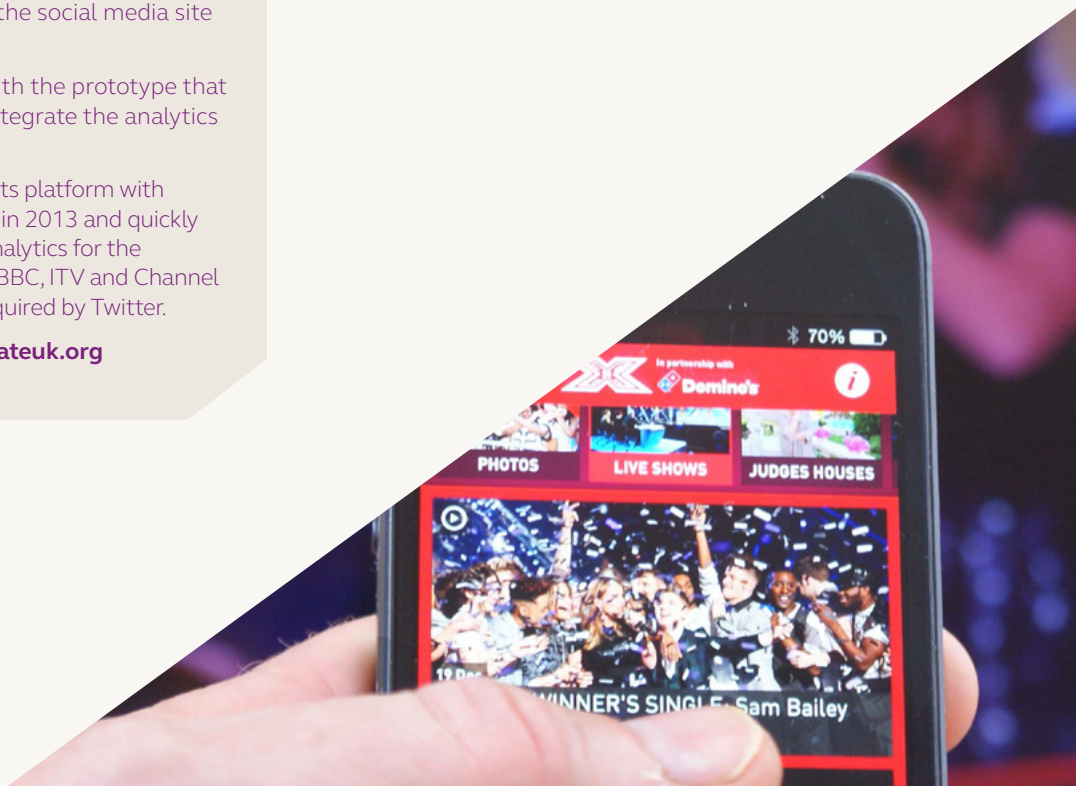
Television production company Fremantle Media set an IC tomorrow 'innovation in TV and film' challenge for businesses to come up with a second-screen app to work in tandem with some of its live event shows, such as X Factor.

Winning company Second Sync proposed a Twitter analytics dashboard to provide live reports on the sort of chatter taking place on the social media site during a specific show.

Fremantle was so impressed with the prototype that it contracted Second Sync to integrate the analytics platform into the X Factor app.

Second Sync further developed its platform with the help of Innovate UK funding in 2013 and quickly became the 'go-to' provider of analytics for the television industry, including for BBC, ITV and Channel 4. The company was recently acquired by Twitter.

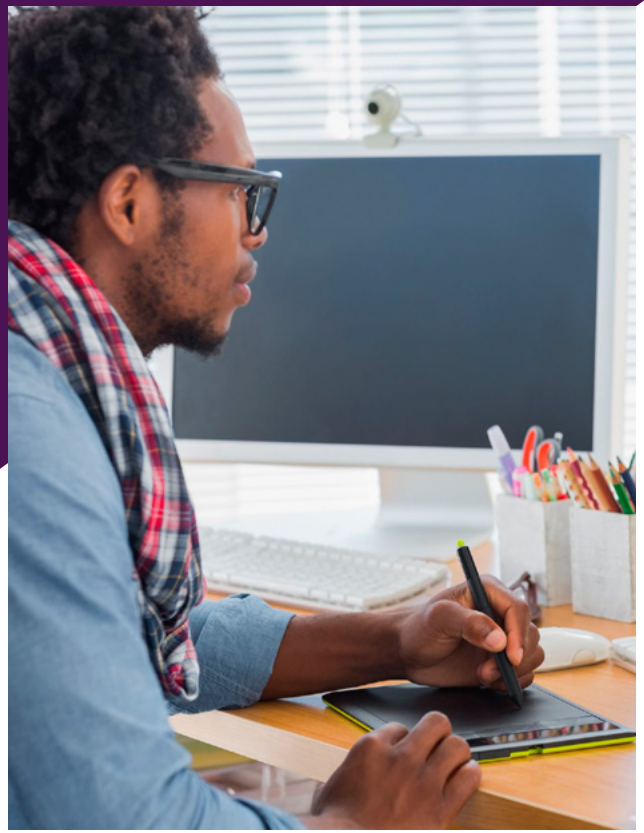
Visit http://ictomorrow.innovateuk.org



Our digital economy **strategy**

continued...

"Understanding users and their needs is of paramount importance to all businesses."



Focus on the user

Good business strategies begin not with the product, or the commercial model, but with the user.

Understanding users and their needs is of paramount importance to all business – from digital start-ups to existing businesses that are digitising. Once they understand this, they can design elegant solutions that provide an excellent user experience.

This is more evident when designing direct customer-facing products, but remains true further upstream for those offering services to other businesses. Somewhere, there is always a human.

We will:

- encourage digital businesses to think about their users' needs and the user experience at every step of product development
- ensure that digital products are trusted, by helping businesses to design their systems for resilience, privacy and consent, identity management and data security
- help businesses to develop products that are available when needed, and that relate and adapt to the place and context within which they are used
- invite businesses to consider inclusive or adaptable designs, so that they can create a compelling experience for the broadest possible market.

Equipping the digital innovator

Digital innovation requires the deployment of technology into business systems. To create a user experience requires products and services, and to create these requires engineering and business design.

We will:

- support tools and systems that streamline transaction flows; that allow data, content, metadata, value and permissions to be moved seamlessly without manual intervention; that are trusted by businesses; and that protect the value of digital assets
- help businesses to develop technology and services that bring the benefits of the digital world into the user context of the physical world
- work with data and content owners on tools and systems to improve the quality of existing and future data sources and their suitability for secondary use, and with web and mobile service designers on tools for software design that take advantage of these resources
- help businesses to build confidence in the commercial and user value of their products.

Creative industries

Our digital economy strategy will draw inspiration from the creative industries[5] for the foreseeable future, and our strategies in the two areas are very closely linked. In the creative industries, and in adjacent sectors such as education, many business flows now centre on the movement of digitised creative goods and 'content'.

The creative industries have led innovation in many aspects of the digital economy and, from a digital innovation point of view, the issues surrounding digital content mirror those surrounding data. The data-using communities have much to learn from those who have gone before.

We will continue to deliver Innovate UK's creative industries strategy in close liaison with this digital economy strategy.

Our digital economy **strategy**

continued...

> "We will encourage industry-wide common practice to broaden the market for suppliers and users"

Growing infrastructure, platforms and ecosystems

The digital economy is connected. Communications networks move data and deliver services; the traffic is handled by software and data management platforms; devices provide the final bridge to the real world and the user. This intricate system is joined together by tools and interfaces that connect businesses into digital supply chains, facilitating data transfer, transactions, payments and hand-offs of metadata and security information.

Each of these elements has the potential to create a marketplace for users and suppliers. Interoperability, open standards and architectures, and interfacing standards such as APIs (application programming interfaces) and metadata standards all contribute to market defragmentation, as do regulations to promote open competition and free trade.

We will:

- support businesses developing interoperable infrastructure and software platforms and enablers that can be used by multiple client businesses, and encourage industry-wide common practice to broaden the market for their suppliers and their users
- support new entrants to build up digital ecosystems around these platforms, and help them with tools and connections, until the activity reaches a critical mass that enables them to scale. This encompasses interoperable open systems ranging from open data to 'internet of things'
- help communications and device businesses, and software and data systems businesses, to work together with service and applications businesses to support one another's investment cases and to design complete user solutions
- work across Europe and worldwide to help establish common practice and fluid trading systems that will support UK digital innovators as they export.

Ensuring sustainability

Digital innovation draws on information and communication technologies and component hardware. We support the development of this capability through our enabling technologies strategy[6]. But digitisation is not just about technology. It streamlines and reroutes business processes and workflows, it disrupts the way we manage transactions and how we think about value, and it redesigns human experiences and changes the way we interact with one another.

In our digital strategy, therefore, we must also draw upon social and economic science, understand the role of law and regulation, draw on design expertise and consider the psychology of the marketplace. This requires multidisciplinary effort and often raises questions for policy makers or exposes unanswered questions for research. Innovate UK, in collaboration with Forum for the Future and Aviva Investors, has developed the Horizons framework (http://horizons.innovateuk.org) to guide thinking in these areas.

We will:

- work closely with the UK research councils to encourage cross-disciplinary academic collaboration and help connect it to real-world business needs
- work with government and regulators to ensure that legal, regulatory and policy frameworks are supportive of digital innovation and business growth, and collaborate in delivering those policy initiatives that invite business innovation
- work with skills agencies and universities so that appropriate skills are available to both product designers and individual and commercial product users, to ensure confident deployment and adoption
- use, and encourage others to use, the Horizons framework when developing strategies and plans
- work alongside other support bodies and the third sector, so that our support for commercial progress can be balanced with support for social progress.

Delivering our programme

We will use whatever tools are suitable and available to us to deliver our programme. This includes the funding of R&D, but just as important will be knowledge transfer activities and the targeting and coordination of specific projects and campaigns. We will work in close partnership with the Knowledge Transfer Network and Tech City UK, and will achieve many of our objectives through the work of the Digital Catapult and the Open Data Institute.

For specific details of our competitions for project funding, networking opportunities, events and other work please see our Delivery Plan, published annually, at www.innovateuk.gov.uk

References and sources

[1] Department for Business, Innovation and Skills, Information Economy Strategy, www.gov.uk/government/publications/information-economy-strategy

[2] Neelie Kroes (May 2012)

[3] Gartner, Forecast: The Internet of Things, Worldwide, 2013, www.gartner.com

[4] McKinsey, Big data: The next frontier for innovation, competition and productivity (May 2011), www.mckinsey.com

[5] Innovate UK (2013), Creative Industries Strategy 2013-16, www.gov.uk/government/publications

[6] Innovate UK (2013), Enabling Technologies Strategy 2012-2015, www.gov.uk/government/publications

Image credits

Front cover - Jenny Griffiths, founder and CEO of Snap Fashion, a digital search business supported by Innovate UK

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Innovate UK is the new name for the Technology Strategy Board – the UK's innovation agency.

We know that taking a new idea to market is a challenge. We fund, support and connect innovative businesses through a unique mix of people and programmes to accelerate sustainable economic growth.