HM Government

Industrial Strategy: government and industry in partnership





Information Economy Strategy

June 2013

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Ministerial Foreword

The information economy is transforming the way we live and work. It is crucial to our success on the global stage, our competitiveness and our connectedness – to our whole economy.

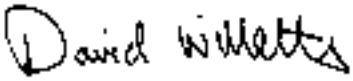
In the UK we have a strong history of innovation, from Alan Turing, the "father of algorithms", to Tim Berners-Lee, inventor of the World Wide Web. Today we have world leading computer science departments, highly innovative technology businesses, and a pioneering approach to open data and transparency.

If we want to retain our strength in the information economy, then we cannot stand by. We need concerted joint action from Government, industry and academia, working in partnership towards the success of the sector, and ensuring that the benefits are felt across the rest of the economy.

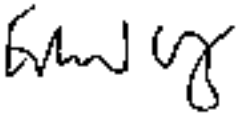
We are not starting from scratch. The Government has already committed to making the UK the best place in the world to start a technology business. We have implemented innovative policies to make that happen, including the new entrepreneurs' visa and abolishing stamp duty on shares traded on growth markets such as AIM. We have put over £220 million behind developing high performance computing and e-infrastructure to take advantage of the data revolution. We are investing over £650 million to achieve a transformation in broadband in the UK by 2015.

There is plenty more to do. The information economy brings massive opportunities, but only if Government, industry and academia work together to make it happen. Our education system must focus on developing creators of technology, as well as confident users. So working with industry and academia we will develop a plan to improve our digital skills, from ensuring everyone can make the most of digital technology, to training the next generation of innovators. We also want to ensure we retain our competitive advantage in data science and algorithms, through a data capability strategy. And the Government will shortly be publishing further details on its approach to digital connectivity, content and consumers, building on work led by the Department for Culture, Media and Sport.

Given the huge potential of the information economy, and the rate of technological developments, this Strategy cannot be the last word on this matter. It must continue to evolve. The new Information Economy Council has a key role to play here. Perhaps more importantly though, we want everyone to be able to contribute to our Information Economy Strategy through http://www.intellectuk.org/information-economy. Because, as Tim Berners-Lee tweeted at the London Olympic Games opening ceremony: “This is for everyone”.



David Willetts
Minister for Universities
and Science



Ed Vaizey
Minister for Culture, Communications
and Creative Industries

Industry Foreword

The UK's prospects in the global race for growth, innovation and new industries depend on harnessing the benefits of the information revolution which is transforming economies and societies at an astonishing speed. This is a vital sector, generating high value, high skilled jobs and huge value add for the UK economy, but it is also a key enabler for every other industry in the country.

Over the last generation, UK citizens and companies have led the world in creating and using technology – improving not only our economic efficiency and productivity, but social and personal outcomes across areas as diverse as healthcare, communications, retail and education. The dynamism of the UK's information economy is one of our true strategic advantages.

As UK technology companies are all too aware, strategic advantages must be constantly strengthened to keep ahead of the competition. To benefit from the new wave of information technologies, the industry will have to evolve – whether market leading tech companies adapting to new innovations or the rising stars of tomorrow growing from tech startups to mature industrial players.

This means ensuring the UK is attractive for talent and investment by making the long term, sometimes difficult, improvements to the sector's environment. We must sharpen our skills, update our infrastructure, protect our citizens and systems, and leverage our valuable assets in data and human capital. Critically, we must also ensure the benefits of technology are accessible for every citizen in the UK.

Government, industry and research organisations all have a role to play in driving this forward, and that's why the Information Economy Council is focused on bringing all three to bear on these critical issues. This Strategy is a framework for the work we will take forward together over the coming months – we have much to do, but the UK has a lot to gain.

Victor Chavez
President of Intellect and CEO of Thales UK

1 Executive Summary

A revolution in information and communications technology is transforming the way we live and work. A recognisable new dynamic force – the information economy – has emerged, and is transforming every other sector. It is changing the way we deliver education and business services, design buildings and cities, and manufacture engines and cars. The UK's ability to achieve strong sustainable growth is highly dependent on a thriving information economy.

The fast-evolving nature of the information economy means we must exercise caution in our approach to industrial strategy to this field. Few of the dominant companies today were household names a decade ago, and many former market leaders have fallen by the wayside. The success stories of the next few decades may well emerge from companies and individuals currently unknown to the wider economy.

But this is not to say we should simply sit back and await change. We can look ahead to the technological innovations of the coming years and prepare ourselves. Industry, academia and the Government all have crucial roles to play. The cross-cutting and pervasive nature of software, IT services, communications and data management, which define the information economy, represent more of an eco-system than a discrete sector.

Without long term action and planning to address skills shortages, organisations will struggle to recruit the right staff. Without the right infrastructure, both physical and virtual, businesses will struggle to develop. Without good cyber security, business and consumers will not have the confidence to use new technologies. Without action to address market failures, our information economy could be stifled by unnecessary barriers to growth.

This Strategy, developed in partnership by Government, industry and academia, sets out a road map to help the UK accelerate in the global race, focusing on our strengths. Our new Information Economy Council, made up of representatives from Government, business and academia will set the agenda for actions towards this Strategy, and monitor progress. It will consider the work of other relevant groups with a view to keeping this Strategy updated and relevant.

Closely linked to this work, the Government will shortly be publishing further details on its approach to digital connectivity, content and consumers, building on work led by the Department for Culture, Media and Sport.

Our Vision

Our shared vision is for a thriving UK information economy enhancing our national competitiveness, with:

- A strong, innovative, information economy sector exporting UK excellence to the world
- UK businesses and organisations, especially small and medium enterprises (SMEs), confidently using technology, able to trade online, seizing technological opportunities and increasing revenues in domestic and international markets
- Citizens with the capability and confidence to make the most of the digital age and benefiting from excellent digital services.

Our long term success will be underpinned by:

- A highly skilled digital workforce (whether specialists who create and develop information technologies, or non-specialists who use them)
- The digital infrastructure (both physical and regulatory) and the framework for cyber security and privacy necessary to support growth, innovation and excellence.

Driving Growth Through Data Science

Business sectors across the economy are being transformed by data, analytics, and modelling. Data is increasingly being produced at a rate that means that current techniques are insufficient to fully exploit it. The UK now has the opportunity to take a lead in the global efforts to deal with the volume, velocity and variety of data created each day. This will require continued infrastructure investment, such as high performance computing and data centres. We have a strong history in the development of algorithms and our universities remain world leaders in computer science research. The Government will publish a data capability strategy in October, in partnership with industry and academia. This will set out further actions to take leadership and advance our capability and capacity in data for growth.

The public sector holds and analyses a vast amount of data, and is leading the world in making that data available. Central Government is leading the way on transparency. We have committed to consult over the summer on options for data release or sharing of some VAT registration information. The Charity Commission has announced plans to make available data from the public register of charities by March 2014, and recognising the continued importance of the Postcode Address File (PAF), Royal Mail have agreed to provide the PAF free to independent micro businesses for one year and free to independent small charitiable organisations. We are also issuing a call to arms for open data in local government.

Improving skills

To reap the economic and social benefits of the digital economy the UK needs a strong flow of future talent, a skilled workforce and a digitally literate population. We need people who can use devices and apply technology as well as people who can invent and develop the devices and technology of the future. But whilst young people are increasingly using digital devices, data shows a decline in the number of students studying Information and Communication Technology (ICT) subjects over the past 10 years[1]. The Government is working with industry and other players to develop a new computing curriculum in England which is due to start in September 2014.

Business, academia, local bodies and skills organisations must work in partnership to develop a high level digital skills strategy. Specific areas for action will include: the promotion of innovative teaching tools in schools, work to encourage young people and especially girls to pursue a career in ICT, seizing opportunities presented by Massive Open Online Courses, and making it easier for people to develop and upgrade their knowledge and skills through vocational conversion courses, one year masters degrees and technical diplomas.

Government will also focus on supporting digital learning in higher education. Industry, Higher Education institutes and skills organisations will work together to create a programme of Massive Online Open Courses, linked to existing and developing industry supported products, for computing and data science. E-Skills UK is working with the sector to build on the ICT Higher Apprenticeship to create a route into a full honours degree.

Helping SMEs Online

The UK has the most advanced online market in Europe, but recent studies show that fewer than a third of UK SMEs transact online[2]. Industry, in partnership with Government, will launch a programme this autumn to get more SMEs trading effectively online. Our intention is to reach 1.6 million businesses over the next five years.

Supporting Innovation and Growth

There is considerable misunderstanding about the shape of the information economy. The overwhelming majority of information economy businesses – 95 per cent of the 120,000 enterprises in the sector – employ fewer than ten people[3]. There is also a small number of large global companies in the information economy, which are household names, who play a fundamental role in shaping the industry. This Strategy focuses on creating the environment in the UK that allows information economy businesses large and small to innovate and thrive. A key part of this Strategy will be supporting SMEs, in order to meet our ambition that the UK is the best place in the world to start and grow a technology business.

Innovation is the lifeblood of the information economy sector, where companies must adapt, evolve, and work together to create new products and services, as well as entirely new business models and markets. Information economy firms are often highly innovative, and the new Information Economy Council will work with the Intellectual Property Office to help SMEs in the information economy make the most of their intellectual property.

Government Services and Procurement

We are transforming the way that people interact with Government, and in the next 300 days we will transform 25 of the top 50 public services across eight different Government departments.

Central Government spends £7 billion a year on IT. The majority of the major contracts that make up this spend will come to an end in 2014-15. We have made sure that the barriers to entry that Government has – for years – put in the way of small businesses have been lifted. Through the reform of procurement and as a result of the Government's agile approach to delivering better services, we will not renew long-term contracts.

We have an aspiration that 25 per cent of central government procurement spend should be with SMEs directly and in the supply chain by the end of the Parliament. As part of efforts to deliver the 25 per cent aspiration and achieve better value for money for the taxpayer, we think at least 50 per cent of spend on new Government IT could flow to SMEs. And in the exceptional cases where large IT contracts are required, we will expect at least 25 per cent of the supply chain of those contracts to go to SMEs.

The G-Cloud programme is simplifying processes and creating a competitive and transparent marketplace. The Government has also introduced Contracts Finder, a free online tool to help businesses find information about opportunities to supply to Government.

Infrastructure

There has been significant recent commercial investment in broadband infrastructure, and the UK compares well with other countries in Europe[4]. By 2015, average broadband speeds will be at least three times faster than in 2010; 10 million more homes and businesses will have access to superfast broadband, an increase of 75 per cent; and large parts of the country will have access to high speed 4G mobile broadband services, with 98 per cent coverage in place by 2017.

In parallel the Government is undertaking an ambitious programme of investment to boost digital access across the UK with a total of £1.2 billion of public funding from central Government, local authorities and the devolved administrations. The Government is considering further options for how those in hard-to-reach areas can access superfast broadband.

We want the next generation of mobile technology to be developed here in the UK. We have got a head start. The new 5G Innovation Centre at the University of Surrey has already secured over £50 million of research funding from Government and a consortium of mobile operators and infrastructure providers from around the world. This centre will establish the world's first live operational test bed for 5G technologies and services, putting us at the forefront of influencing and informing new global standards in 5G. It should be a catalyst for research at universities elsewhere in the country.

Technology companies and research labs need access to radio spectrum for research, trials and development work. In order to drive efficient use of spectrum, Government has asked Ofcom to investigate the creation of an automated online geolocation database aimed at providing on-demand, short term spectrum licences for research and development (R&D) into 5G and other advanced communication systems.

Privacy and Cyber Security

With data at the heart of information economy growth opportunities, it is vital that the UK is effective in managing complex privacy and security challenges. Domestically and in international settings Government will continue actively to support a proportionate data protection framework. On Identity Assurance, Government is working closely with industry, privacy advocates and consumer groups to develop a solution for Government services and set informed minimum standards.

Cyber security underpins the information economy. Without it businesses and consumers would not have the trust and confidence to use the internet and other digital technologies. Government is delivering the commitments made in the National Cyber Security Strategy – with eleven leading universities awarded Academic Centre of Excellence for cyber security research status, sponsorship of 78 PhDs and funding for two Research Institutes. We are developing new routes for transferring cyber know-how between GCHQ, research institutions and industry; this will capitalise on the current active interest in investing in cyber on the part of high-tech venture capital funds and technology multinationals. The Cyber Growth Partnership will work collaboratively with the Information Economy Council.

Engagement

We are not starting from scratch, as the number of initiatives already underway in this area demonstrate – but through this Strategy, Government and industry will work together to bring greater coherence to these existing actions and focus on what has the most impact. Where there is further and new work to be done, we will tackle it in partnership.

This is the start of an ongoing journey, and this Strategy cannot remain static. New inputs will come from the market, groups and the public which will be considered by the Council in due course. We welcome continued engagement and contributions to the implementation of this Strategy as we work towards our vision for a thriving information economy in the UK.

2 Context and Outlook

Key Facts[5]

- The ICT sector contributed around 8 per cent (£105 billion) to GVA in 2011 (at current prices)
- There were 1.3 million jobs in the ICT sector in 2011
- Online purchases by consumers grew by more than six times between 2003-2012
- Only a third of SMEs sell products or services online
- At least four out of five small firms experienced a cyber security breach last year
- Fourteen per cent of adults (7.1 million) have never used the internet
- Apprenticeships achieved in ICT increased by 35 per cent between 2009/10 and 2010/11.

Characteristics

The information economy is a recognisable new dynamic force. At its core, it spans the familiar sectors of software, IT services and telecommunications services, and this is the definition we use in this Strategy. However, the reach of the information economy is broader than this as it is constantly evolving and pushing into new areas. Its metamorphic nature and transformative impact on other sectors means it may be more clearly thought of as an eco-system, though we refer to it as a "sector" in this strategy. This means we may not have an exact picture of the number of businesses in the information economy, or its employment, or the value it brings to the UK economy.

Addressing the lack of clear and universally-agreed metrics will be an early priority for Government and industry. There will be a need for continual re-assessment of scope and definition of the information economy as it evolves.

There are a number of large global companies in the information economy who are household names and have played a fundamental role in shaping the industry.

However, the overwhelming majority – 95 per cent – of the 120,000 enterprises in the UK information economy employ fewer than ten people[6].

Companies working in the information economy are highly innovative, in terms of both products and services[7], as would be expected for firms working in a fast-paced, globally competitive and highly mobile sector. They are also strong exporters, generating a significant contribution to UK GDP by reaching markets across the world.

As providers of digital technologies, companies in the information economy enable all other business sectors, the public sector, academia, and individual users. Of the approximately 1 million IT jobs, only 40 per cent are in information economy businesses[8]. The remainder are in other sectors of the economy such as financial and business services, education, and public administration.

The information economy is characterised by the pace of technological developments, and the inherently unpredictable and often disruptive nature of these changes. New technologies emerge and change markets quickly. As a result, even established information economy businesses must continuously adapt and transform in order to remain competitive.

For citizens and businesses their daily activities increasingly span the physical and digital worlds. Networks are becoming the pre-eminent form of organisation. Many of the things we take for granted in our lives from smart phones to social networks were not in existence ten let alone fifteen years ago. The emerging economy powered by information and connectivity is a new landscape. We have new expectations, new ways of seeing and new opportunities.

The Government's industrial strategy is about looking to the future, developing a long term approach in partnership with business to give confidence now for investment and growth. It involves a whole of Government approach and along with deficit reduction, monetary activism and supply-side reform is a core part of the Government's approach to improving growth. The pace of change in the information economy means though that both this Strategy and Government need to be agile. The Strategy must evolve quickly to remain relevant to the emerging opportunities.

Opportunities

The UK is well placed to take advantage of the information economy, recognised in the World Economic Forum's 2012 Global Competitiveness rankings[9], which placed the UK seventh in the world in terms of technological readiness. This measured the preparedness of our economy to use ICT to boost competitiveness and citizens' wellbeing, and found the UK to have one of the most conducive environments for ICT development, with a sound political and regulatory environment and high levels of ICT adoption by citizens, businesses and Government.

Of the emerging trends and technologies in the information economy, the following form the priorities for the UK and hence for this Strategy. These are areas in which we have existing strength, or which have the greatest potential to be transformative across our economy.

The Data Revolution

The amount of data created and stored each day is rising, so much so that 90 per cent of the data in the world today was created in the last two years alone[10]. With the increase in the availability of both data and computing power, as well as advances in mathematical science and algorithms, business sectors across the economy have the potential to be transformed by data, analytics, and modelling. Data comes from the activities of individuals and organisations, from the world around us, and from our historic records.

"Big Data" refers to ways of handling data sets so large, dynamic and complex that traditional techniques are insufficient to analyse their content. One approach to meeting the Big Data challenge is though high performance computing, such as the UK's £37.5 million investment in Daresbury, or the £189 million funding announced in 2012 for capital investment in data centres and energy efficient computing as part one of the UK's "Eight Great Technologies[11]". The E-Infrastructure Leadership Council, a partnership between Government, industry and academia, is working to ensure the UK has the e-infrastructure it needs to take advantage of these opportunities.

Data science is an increasingly important discipline and one in which the UK has strength. We have a strong history in the development of algorithms and our universities remain world leaders in computer science research. We also have some of the world's most comprehensive historic data sets, such as Meteorological Office records dating since 1880 and NHS data across the whole population.

Information is an unusual good: the more widely it is shared, the more people benefit from it. The taxpayer currently funds the production of an array of information such as legislation; academic research; maps and postcode frameworks; school and hospital performance metrics; and a broad swathe of national statistics. The Government believes that publicly funded information should be freely available; and be provided in formats that computers as well as people can easily read.

The UK is leading the world on open data, through its data.gov.uk portal[12] which brings together over 9,000 data sets into one searchable website, and the world's first Open Data Institute (ODI) which aims to foster the creation of value from open data. The many benefits of open data range from increased transparency and accountability, innovation and data linkage, and creation of economic value.

E-commerce

The UK has one of the most sophisticated and competitive online markets in the world, with the highest share of individuals who purchase goods or services online out of all OECD countries[13]. The UK's online market is the most advanced in the European Union and makes up more than a third of the whole EU online market[14]. With the increase of mobile computing also come opportunities for mobile commerce and more electronic payments.

Mobility and Connectivity

Devices are becoming ever more intelligent, connected, and mobile. With mobile access to computing, individuals and organisations have increased expectations on how we can use systems and keep connected. People and businesses expect the right information to be available, all the time, and anywhere. Through trends such as cloud computing, software services and data are hosted away from users but are accessible on demand, any place or time. Cloud computing provides new opportunities for businesses and organisations to reduce running costs, work collaboratively and deliver new services.

Despite the advances in the information economy we have seen already, we are still only in the foothills of a fully connected world. The Internet of Things, seen by some as the next phase of the internet, is a concept where not only people but objects and devices are able to network and communicate with each other. It will involve an increase in machine-to-machine (M2M) communication, with up to one trillion devices or "things" which could be connected to networks across industries.

Smart cities will be a live application of the Internet of Things, where transport, energy, environmental and healthcare systems are much more interconnected – reducing costs, providing new services, and driving efficiencies, all for the benefit of the citizen.

Government as a Catalyst

The ambition to deliver digital public services so good people prefer to use them was set out Government's Digital Strategy published in November 2012. It is founded on the premise that digital services should serve the needs of the users, rather than reflect the internal structure of government, and that this requires a revolution, not an evolution, of the approach towards the use of information and technology within government. We believe that the government and the public sector can be an international beacon for digital creativity and excellence.

This Strategy also sets out the ambitions of the Government and sector to work in partnership to work to address the challenges of improving digital literacy, infrastructure and cyber security. Government also plays a role in markets as a procurer of goods and services.

Challenges

There remain challenges which we must overcome, or work around, in order for the UK information economy to continue to thrive. Prime among these is the truly global environment in which the information economy sector operates, more so perhaps than any other business sector. The intangibility and ease of distribution of many information economy products and services allows truly global competition.

The major players in the information economy – those relatively few but massive household names – are predominantly based in the US or Asia. There are however opportunities in the information economy for other countries to play to their particular strengths, and we see this reflected in the information economy strategies of countries like Germany, Singapore, Finland, Estonia and Israel. The UK, therefore, must look closely at its own capabilities and strengths, and consider where we should focus our efforts.

Because critically in the information economy, we recognise that we operate in a global environment, we must work internationally, in areas such as the promotion of open standards or the governance of the internet. In this, a strong partnership between industry and Government is vital, with each understanding the needs of the other and where they can influence.

We must also consider those qualities that set us apart in the global market – for better or for worse. This means ensuring that our business environment remains attractive to inward investment including relevant factors, for example with respect to skills, clusters and quality of life. The UK also has a reputation for combining a conducive business environment with privacy and security, maintaining a fair and proportionate data protection framework, ensuring that the needs of business, academia and individuals are balanced.

Change is disruptive. Entire industries are transformed by networked technology. The need for some products and services diminishes as opportunities for new offerings emerge. Not too far into the future, manufacturing will be transformed as 3D printers across the world increasingly fabricate goods on demand. For those at work this may mean disruptive change too. An essential part of this Strategy therefore is ensuring that the workforce has the skills it needs to take advantage of the opportunities.

The Partnership and Action Plan

Putting this Strategy into action requires a strong partnership and cooperation between Government, business, academia, and other key players in the information economy.

The Government has established the Information Economy Council[15] as a key step to promoting an ongoing partnership between these various players, with the ambition of securing the long term competitiveness of the information economy sector.

The Council will set the agenda for future activity, monitor progress against the actions set out in the Strategy and assess the impact of Government interventions on the sector. Progress will be reported regularly through the Council's website.

One of the Council's early priorities is to address the lack of clear and universally-agreed metrics about the information economy sector. The Council will also prioritise the skills and standards issues identified in the Strategy, and analyse the growth challenges of small businesses in the information economy sector.

This Strategy covers a mix of reserved and devolved issues. A lot of work has already been done at the devolved level. Whilst many policy responses will be the same across the UK, these will be delivered via different channels or brands across the devolved administrations.

3 Actions: A Strong, Innovative Information Economy Sector Exporting UK Excellence to the World

We want a strong and growing UK information economy sector that leads the world in developing new digital technologies and taking them to global markets. The UK's innovation ecosystem must support this by investing in research, encouraging collaboration between business and academia, and enabling the successful commercialisation of ideas. The UK must also, through its approach to standards and its regulatory framework, promote open global markets.

Promoting Innovation in the Sector

Innovation is the lifeblood of the information economy sector, where companies must adapt, evolve, and work together to create new products and services, as well as entirely new business models and markets. Information economy firms are often highly innovative, and as such, it is important for companies to understand their intellectual property rights and how to protect them.

The Hargreaves Review[16] of intellectual property (IP) and growth in 2011 concluded that SMEs in particular often struggled to make the most of their IP, and needed access to affordable basic advice on IP. The Intellectual Property office provides a range of products and services to support SMEs to make the most of their IP, including funding strategic IP audits for selected businesses, and launching a training package later this year for SMEs and their advisors to improve understanding of IP.

Action: The Information Economy Council will work with the Intellectual Property Office to publicise these opportunities to information economy businesses, enabling them to make the most of their intellectual property.

Innovation is also supported by our high quality research base, led by the UK Research Councils. The Research Councils' ICT and digital economy themes have been notable agents of transformational change, evolving new ways of carrying out internationally leading multidisciplinary research and supporting high quality research students from new sources.

The Technology Strategy Board (TSB) is the UK's innovation agency, bringing together business, research and the public sector to accelerate economic growth by stimulating and supporting business-led innovation. It has an extensive programme of activities to support the information economy, including a collaborative R&D Programme and an ICT knowledge transfer network. It has also provided funding for the Open Data Institute for its development of an ecosystem of companies large and small that use open data.

Most recently, the TSB announced a new Connected Digital Economy Catapult that will begin its first projects in summer 2013 with funding of up to £50 million over five years. Working in collaboration with leading business, research and innovation partners, the Catapult will address gaps in the digital economy innovation landscape and help make it easier to take innovative products and services to market. The TSB also runs the Small Business Research Initiative (SBRI) which helps innovative technology companies engage with the public sector to solve policy challenges. Since 2009, SBRI has awarded 1200 contracts worth over £100 million in total.

Clusters

It is widely recognised that industrial clustering can bring benefits for the businesses and organisations involved. Clusters create an environment where companies can collaborate and innovate. Successful clusters help companies attract the best people and investment. There are number of established and emerging digital technology clusters across the UK including Cambridge, East London, Manchester, Glasgow, Bristol, Malvern and Sunderland. These, and other, smaller, clusters feature highly on the priorities of the relevant local enterprise partnerships (LEPs).

In April 2013, the Tech City Investment Organisation in East London brought together over twenty leaders and influencers from technology clusters across the UK and Northern Ireland for the first ever Technology and Business Cluster Summit. This led to the creation of the UK Tech Cluster Alliance. One of the main objectives of the Alliance is to help gain further insight into the needs of technology clusters. The Alliance set out a number of themes that will shape its future work, namely: the need to change cultural perception around technology and entrepreneurship; nurturing talent and skills; supporting high growth businesses; commercialising great ideas; and preventing intellectual property from leaving the country.

Case Study: Greater Manchester

The digital industries in Greater Manchester account for 7,300 businesses employing 45,770[17] people and generating approximately £2 billion per annum of economic output[18]. Alongside MediaCityUK, a £650 million digital media complex which is the new home of ITV and the BBC, the Sharp Project in East Manchester, is developing the next generation of digital businesses.

The digital sector is thriving and there are many examples of small businesses getting investment and growing. Joining the 47 digital businesses already at Sharp is EON Reality, one of the world's leading interactive 3D solutions providers for businesses and education, which has established its European HQ and R&D centre onsite. At the corporate level Cisco, IBM, BT and Virgin Media all have sizable presence in Greater Manchester.

Access to Finance

High-potential tech start-ups and small businesses in the information economy sector can face particular barriers in accessing the finance to grow into medium and large-sized firms. Technologically innovative ventures which are novel or consist mainly of intellectual property present particular challenges to investors. Tech entrepreneurs often lack tangible assets, and early stage ideas may not pay off in the timescales investors seek.

The Government has taken steps to improve the investment environment for tech companies and start ups. In Budget 2013, the stamp duty on shares traded on growth markets, such as the Alternative Investment Market (AIM), was abolished and the tax breaks offered to investors in a Seed Enterprise Investment Scheme were extended into tax year 2013/14. The London Stock Exchange is also reforming rules to make entry to the public market easier for entrepreneurs. The Intellectual Property

Office has also commissioned research to investigate barriers to the use of intellectual property rights and related intangible assets for debt and equity fundraising.

Venture capital markets in the US tend to be more comfortable with technological sectors than those in Europe, but there is a small but increasing number of UK Venture Capital partnerships developing specialised funds for early-stage investment in high tech firms. UK Trade and Investment's venture capital unit helps high growth and innovative technology and life sciences companies access early stage equity investment. A noteworthy success was attracting Tech Stars, one of the world's premier accelerators, to choose the UK as its first international expansion.

Action: The UK Tech Cluster Alliance will work with the Information Economy Council and the various tech clusters in the UK to promote and facilitate connections and identify common barriers to growth. This will include consideration of access to finance issues such as the availability of venture capital or alternative forms of financing. We will also work to champion all UK tech clusters internationally to attract international investment.

Case Study: Duedil

Duedil is a London-based FinTech firm. It aggregates company data from multiple sources, links it and provides it online as part of a freemium business model, with the basic product free of charge and advanced due diligence features accessible for a premium. This data analytics and visualisation engine covers 20 years of information on companies registered across the UK and Europe. Duedil has attracted continued investment by innovating in the business information space, making information on private companies easily accessible and demonstrating sustained growth.

Duedil's most significant round of venture funding recently resulted in an injection of $5 million, led by Notion Capital and joined by US VC firm, Oak Investment Partners. This funding is being used to grow the company's data science and engineering teams to further develop Duedil's open data platform. The recent funding has also enabled Duedil to begin expanding internationally, opening data in 20 new markets via its Application Programming Interface (API) in May 2013.

Interoperability and Standards

Business users and consumers want more not less interoperability – to pull the threads of their operations or lives together and to remove barriers. Successful technology products and services depend on interoperability across different platforms and international boundaries, underpinned by an internationally-accepted framework of standards which promote competition and growth in the information economy sector. Increasingly, particularly in the information economy area, standards

are being produced by organisations with no direct state links – so called "informal" or "consortia" standardisation.

Action: The Government, working through ETSI, BSI and other bodies in the standards field, will bring together a range of stakeholders to align programmes, to build on existing knowledge and to put the UK in the best position to influence future standards at an international level.

We will focus on ensuring that key building block standards are deployed – to enable businesses to easily build innovative systems which remain open to further new ideas. This will include promoting the use of standards for IPv6 and securing DNS. Alongside this we will ensure that new large concepts such as cloud computing, 5G mobile and Internet of Things are better defined to enable ideas to be easily incorporated into standards and services.

Market Opportunities

Supply Chains

Given that the information economy is a relatively new sector the nature of its supply or value chains have been subject to some study. Within the information economy the traditional linear supply chains of other business sectors are less likely to be observed; instead, there are more complex supply networks or ecosystems. The broad reach of digital technologies also means that information economy businesses are in many cases an integral part of the supply chain of other business sectors (such as automotive manufacturing or financial services), as well as within their own sector.

The Advanced Manufacturing Supply Chain Initiative was launched in 2011 to strengthen the capability of UK businesses in global supply chains. The first round of funding made up to £125 million available to help UK supply chains achieve world-class standards and encourage major new suppliers to locate in the UK. A second round is currently underway with £120 million to fund R&D, skills training and capital investment, with a single pot open to all companies in manufacturing supply chains, including those from the information economy sector.

UKTI's new Technology Partnerships programme seeks to increase the international performance of UK high-growth technology companies through direct trade, collaboration and partnerships with global value chains. Through better understanding the future technology needs of multi-national and large national companies the programme helps companies access opportunities and create commercial partnerships.

Action: The Information Economy Council will lead action to promote the opportunities available through the Advanced Manufacturing Supply Chain Initiative and the Technology Partnerships programme, with the aim of increasing the number of successful applications from the information economy sector.

Public Procurement

The Government is rebalancing how it purchases technology to deliver fit-for-purpose services. This new approach, based on openness, makes it easier for companies, including SMEs, to supply to Government. It also provides more support for innovation and greater transparency, whilst providing users with services which are agile and responsive to changing needs.

The G-Cloud programme[19] is simplifying processes and creating competitive and transparent marketplace, supported by a 'Cloud First' policy for central Government. This makes it easier for SMEs to supply to Government, demonstrated by the fact that SMEs have taken over 60 per cent of G-Cloud sales to date. Of the 708 suppliers involved in the latest G-Cloud framework, G-Cloud iii, 83 per cent were SMEs. Government is also launching a Digital Procurement Framework for the supply of Agile software development services, and like G-Cloud, it will be designed to be attractive to SMEs.

The Government has also introduced Contracts Finder[20], a free online tool to help businesses find information about opportunities to supply to Government. Contracts Finder includes tenders worth over £10,000, sub-contracting opportunities, what is coming up in the longer term and details of previous tenders and contracts in England. A number of large suppliers, including Hewlett Packard, CapGemini, Capita, and CGI have also committed to publishing subcontracting opportunities on the site. Similar sites are available for Scotland, Wales and Northern Ireland.

We have an aspiration that 25 per cent of central government procurement spend should be with SMEs directly and in the supply chain by the end of the Parliament. IT presents the best opportunity to meet and exceed this expectation.

Central government spends £7 billion a year on IT. The majority of the major contracts that make up this spend will come to an end in 2014-15.

We have made sure that the barriers to entry that government has – for years – put in the way of small businesses have been lifted. G Cloud, Contracts Finder and Mystery Shopper are just some of the concrete steps we have taken to make it possible for SMEs to do business with government.

Through the reform of procurement and as a result of the Government's agile approach to produce better services (as detailed in the Government Digital Strategy), we will not renew long-term contracts. Instead Government will be able to break down these contracts to specific tasks. This will minimise risk and cost whilst producing better services, and allow a host of new vendors, including SMEs, to competitively bid for public work.

As the market sees the costs of technology fall and the capability of cloud services grow we anticipate this more dynamic, more open market will develop with a higher level of SME involvement and reduced costs for Government – and this is already

happening. More than 60 per cent of the contracts let through the G Cloud have gone to SMEs and we anticipate this being the new normal for Government contracts.

As part of efforts to deliver the 25 per cent aspiration and achieve better value for money for the taxpayer, we think at least 50 per cent of spend on new Government IT could flow to SMEs. And in the exceptional cases where large IT contracts are required, we will expect at least 25 per cent of the supply chain of those contracts to go to SMEs.

As well as addressing what central government does, Government continues to encourage larger local government and NHS procurement chains to follow similar practice.

Case Study: New Correspondence Handling System for BIS

A new correspondence contract, awarded through G-Cloud, will save BIS £500,000. IT solutions company Fivium, a London-based SME has been awarded the contract for the new BIS Ministerial correspondence handling system – saving the Department around £500,000 on current costs. Fivium will provide the new eCase system, which will replace the current platform in August 2013.

The new contract brings a range of benefits, including: using a shared service for support and cloud hosting; improved reporting facility; improved search facility to enable users to find previous cases relating to the subject.

Government also wants to make it easier for its suppliers once they have won contracts, by encouraging the use of electronic invoicing. Our aim is for central Government to use electronic invoicing for all transactions. Some local authorities and NHS trusts are already using e-invoicing, and have realised significant efficiency savings as a result. Government will not mandate suppliers at this stage, but will look at ways to spread best practice, and will track progress with a view to taking action if required at a later date.

For UK businesses, particularly small and medium sized enterprises, to realise the full benefits of e-invoicing, it is important that the systems are easy to install and use, and pricing is flexible enough to suit the needs of diverse businesses. E-invoicing providers have committed to looking at ways to improve interoperability and accessibility of e-invoicing for SMEs, including through the Business Application Software Developers Association interoperability charter.

Opportunities to Export

Among the G7 nations the UK is the highest net exporter of computer and information services. In 2011 the UK exported telecoms services worth around £5 billion, computer services worth around £7 billion and information services of around

£2 billion[21]. UKTI supported 2,799 companies involved in ICT during 2012/13 and engaged in 67 technology events and missions. It offers targeted overseas missions such as the Smart Cities, Future Cities mission to SE Asia, the Future Health Mission to the US and the Web Mission to India. Its Tradeshow Access Programme supports SMEs to attend trade shows such as the Mobile World Congress in Barcelona.

UKTI and the TSB have worked together on a number of missions to support high growth, innovative and early-stage UK SMEs to visit countries strong in innovation and enterprise. These missions are designed to help SMEs make new connections and meet potential investors, suppliers and customers. The missions have been organised by entrepreneurs for entrepreneurs and are backed by public and private sector support.

The first Cyber Security Export Strategy[22], building on the UK's strength in cyber security, was launched in May 2013. The strategy sets out the commitments the Government has made to promote UK companies in this rapidly growing market, estimated to be worth in excess of £100 billion. The strategy aims to deliver a catalogue of UK companies operating in cyber security, analysis of overseas markets, guidance on emerging export controls and cross-Government co-ordination of effort. Providing greater access to overseas markets for SMEs is a key theme in the strategy, as is the necessity to create pan-Government support for this initiative. One of the principal mechanisms for achieving effective engagement between exporters and Government will be the Cyber Growth Partnership.

Promoting the Sector

The success of the information economy sector in the UK relies on ensuring that overseas businesses and investors are aware of the UK's strengths in the information economy and our supportive environment for businesses who want to locate here. Between Government and the sector, we also need to ensure that the success of the information economy in the UK is championed and promoted, and that citizens and businesses are aware of our track record, and the jobs and services it offers.

UKTI has a package of support designed to reinforce the UK as the location of choice for investors, and to help deliver the Government's aspiration to become the number one European destination for foreign direct investment from emerging markets. This includes building on the success of the Tech City Investment Organisation, enhancing investment support in emerging markets, attracting the world's best entrepreneurs through the Graduate Entrepreneurs Campaign and the Global Entrepreneur Programme.

Action: The Information Economy Council will work with the sector to promote and champion the importance of the information economy to the UK.

4 Actions: UK Businesses Across the Economy making Smart Use of Information Technology and Data

Information economy businesses, and the digital technologies they provide, have the potential to impact and transform companies and organisations across the whole economy. The benefits from digital technologies come from their adoption by all companies and organisations, particularly those where adoption of technology and best practice has been weakest to date. It is our shared ambition that all organisations, especially SMEs, can be confident and successful consumers of digital technologies – able to trade online, seize new technological opportunities, and increase their revenues in both domestic and international markets.

Some business sectors have already been transformed by information economy tools, from news and media gathering, to retailers using real time analysis of customers' shopping habits to transform the services they offer; through to transport and logistics companies monitoring shipments. Other sectors are beginning to embrace the opportunities, for example, the construction sector improving quality and efficiency through building information modelling software. Opportunities for the information economy sector to impact still more deeply include healthcare, FinTech, the creative industries, smart energy and cyber security.

Developing Our Online Economy

Both the European Digital Single Market and the rest of the world offer significant commercial opportunities for our competitive online businesses. However, in many cases companies face different regulations and requirements depending in which country they wish to trade. Complying with these different requirements is time consuming, resource intensive and adds cost, making it more difficult to compete with domestic companies. The fragmented regulatory framework can also sap consumer confidence to buy goods and services cross-border within Europe, hindering the exploitation of the Digital Single Market's potential. These challenges also apply at the wider international level.

The Government has therefore established a time limited e-commerce taskforce consisting of key online companies, SMEs, the retail industry and consumer organisations. Objectives of the taskforce are to identify key barriers and obstacles for industry and consumers to trade cross-border in the EU and recommend industry short-term actions to boost UK cross-border trade. This e-commerce taskforce will

also identify UK negotiating priorities for the EU Digital Single Market to be taken forward. The findings and lessons relevant to furthering e-commerce opportunities beyond Europe will also be actioned.

Action: The e-commerce taskforce will report back in June 2013, with the Information Economy Council taking forward appropriate action as required.

Helping SMEs Online

There are particular benefits for SMEs who make full use of the internet, and associated activities such as e-commerce. According to McKinsey research, they grow faster, export more, and create more jobs[23]. Services such as cloud computing allow companies to operate in a cost effective and flexible way, through mobile access to computing and data, the ability to quickly scale their computing capabilities as business needs change, and digitising back office operations to reduce start up and operating costs.

The UK has the most advanced online market in Europe, and there are opportunities for SMEs to increase their online presence and sales in both domestic and international markets. Rates of international online trading are particularly low, with fewer than one in ten UK SMEs selling to customers overseas. To address this, UKTI has developed the Export Communications Review service and the Web Optimisation for International Trade programme, both of which provide companies with support and advice on improving their export potential for overseas markets. Companies accessing support to trade online will also be signposted to these service.

Case Study: Cambridge Satchel Company

The Internet helps companies not just to grow, but to scale more easily. Julie Deane, founded The Cambridge Satchel Company in 2008 at her kitchen table with capital of just £600. She set up a basic website at little cost and with no prior training. The company which employed just 7 people in 2010, now employs more than 90 people, is stocked in more than 100 countries and has 2 stores of their own, one in London and one in their hometown of Cambridge. From year end 2010 to year end 2011 there was a 60 per cent increase in profits and from year end 2011 to year end 2012 there was an 82 per cent increase in profits.

Case Study: Hall-Fast

The internet helps companies reach overseas markets. Hall-Fast, an Industrial Supplies Company headquartered in Nottinghamshire, used to focus solely on the UK market. Following advice from UKTI, Hall-Fast developed a strong online strategy. It extended its use of the internet, launching 100,000 products on the company website, which grew to 14,000 pages. Over three years this resulted in over £600,000 of sales in export markets and Hall-Fast now has customers in 75 countries around the world.

However, many SMEs are not currently making the most of these opportunities, with recent studies showing that fewer than a third of UK SMEs transact online[24]. The reasons cited by SMEs for not trading online include technical issues, such as reorganising business processes and systems, skills issues, including a lack of specialist knowledge or capability, and trust issues including concerns about security and a lack of trust in available advice.

Action: Industry, in partnership with Government, will launch a programme this autumn to get more SMEs transacting online. The programme will target both those SMEs who are already online in a basic way but are looking to transact online, and those SMEs who are transacting online but are looking to scale up. The intention of the programme is to reach 1.6 million businesses over the next five years. It will build on existing support to SMEs including advice on improving their cyber security and protecting their intellectual property.

The programme will equip both groups with the tools and skills they need to effectively trade online (in both domestic and international markets) and to grow their business, through a series of targeted activities including awareness raising, a web portal with online tools, and a network of digital advice centres offering training, mentoring, and access to voucher schemes.

It is also important to ensure SMEs trust and have confidence in the internet. The Government is seeking to educate businesses and other users on cyber security through guidance for small businesses and the Get Safe Online campaign.

Driving Growth Through Data Science

Using data intelligently to provide insight and value has the potential to transform businesses and organisations, and support our strong research base, by driving innovation and economic growth. Developments in data analytics and access to scalable high performance computing allow for real time analysis of data. Examples of this transformative effect include the processing of share price data in support of real-time dealing on the stock market, virtual prototyping which has transformed manufacturing and design, or the insights into customer shopping habits gained by retailers.

The UK has the opportunity to take a lead in the global efforts to deal with the volume, velocity and variety of data created and analysed each day. With the development of smart cities and the internet of things, as well as advanced research projects such as the Square Kilometer Array (see below), data will increasingly be produced at a rate that means that current techniques are insufficient to fully exploit it.

We need to build the capability and the capacity in the UK to be at the forefront of extracting knowledge and value from data for the benefit of citizens, business, academia, and Government. Excellence in data handling would mean that UK organisations can reap the benefits of big data analytics, and ensure UK information economy businesses are able to export this expertise to the world.

This will require continued investment in and development of the physical and virtual infrastructure, such as high performance computing and data centres. We also need to boost our workforce skills and the research base of data scientists and analysts across disciplines. There is a real opportunity to develop that capability and capacity, and at the same time create new business opportunities, through solving real world problems and challenges. Some of these might come from research and academia, but others may come from Government or from industry itself.

Government holds and analyses a vast amount of data, and is leading the world in making that data available. Deloitte's market analysis[25], published alongside Stephan Shakespeare's review[26] of public sector information in May 2013, gave a value of £1.8 billion per annum as the direct economic benefit from re-use of public sector information, and £6.8 billion per annum when wider economic and social impacts were considered. The Government response to the Shakespeare Review broadly accepts the recommendations, which include the recommendation for a growth-focused "national data strategy" to provide business with clarity about the Government policy on open public data, and provide the certainty needed to encourage innovation and investment in new data-driven opportunities.

We accept this challenge, and would go further still. Our aim should be not only to articulate the Government's future plans on data, but to set out our partnership approach to data science success in the UK. The onus cannot only be on Government to stimulate the market through data release and sharing. Companies

and organisations across business sectors have a vast supply of data to be analysed. They could therefore benefit from advances in data science and analytics. We should explore how industry and academia can collaborate to stimulate development of data analytics – and if there are barriers to doing so, how they can be resolved.

Action: The Government will publish a data capability strategy in October 2013, developed in partnership with industry and academia. The strategy will build on the recommendations in Stephan Shakespeare's review and the Prime Minister's Council for Science and Technology report on algorithms[27], and will be published alongside the Open Government Partnership National Action Plan. The strategy will include:

- Measures to build capability in the commercial and academic sectors
- Opportunities for collaboration on real-world problems, such as through the Open Data Institute, the Government Immersion Programme, or the Technology Strategy Board
- Skills initiatives focused at schools, higher and further education, and continuing professional development

The public sector holds and analyses a vast amount of data, and is leading the world in making that data available. Through the Government response to the Shakespeare Review the Government has announced the following:

- HMRC will consult over the summer on options for making some of the data that it holds more widely available to support the Government's transparency and growth objectives, such as improving access to credit for business. The consultation will include options for the wider sharing of aggregated or anonymised data and the release of some VAT registration information (not including financial data) as open data
- The Charity Commission has announced plans to make data from the public register of charities freely available to download and use by the end of March 2014
- The Government has announced a call to arms for open data in local government, with a local section of data.gov.uk, case studies of best practice, with a revised Transparency Code for Local Authorities expected shortly
- The Government has published its response to the Administrative Data Taskforce report, in which it agrees to work with the research community to develop the capacity and infrastructure to complement the open data agenda by facilitating secure access for research and statistical purposes to de-identified administrative data that can not be made open
- The Postcode Address File (PAF) is a fully integrated part of Royal Mail's business and will continue to remain so. In recognition of the continued importance of this dataset to innovation and growth, the Government has been working closely with Royal Mail to improve the licensing regime and drive greater take-up of the data. The Government is now announcing that, from the beginning of July, Royal Mail

will provide the PAF for free to independent* small charitable organisations and free to independent* micro-businesses for one year. Royal Mail will also be increasing the number of free online address look-ups on its website from 15 to 50 per day. In addition, Royal Mail will consult in July on a radical simplification of the licensing regime for all customers based on a permissive licence with minimal restrictions.

Supporting Academia and Research

The UK is a centre of academic excellence, and just as business sectors have seen their business models transformed by the information economy, so too is our education sector. Our universities, supported by Research Council funding for PhD studentships, play a vital role in the provision of doctoral and graduate level skills which make the UK a good place to develop technologies. Through online offerings such as Massive Open Online Courses, the UK's world-renowned academic sector can vastly improve its reach and its audience, including growing our education exports. Massive Open Online Courses provide the opportunity to address some of our specific information economy skills issues.

The UK research base is world-leading in its efficiency and we rank strongly in terms of international collaboration. The information economy supports data-driven science, where the UK has some ambitious projects in disciplines as varied as bioinformatics, autonomous systems, and radio astronomy. High performance computing and data analytics can support research and development through virtual prototyping, revolutionising the way new products are developed and tested. As computers move from being merely programmable to the ability to "learn", and as more data becomes accessible through cloud computing and open data initiatives, new opportunities arise for the combination and analysis of data from disparate sources in ways that are currently impossible.

* Independent – not associated or affiliated with any existing Solutions Provider

Case Study: Square Kilometer Array

Image Courtesy of SKA

The Square Kilometer Array (SKA) will be the world's largest and most sensitive radio telescope, consisting of thousands of linked radio wave receptors located in Australia and Southern Africa. The telescope will be used to address fundamental unanswered questions about our Universe. This is a global project led by the SKA Organisation based at Jodrell Bank Observatory in the UK. Processing the vast quantities of data which will be produced by the SKA will require high performance supercomputers and analytical techniques far greater than those which exist today. The information economy in the UK can play a key role in developing the software and computing which will enable the SKA to be successful.

5 Actions: Ensuring Citizens benefit from the Digital Age

So far, the impact of IT, the internet and mobile devices has been felt most strongly in the areas of communication, retail and entertainment. However, digital technologies have the potential to transform people's quality of life, and help society address some of our future challenges in areas such as caring for an ageing population, managing natural resources, or running effective public services. Government, industry and academia each have a significant role to play in ensuring that the UK population is empowered to realise the benefits of digital technologies, through rolling out access, improving skills and supporting safe and confident consumers. Good cyber security is essential otherwise consumers will not have the confidence to use new technologies.

Getting People Online

The UK has a mature digital market, but still has some way to go to ensure that all individuals can take advantage of it. Go ON UK assesses that there are 16 million people aged 15 and over in the UK who currently lack the basic online skills to make confident full use of digital tools available to them[28]. ONS data shows that 7.1 million people have never been online[29], and 5.7 million households are without an internet connection[30]. Those who are digitally excluded in this way may miss out on benefits such as applying for jobs or making purchases online, and their lack of online skills may also exclude them from the workplace or socially.

The Government supports a range of initiatives to target the different facets of digital exclusion. It appointed Martha Lane Fox as the UK Digital Champion in 2010, with a remit to encourage as many people as possible to go online and improve public services by driving online delivery. This work is driven through Go ON UK[31] and the UK's Digital Skills Alliance, a unique cross-sector partnership who have committed to reaching those who do not have the basic skills and knowledge to operate online.

The Government also supports the UK Online Centre network[32] comprised of 3,800 community partners who support people to get online and become confident users of computers and the internet. This can enable them to progress to further learning, employment and active citizenship.

Action: The Government intends to coordinate its own efforts on digital inclusion and is setting up a new team based in the Government Digital Service to lead and coordinate Government activity in this area. The team will develop a delivery-focused strategy for central Government, and liaise closely with other public, private and voluntary sector stakeholders to look for opportunities for shared programmes of work. The team will work alongside Martha Lane Fox and Go ON UK to provide support as they roll out their partnership model. The team will support the embedding of digital skills in relevant policy areas, and will develop the evidence base on success in the digital inclusion area. Success of the team will be reviewed in 2015/16.

Case Study: Go ON Liverpool

Go ON Liverpool was a national and local cross-sector partnership campaign. According to Go ON UK, in June 2011, 29 per cent of adults (104,000 people) in Liverpool had never been online, compared with 17 per cent nationally. 1,500 digital champions were recruited to deliver the message and provide training. In 18 months, the Go ON Liverpool campaign led to a 55 per cent reduction in adults in the city who had never gone online, and Liverpool had 43,000 new internet users. This compared to a 13 per cent drop nationally. The campaign had political, business and community support: all 90 local councillors backed it, 80 local partners supported it, each promoting a specific, targeted benefit message appropriate and meaningful to the local people and businesses they reached.

Action: Following the success of Go ON Liverpool, this year Go ON UK and its Founder Partners will aim to "supercharge" the activity of local partners and help improve basic online skills in the North East of England. This programme will provide further evidence of the impact of partnership working to drive up digital skills, and build a replicable partnership model that can be further rolled out across the UK.

Transforming the Delivery of Government Services

The Government Digital Strategy focuses on making public services more relevant, responsive and convenient, with the ambition that it should be as easy to deal with Government online as it is to bank online. Government began its digital transformation last year with the launch of GOV.UK (https://www.gov.uk/), a simple, single platform for all interaction with Government, which is updated constantly. GOV.UK brings together hundreds of Government websites in a clear and consistent format.

Government is ensuring that appropriate assisted digital support is in place for people who are not online, or who do not have the digital skills to access these online services. People who need support will be able to access services in non-digital ways, including face-to-face or by phone, or with support to input their data into the digital system.

Action: Over the next year, 25 of the top 50 public services will be transformed across eight different Government departments.

25 Services
14 Agencies
8 Departments

Department for Business Innovation & Skills

The Insolvency Service
– Redundancy Payments

Intellectual Property Office
– Patent Applications and Renewals

Land Registry
– Digital Service Delivery

Apprenticeships
– National Apprenticeship Service

Student Loans Company
– Student Loans Company

Ministry of Justice

HM Prison Service
– Prisoner Visits Booking

HM Courts & Tribunals Service
– Civil Claims
– Fee Payment

Office of the Public Guardian
– Lasting Power of Attorney

Department for Environment Food & Rural Affairs

Rural Payments Agency
– Common Agricultural Policy Delivery Programme

Environment Agency
– Waste Registration & Applications

Department for Work & Pensions

– Carer's Allowance
– Personal Independence Payment
– Universal Credit

Home Office

UK Border Force
– E-Gates at the Border

Disclosure & Barring Service
– Criminal Record Checking Service

UK Border Agency
– Visitor Visa Application

Department for Transport

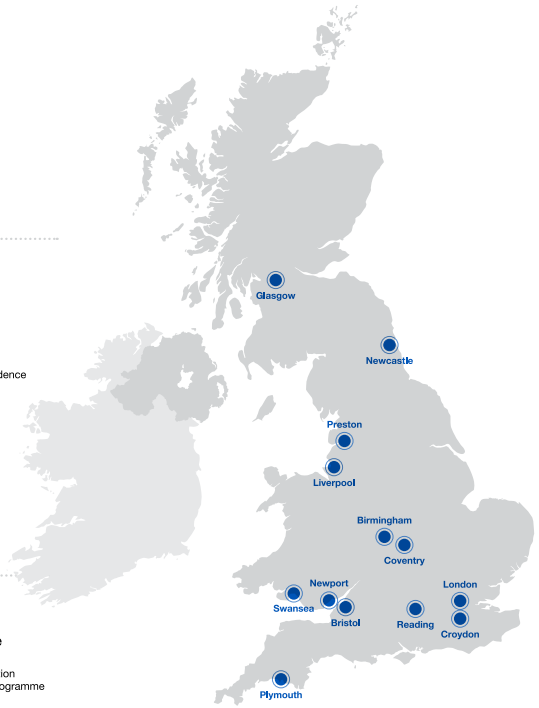
DVLA
– Vehicles Online Logbook
– Personalised Registration
– Integrated Enquiries Platform

HM Revenue & Customs

– PAYE Online
– Paperless Self Assessment
– Tax for My Business
– Agent Online Self-Serve

Cabinet Office

– Electoral Registration Transformation Programme



Digital transformation exemplar projects

Two specific examples of these transformations are below:

Case Study: HMRC Tax

Whilst the tax system is highly digitised, it still treats small businesses and individuals as separate entities. Government plans to launch a single tax account in the second quarter of 2014, which will allow an additional ten million Corporation Tax submissions to be completed online. People will also be able to manage all their tax affairs through this single account and update their details.

Businesses will get a single, digital view of all their tax affairs, and be able to check at a glance that all their information is in order. Tasks like setting up PAYE for a new employee or applying for tax credits will take just a few taps on a tablet. Our digital transformation will substantially reduce the need to pay for expensive specialists to navigate the tax system.

Case Study: DEFRA: Common Agricultural Policy Payments

Currently, Government administers around 40 Common Agricultural Policy schemes, which pay over 100,000 farmers and traders more than £2 billion each year in EU subsidies. Farmers have to complete paper forms asking questions like "how many fields, woods, ponds do you have?", and mark these on paper maps. That means details on more than two million parcels of land, all on paper. This wastes time for farmers, and the systems required to manage it are so complex that errors are inevitable – which leads to EU fines averaging over £80 million every year since 2005. Moving this service online will make it accurate, timely, and built around the needs of farmers. The Common Agricultural Policy is an inherently complicated system, but through digital transformation, we can make complex systems work well for users.

The devolved administrations have also prioritised improving their own digital services. In Scotland, the Scottish Government published 'Scotland's Digital Future – Supporting the Transition to a World-leading Digital Economy' in May 2013[33]. The report assesses the role that the public sector in Scotland is playing in stimulating the digital economy and proposes actions that could be taken collectively and in partnership with the private sector to ensure that Scotland develops and sustains a world class digital economy in the future. In Wales, 'Delivering a Digital Wales' is the Welsh Government's policy framework that draws together the key activities and interventions relating to the use and promotion of digital technologies in Wales[34]. In Northern Ireland, the Department of Enterprise, Trade and Investment has developed the Telecommunications Action Plan 2011-2015, which incorporates the LogonNI programme[35] and recognises the need to eliminate the digital divide and

make information economy available for all. This is underpinned by the Digital Northern Ireland 2020 initiative[36].

Opportunities for Consumers

EU Online Market

Consumers in the information economy need to feel secure in order to make purchases and use digital services. The Government's strategy for digital connectivity, content and consumers will set out a wide range policies and activity to help people to feel confident in navigating their way around the online world.

With the international online market and the opportunities for cross-border trade, consumers should be aware of what the implications are when they are buying services or products on terms different from those established under either UK or EU law. There are particular rules governing the choice of law when businesses trade with consumers in a different country[37]. Essentially, these rules make clear that where a business trades in the UK to UK consumers any legal protections that cannot be contracted out of, will apply whichever law is chosen to govern the contract. Through the Consumer Rights Bill the Government is making domestic consumer law clearer on what rights consumers have when purchasing digital content, including when downloaded or streamed from the Internet. These protections will not be able to be contracted out of.

UK businesses have a major share of the EU e-commerce market. The Government is encouraging the European Commission to create the best possible regulatory environment within the European Single Market. A key element of this will be the Consumer Rights Directive. This, when implemented, will introduce clear pre-contractual information that must be provided before a consumer buys anything online from a trader. This will include clear pricing information and contact information about the trader, and for digital content sales will also include key information on functionality and interoperability. The Consumer Rights Directive also clarifies the general rule that there is a 14 day right to cancel an online purchase, and the rights and obligations of traders and consumers following a cancellation.

Action: The Government's e-commerce taskforce, as well as looking at barriers to business trading online, is also addressing how it can be made easier for customers to shop across borders.

Midata

The information economy, and particularly digital services, can provide consumers with useful information such as purchaser rights, product availability and data privacy. Government and industry working together want to allow consumers access to data about themselves – their energy usage, spend on utilities, or purchasing habits. The midata programme has been established for this purpose.

Through the programme Government is encouraging firms to release transactional data back to customers in a machine readable, portable format. This could help consumers access services to find a better deal, or give them new insights into their spending habits, especially where combined with open and volunteered data. The UK, along with the US, is a world leader in this approach to empowerment. There are real opportunities for innovators to help customers understand the value and uses of their data. US initiatives such as Blue Button, which gives military veterans access to their medical and health care data, show the opportunities for Government to provide data to its citizens. Combining private and public sector data around the individual can be powerful in both economic and social terms.

As part of this programme, the midata Innovation Laboratory has been set up as a voluntary accelerator project in partnership between Government, the Open Data Institute, the Information Commissioner's Office, business and consumer organisations. The laboratory will stimulate innovation in data services and applications and demonstrate the growth potential of midata. From our work with the lab we expect to gain insights and understandings for future policy and data management developments, including security in data sharing. The Government has also established a number of Consumer Confidence and Trust working groups to look at a range of potential security and privacy issues affecting the sharing of personal data, examining current data protection frameworks and practices and assessing whether the midata initiative creates the need for additional safeguards. The groups are drawing on contributions from business, regulators and consumer representatives to identify current best practice which can be shared to provide guidance to business and set expectations amongst customers.

Action: The Consumer Confidence and Trust working groups are due to report in the summer, following which the Government will set out plans to implement the agreed recommendations.

Smart Cities

Many of our most pressing societal challenges manifest themselves in our cities. Urbanisation is growing apace in emerging markets, where the growing middle class is demanding cleaner, more sustainable and healthier urban environments, with reliable sources of energy and less congestion. City leaders the world over are turning to integrated "intelligent" or "smart" systems and concepts to deliver vital public services, for example:

- Healthcare: assisted living, patient monitoring, digital records and hospital administration
- Smart energy grids: demand management, renewable energy integration
- Transport: traffic and congestion management, road user charging, emergency response, public information systems, smart parking

- Water management: consumption monitoring, wastewater treatment, environmental safety systems, and flood management
- Waste management: waste collection modelling.

As part of the evidence base for this Strategy, the Government has commissioned Arup to analyse global supply chains related to smart cities. Arup estimated that the global market for smart urban systems will amount to $400 billion per annum by 2020. On the basis of the UK's share of OECD tradable services, it conservatively estimates the UK should aim to secure 10 per cent of the global market, worth $40 billion per annum. The provision of smart solutions therefore represents a significant global market opportunity and a means by which UK cities can address their own challenges.

UK firms are at the forefront of developments in this area. We have world-leading companies in project management, engineering, architecture, energy and transport systems, communications and the digital economy, finance, legal and insurance. Our ability to bring together the cluster of companies needed to design, finance, risk manage and execute large infrastructure projects makes the UK a major global centre for such projects. We are recognised for our expertise in integration, and trusted because of our long experience with maintaining and managing city infrastructure. Business strength is supported by a world-class and internationally recognised research capability in the built environment and city systems. Our ambition is to consolidate this position and make the UK a global hub of smart city delivery. However, competition is intensifying and cities around the globe are seeing the opportunities afforded by smart solutions and taking action.

The Government recognises the barriers to, and the opportunities of, smart city concepts and a range of activities are underway, for example:

- RCUK is funding a number of projects under the Digital Economy Programme, such as Digital City Exchange and Liveable Cities, to improve understanding of how to design smarter cities
- The British Standards Institution is developing a strategy to provide standards and guidelines to help deliver smart city solutions at scale
- The Energy Technology Institute is designing and testing a commercially viable Smart Energy System, which will facilitate improved heat management and low carbon energy services across the UK
- The Technology Strategy Board is investing £24 million to fund a large scale Future Cities demonstrator in Glasgow, £3 million each to Bristol, London and Peterborough, a further £50 million over five years to create a Future Cities Catapult in London and £5 million in an SBRI competition to support innovative companies to create new solutions to challenges identified by UK cities.

The Future Cities Demonstrator in Glasgow will enable businesses in Glasgow to test, in practice and at scale, new solutions for connecting and integrating their city systems, to deliver practical benefits for visitors and residents, attracting hi-tech jobs. The programme encompasses several projects:

- The creation of an Integrated Operations Centre managing public space CCTV network and TRAFFCOM roads management systems
- Sustainable Glasgow – addressing issues such as energy conservation and generation, greater use of green technology such as white street lighting, air pollution and the integration of transport routes
- The creation of a Big Data Store collecting and analysing information from previously unconnected databases to influence future city services and make it more accessible to more organisations
- Setting up a centralised City Dashboard giving the public and agencies real time information via smartphone apps[38] on subjects like traffic flow, rail and bus services, weather, accident and emergency waiting times.


Image courtesy of Steve Hosey @ GCC

However, to remain at the forefront of this agenda, we will pursue the following actions to improve our understanding, co-ordinate policies more effectively and ensure UK firms are able to exploit their capabilities in global markets.

Action: The Government will establish a Smart Cities Forum, comprising representatives from Departments, cities, business and the research community. The Forum will bring together those with an interest in smart systems to develop and coordinate policy more effectively. It will provide advice to Ministers and local government leadership, ensuring that policy makers and city leaders are informed by a global perspective of best practice.

Action: Through our data capability strategy the Government will examine the feasibility of a (randomised control) trial through which public data is made available to pilot cities.

Action: BSI will work with stakeholders to identify where standards can help address barriers to implementing smart city concepts, including the interoperability of systems and data sharing between agencies, promoting the uptake of smart cities.

Action: UKTI will work with the Smart Cities Forum to ensure that UK firms are supported in their efforts to export their expertise in world markets.

6 Actions: Underpinning the Information Economy in the UK

The vision for the information economy sector is underpinned by three factors. First, a highly skilled digital workforce (whether specialists who provide information technologies or non-specialists who use them). Second excellent digital infrastructure (both physical and regulatory). Third, a framework for privacy and security. The combination of these will support growth, innovation and excellence in the economy as a whole.

Improving Skills Across the Workforce

To reap the economic and social benefits of the digital economy the UK needs a strong flow of future talent, a skilled workforce and a digitally literate population. We need people who can use applications and apply technology as well as people who can invent and develop the technology and applications of the future. We want the UK to be a global leader, excelling in cutting edge technologies like Big Data, Cloud Computing and Cyber Security.

But there is a paradox. Young people are increasingly using digital devices and around 129,000 new recruits are needed each year in the sector; this is forecast to grow at almost twice the UK average through to 2020. At the same time, data shows a decline in the number of students studying ICT subjects over the 2002-10 period[38].

There has been widespread criticism of the statutory school ICT curriculum in England. Employers did not think it was sufficiently challenging, focused too much on using IT applications and students were not excited by course content. In response, the Government is reforming what is taught in this subject area in schools. Working with industry and others, a new computing curriculum is being developed which is due to become compulsory in September 2014. This will be more ambitious and rigorous than the existing ICT programmes of study and will place greater emphasis on teaching the principles of computational thinking and practical programming skills.

The aim of the new computing curriculum is not only to prepare pupils to apply digital technologies confidently in further study and employment, but to provide them with the knowledge and skills to create new digital technology products. In the meantime, the programmes of study at all key stages (ages 5-16) were disapplied in September 2012 to give schools wishing to deliver more demanding and innovative ICT teaching the freedom to do so. In addition, the experience of the University Technical Colleges

– where new approaches to IT teaching are being nurtured – will be looked at for its potential for wider application.

Case Study: EPOSability Apprenticeships

EPOSability is a small IT services company specialising in electronic point of sale and IT retail services. Their customers range from small restaurants to household names like Mothercare. Since 2010 EPOSability has taken on four new IT apprentices, supported by the work of a number of organisations including e-skills UK to put employers in the driving seat in defining and quality assuring apprenticeships. Director Michael Ayers explains "We employ apprentices with a real interest and commitment…although we may need to do some hand holding to begin with, the acceleration of growth of individuals can be quite remarkable". Investing in apprentices is now an important part of the company's long term future.

Another paradox is that there is a high demand for good computer specialists, across an increasing range of occupations, but employers report difficulties in finding applicants with the skills set they require, including in the seemingly attractive digital creative industries. In parallel, data shows that computer science graduates are proportionately more likely to be unemployed 6 months after graduation than those in other subjects[39].

The Government has identified rigour and responsiveness as its key objectives for the public skills system. With greater rigour in the publicly provided skills system, the concerns that many in the information economy sector have about confusion on the supply side should be addressed. But greater responsiveness to the needs of learners and business is key to delivering the skills that business needs.

A key element in delivering responsiveness is the Employer Ownership of Skills initiative. The aim is to explore how better to align public and private investment to support workforce development and growth. The Employer Ownership Pilot projects will see companies co-investing in a range of training initiatives that will directly reflect their economic priorities and will fund long-term Industrial Partnerships to enable business to take end to end responsibility for skills development. If such a partnership is funded for the information economy sector, that should provide a launch pad for a new strategic approach to meeting the skills challenges identified in this report. Even if this funding does not materialise, it is to be hoped that business leaders see the inherent value in such an approach.

Through the Richard Review[40] implementation announced in March 2013 the Government intends to build on the current success of Apprenticeships by ensuring employers have more ownership of the programme, putting them fully in the driving seat in its design and delivery. A Higher Apprenticeship Fund was launched in July 2011 to create an "alternative to traditional graduate recruitment by enabling

employers to attract talented individuals at an early age and train them to suit their business needs". This includes the IT Higher Apprenticeship, developed as an alternative route into the sector for young people with A Levels or equivalent qualifications.

The Government also recognises the value of ICT in contributing to skills solutions. It has promoted the creation of the Further Education Learning Technology Action Group (FELTAG) to facilitate better understanding and uptake of education technologies in the Further Education and skills sector.

A lack of sufficiently skilled people is one of the biggest barriers to UK leadership in the global information economy. To have the skills to compete internationally and win the race to be one of the leading economies in the digital economy, a rethink is needed. Addressing this challenge requires a collaborative relationship between industry, academia and government.

There are already many initiatives to address skills issues, but these need to be better coordinated. More importantly, government, academia, business and local players must agree a game changing plan as a priority.

Action: A group representing the demand and supply side of skills provision will set out a digital skills strategy. Specific actions that will be considered are:

- Exciting young people, and particularly girls, to pursue a career in ICT
- Increasing how business shapes the design and delivery of digital learning
- Realising the great benefits offered by Massive Open Online Courses to support ICT learning, work force re-skilling and increased digital literacy
- Increasing the number of ICT apprenticeships in the information economy sector and wider supply businesses
- Identify new pathways into the sector and wider ICT jobs for the unemployed (particularly NEETs) and those re-entering the labour market.

In addition, the following proposals are being pursued to support digital learning in Higher Education and open up exciting careers in the information economy to more people.

Action: Government will bring together representatives from business and the Higher Education sector and encourage them to agree action to improve employment outcomes for computer science courses.

Action: Industry, Higher Education institutes and skills organisations will work together to create a programme of Massive Online Open Courses, linked to existing and developing industry supported products, for computing and data science.

Action: OCR will pilot courses aimed at bridging the gap between level 3 and level 4 qualifications to create flexible routes into Higher Education from Further Education

Action: To accelerate the uptake of apprenticeships e-skills UK will bring together Higher Education and industry to provide a progression pathway from an apprenticeship to a degree.

Infrastructure

Digital and physical infrastructure is vitally important for the information economy and for all UK businesses and society. Business and consumer expectations on the availability, cost, speed, security and reliability of the internet, including on mobile and wireless access, are increasing all the time. Meeting these demands is crucial in reinforcing the UK's position as a leading digital economy and driving jobs, investment, productivity and growth. The Government's forthcoming strategy for digital connectivity, content and consumers will cover these issues in more detail.

Broadband

The ambition for the UK's digital infrastructure by 2015 is for at least 90 per cent of all homes and businesses to be able access broadband with potential headline download access speeds greater than 24 Mbps and for there to be universal access to standard broadband with a speed of at least 2 Mbps.

There has been significant recent commercial investment in broadband infrastructure, and the UK compares well with other countries in Europe. By 2015, average broadband speeds will be at least three times faster than in 2010 (at around 15-20 Mbps); 10 million more homes and businesses will have access to superfast broadband, an increase of 75 per cent; and large parts of the country will have access to high speed 4G mobile broadband services, with 98 per cent coverage in place by 2017. The UK has a highly competitive and low cost broadband market.

In parallel the Government is undertaking an ambitious programme of investment to boost digital access across the UK with a total of £1.2 billion of public funding from central Government, local authorities and the devolved administrations. The programme provides funding to enable superfast broadband to be available to 90 per cent of premises and ensure universal availability of standard broadband. Many of the projects are in delivery now and the last roll-out will be completed by 2016. Some LEPs are supplementing other funding for broadband infrastructure, for example through their Growing Places Fund allocations. A £20 million Rural Community Broadband Fund (RCBF) is being delivered as part of the Rural Development Programme for England. The RCBF is jointly funded by Defra and Broadband Delivery UK (BDUK) and provides grants to communities to establish superfast broadband in hard-to-reach areas.

Action: The Government is considering further options for how those in hard-to-reach areas can access superfast broadband.

BDUK is also running the Super Connected Cities Programme (SCCP) which aims to support growth in cities. This will fund cities to provide space in publicly owned buildings with high-speed wireless connectivity and remove the barriers to rapid private sector deployment through, for example, upgrading street furniture for wireless services and invest in capital projects that will demonstrate the economic benefits of high-speed connections. The Government's forthcoming strategy for digital connectivity, content and consumers will set out more detail on the SCCP.

Action: Government is working towards providing, at the earliest opportunity, superfast broadband to those Enterprise Zones lacking access.

Mobile Services

The mobile internet is already changing the way we live our lives. A recent study by the McKinsey Institute on the disruptive technologies ranked the mobile internet first in terms of its economic potential. According to McKinsey the mobile internet could generate between $4 and $11 trillion of global economic value per year by 2025[41].

From the very beginning the UK was a pioneer of mobile and still has many world leading technology companies large and small who are at the forefront of developing mobile technology, services and applications. New 4G infrastructure is being deployed in the UK, with companies such as Vodafone increasing their capital investment in the UK by 50 per cent this year[42]. Globally the market for 4G technology will be worth many billions this year, but not enough of the technology and IP that underpins that global market was developed here in the UK.

We want the next generation of mobile technology – the technology that we and the rest of the world will be using in 10-15 years time – to be developed here in the UK. We have got a head start. The new 5G Innovation Centre at the University of Surrey has already secured over £50 million of research funding from HEFCE (Higher Education Funding Council for England) and a consortium of mobile operators and infrastructure providers from around the world. This new innovation centre will establish the world's first live operational test bed for 5G technologies and services here in the UK, putting us at the forefront of influencing and informing new global standards in 5G.

Action: Working together with the University of Surrey, Industry and the wider research community, we will establish the world's first test bed for 5G technologies and services.

This new state-of-the-art global research facility should be the catalyst for a nationwide effort to achieve our ambition to be a world leader in the development of 5G technology. To do that we need to encourage UK universities to fund research into 5G and to ensure that technology companies large and small across the country are able to conduct 5G R&D.

Spectrum

Technology companies and research labs across the country need access to radio spectrum for research, trials and development work. The existing mobile broadband spectrum is already heavily used and there are competing pressures for bandwidth, which makes existing mobile spectrum less than perfect for experimental use. At present a substantial part of the suitable spectrum is still in the hands of public sector users, supporting important public services, but in many cases this spectrum could be more effectively utilised. The Government is committed to incentivising efficient use of spectrum by the public sector and has announced that it will establish a system of charges for public sector bodies to reflect fully the opportunity cost of use.

The Government also wants to explore how public sector users can share their spectrum with researchers and innovators in new ways. Ofcom has been working on ways of sharing the unused spectrum between TV transmitters for machine-to-machine applications and for future mobile broadband systems in 2.3 GHz spectrum. This technology has further potential to make shared access to spectrum available very quickly on demand for R&D purposes.

Action: In order to promote innovation, Government has asked Ofcom to investigate the creation of an automated online geolocation database aimed at providing on-demand, short term spectrum licences for R&D into 5G and other advanced communication systems using spectrum primarily used by the public sector. This proposal is one example of the innovative approach to spectrum management that the UK will deploy. The forthcoming strategy for digital connectivity, content and consumers will set out more on this.

Privacy and Security

Data Protection

Data underpins all of the growth opportunities in the information economy. The UK supports a proportionate and sensible data protection framework which protects consumers at the same time as encouraging economic growth. For business certainty and confidence, such a framework needs to set out how data should be created, stored and used, to ensure that businesses and individuals can realise the benefits of the information economy. For consumers, the framework needs to help them understand the value of data they provide, how risks to privacy are managed, and the benefits that they can receive in the form of better services from permitting wider use of their data.

Government is continuously and actively engaged in debate on Data Protection legislation, particularly in the European Union, with the objective of balancing legitimate privacy concerns and the need to ensure that regulations on industry are not excessive. The Government has also produced a range of guidance on data

protection and data sharing through the Information Commissioner's Office[43] and will continue to ensure that guidance is kept constantly under review.

Action: The UK Government will continue to drive and influence EU and international discussions in key areas such as privacy and data protection and the digital single market to ensure that growth opportunities are not inhibited by new or existing levels of regulation, whilst providing a proper balance of protection and security for citizens.

Identity Assurance

Individuals and operations operating online need to be able to safely and securely assert their identity. Government is leading the way in using an Identity Assurance (IDA) approach to enable secure access to digital public services, with a system which enables users to simply and securely choose a private sector identity provider, all of whom will have been certified against specified standards.

As IDA is an innovative approach it requires a new market of services to be developed and creates an opportunity for a private sector marketplace of identity-enabled services to flourish. A Government-backed authentication of ID, designed around open standards, could be re-used and deployed to support central and local government, other public sector organisations, and the voluntary and third sector.

Action: Government will work closely with industry, privacy advocates and consumer groups to develop an Identity Assurance solution for HMG services that leverages existing capabilities and sets informed industry standards. The creation of a Government backed identity authentication, re-usable across industry, is a global first and will allow a new market of identity-enabled services to develop from the UK. The knowledge and skills applied during the development of this IDA solution will create a centre of excellence within HMG across a range of digital, technology and service sector disciplines (e.g. identity and authentication technology, design, cyber security, research, business transformation, mobile communications, digital service and platform development).

Action: Government will work closely to align its IDA approach with other national governments, international standards bodies and major industry associations to promote international interoperability.

Cyber Security

Improving cyber security underpins growth in the information economy and all other sectors by building confidence in the integrity of online services and boosting take-up. Consumers have legitimate concerns about how much trust they can place in online transactions. Security, trust and privacy concerns are three of the top five reasons cited by internet users for not buying online. Businesses too can be vulnerable to fraudulent transactions or theft of intellectual property, with many SMEs citing cyber security concerns as a reason for not selling more online[44].

Cyber security is also a significant national security topic. There are threats which could seriously affect individuals and organisations across the whole country, such as disruption of critical national infrastructure, or wholesale theft of valuable intellectual property or damaging secrets.

The National Cyber Security Strategy[45] published in 2011 and its one year on progress report[46] set out the range of Government and industry actions and academic activity in train to improve national cyber security. The strategy's vision is for the UK in 2015 to derive huge economic and social value from a vibrant, resilient and secure cyberspace, where our actions, guided by our core values of liberty, fairness, transparency and the rule of law, enhance prosperity, national security and a strong society. The strategy's first objective is for the UK to tackle cyber crime and be one of the most secure places in the world to do business in cyberspace. We believe that by achieving that objective we will create an environment where UK businesses have a competitive advantage over businesses based in less secure locations.

One way of building confidence in cyber security is through educating users and businesses. The Get Safe Online campaign[47] and the Government's cyber security guidance[48] are two measures. Other aspects of the approach are less visible to consumers: Government and industry working together to improve the inherent resilience and security of infrastructure and software services, and sharing information about threats and vulnerabilities so that quick action can be taken to tackle problems. Government – working closely with industry and academia – is also seeking to develop a clearer and more coherent cyber security standards landscape which will help raise security levels and customer confidence.

The UK has a strong base to build on. As well as our wider strengths in the information economy, we have specialist expertise in Government, business and academia in cyber technologies and a world leading cyber research sector. Specialist cyber clusters are developing in Malvern and Bristol. In order to identify and implement specific initiatives that will help the growth of the UK's cyber security industry, Government, industry and academia have formed the Cyber Growth Partnership. One early focus of the Partnership is to help implement UKTI's Cyber Security Exports Strategy. Its remit also includes supporting the development of UK sector capability through initiatives in R&D and innovation, education and skills.

Action: The Cyber Growth Partnership and the Information Economy Council will work collaboratively on areas of mutual interest including R&D and skills.

Case Study: Malvern Cyber Cluster

The area around Great Malvern has a high concentration of small, innovative cyber security companies. This cluster developed in the area due to proximity of skills and customers. In 2011 a network was formed to capitalise on the concentration of cyber security companies. As a result, the companies came together in the form of the Malvern Cyber Security Group.

The area has gained a reputation as "Cyber Valley" and is one of the primary locations in the UK for the research, development and commercialisation of cyber security products and services. The cluster has strong links with Tech City. They want to support the development of other cyber security clusters, working collectively to address barriers to growth and offer end to end services and solutions.

Given the national security importance of growing cyber security capability, Government pays particular attention to supporting innovation, technology transfer and investment in this area. The RCUK Global Uncertainties Programme and the National Cyber Security Programme are investing in Research Centres of Excellence at eleven leading universities and sponsoring up to 250 PhDs per year in areas relevant to cyber security issues. In addition, we are developing a range of new routes for transferring cyber know-how between GCHQ, research institutions and industry. The three Research Institutes in Cyber Security to be jointly funded over the next five years by EPSRC, GCHQ and CPNI are particularly relevant to this aim. This activity will increase innovation, ensure that research is focused on industry needs, make the commercialisation of research easier, and capitalise on the current active interest in investing in cyber which we are seeing from high-tech venture capital funds and ICT multinationals.

Action: We will continue the National Cyber Security Strategy commitment to develop strategic vehicles for bringing together industry, academia and Government to develop and exploit innovations in cyber security.

7 Summary List of Actions

Action
Chapter 3: Actions: A Strong, Innovative Information Economy Sector Exporting UK Excellence to the World
The Information Economy Council will work with the Intellectual Property Office to publicise these opportunities to information economy businesses, enabling them to make the most of their intellectual property.
The UK Tech Cluster Alliance will work with the Information Economy Council and the various tech clusters in the UK to promote and facilitate connections and identify common barriers to growth. This will include consideration of access to finance issues such as the availability of venture capital or alternative forms of financing. We will also work to champion all UK tech clusters internationally to attract international investment.
The Government, working through ETSI, BSI and other bodies in the standards field, will bring together a range of stakeholders to align programmes, to build on existing knowledge and to put the UK in the best position to influence future standards at an international level.
The Information Economy Council will lead action to promote the opportunities available through the Advanced Manufacturing Supply Chain Initiative and the Technology Partnerships programme, with the aim of increasing the number of successful applications from the information economy sector.
The Information Economy Council will work with the sector to promote and champion the importance of the information economy to the UK.

Action
Chapter 4: Actions: UK Businesses Across the Economy making Smart Use of Information Technology and Data
The e-commerce taskforce will report back in June 2013, with the Information Economy Council taking forward appropriate action as required.
Industry, in partnership with Government, will launch a programme this autumn to get more SMEs transacting online. The programme will target both those SMEs who are already online in a basic way but are looking to transact online, and those SMEs who are transacting online but are looking to scale up. The intention of the programme is to reach 1.6 million businesses over the next five years. It will build on existing support to SMEs including advice on improving their cyber security and protecting their intellectual property.
The Government will publish a data capability strategy in October 2013, developed in partnership with industry and academia. The strategy will set out further actions to build our leadership and capability in data for growth, and provide business with clarity about the Government policy on open public data.
Chapter 5: Actions: Ensuring Citizens benefit from the Digital Age
The Government intends to coordinate its own efforts on digital inclusion and is setting up a new team based in the Government Digital Service to lead and coordinate Government activity in this area. The team will develop a delivery-focused strategy for central Government, and liaise closely with other public, private and voluntary sector stakeholders to look for opportunities for shared programmes of work. The team will work alongside Martha Lane Fox and Go ON UK to provide support as they roll out their partnership model. The team will support the embedding of digital skills in relevant policy areas, and will develop the evidence base on success in the digital inclusion area. Success of the team will be reviewed in 2015/16.
Following the success of Go ON Liverpool, this year Go ON UK and its Founder Partners will aim to “supercharge” the activity of local partners and help improve basic online skills in the North East of England. This programme will provide further evidence of the impact of partnership working to drive up digital skills, and build a replicable partnership model that can be further rolled out across the UK.
Over the next year, 25 of the top 50 public services will be transformed across eight different Government departments.
The Government’s e-commerce taskforce, as well as looking at barriers to business trading online, is also addressing how it can be made easier for customers to shop across borders.

Action
The Consumer Confidence and Trust working groups are due to report in the summer, following which the Government will set out plans to implement the agreed recommendations.
The Government will establish a Smart Cities Forum, comprising representatives from Departments, cities, business and the research community. The Forum will bring together those with an interest in smart systems to develop and coordinate policy more effectively. It will provide advice to Ministers and local government leadership, ensuring that policy makers and city leaders are informed by a global perspective of best practice.
Through our data capability strategy the Government will examine the feasibility of a (randomised control) trial through which public data is made available to pilot cities.
BSI will work with stakeholders to identify where standards can help address barriers to implementing smart city concepts, including the interoperability of systems and data sharing between agencies, promoting the uptake of smart cities.
UKTI will work with the Smart Cities Forum to ensure that UK firms are supported in their efforts to export their expertise in world markets.
Chapter 6: Actions: Underpinning the Information Economy in the UK
Government will bring together representatives from business and the Higher Education sector and encourage them to agree action to improve employment outcomes for computer science courses.
Industry, Higher Education institutes and skills organisations will work together to create a programme of Massive Online Open Courses, linked to existing and developing industry supported products, for computing and data science.
OCR will pilot courses aimed at bridging the gap between level 3 and level 4 qualifications to create flexible routes into Higher Education from Further Education.
To accelerate the uptake of apprenticeships e-skills UK will bring together Higher Education and industry to provide a progression pathway from an apprenticeship to a degree.
The Government is considering further options for how those in hard-to-reach areas can access superfast broadband.
Government is working towards providing, at the earliest opportunity, superfast broadband to those Enterprise Zones lacking access.
Working together with the University of Surrey, Industry and the wider research community, we will establish the world's first test bed for 5G technologies and services.

Action
In order to promote innovation, Government has asked Ofcom to investigate the creation of an automated online geolocation database aimed at providing on-demand, short term spectrum licences for R&D into 5G and other advanced communication systems using spectrum primarily used by the public sector. This proposal is one example of the innovative approach to spectrum management that the UK will deploy. The forthcoming strategy for digital connectivity, content and consumers will set out more on this.
The UK Government will continue to drive and influence EU and international discussions in key areas such as privacy and data protection and the digital single market to ensure that growth opportunities are not inhibited by new or existing levels of regulation, whilst providing a proper balance of protection and security for citizens.
Government will work closely with industry, privacy advocates and consumer groups to develop an Identity Assurance solution for HMG services that leverages existing capabilities and sets informed industry standards.
Government will work closely to align its IDA approach with other national governments, international standards bodies and major industry associations to promote international interoperability.
The Cyber Growth Partnership and the Information Economy Council will work collaboratively on areas of mutual interest including R&D and skills
We will continue the National Cyber Security Strategy commitment to develop strategic vehicles for bringing together industry, academia and Government to develop and exploit innovations in cyber security.

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