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Towards a smart society

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The Big Innovation Centre is an initiative of The Work Foundation and Lancaster University. Launched in September 2011, it brings together a range of companies, trusts, universities and public bodies to research and propose practical reforms with the ambition of making the UK a global open innovation hub as part of the urgent task of rebalancing and growing the UK economy, and with the vision of building a world-class innovation and investment ecosystem by 2025. For further details, please visit www.biginnovationcentre.com.

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1

The rise of smart society UK

The rise of digital technologies is transforming almost every aspect of modern life. We no longer have to wait for the next morning's newspaper to learn what is going on in the world. We can have a face-to-face conversation with someone on a ship in the middle of the Southern Ocean. And we have more information at our fingertips than ever before. Data on everything from the rhythm of our heart to the location of the 53 bus can be used to improve our day.

A cluster of technological advances are changing how people live, work and play. Physical and virtual areas of our lives are increasingly becoming intertwined. More and more of our interactions are mediated by machines. The Internet of Things, M2M (machine to machine) hyper-connectivity, wearable technology, intelligent living and ubiquitous computing are all increasingly important areas. The common underlying agenda is to develop new forms of connectivity, new types of digital relationships, and anchor opportunities presented by the greater integration of connected technologies into everyday lives.

A smart society is one which has found ways to maximise these opportunities. A smart society leverages the power and the potential of technology to make human beings more productive; to allow us to focus our resources on activities and relationships that matter; and ultimately to improve health, wellbeing and the quality of life. In short, we define a 'smart society' as:

"One that successfully harnesses the potential of digital technology and connected devices and the use of digital networks to improve people's lives."

Our research confirms that the UK is becoming smarter. Our citizens are incredibly open to exploiting the benefits of the digital world. Our strengths in design and the quality of our institutions means that we excel at bringing together many of the key players needed to exploit the new and unpredictable opportunities presented by digital technologies.

However, being smart is a moving target. As one of the individuals we interviewed for this project put it: "There will be no moment of promised land." The emergence of a smart society is also dependent on the extent to which the innovation ecosystem is robust and vibrant. Each component of the ecosystem – businesses, academia, government, the third sector and consumers – will have to work together to co-create a future where institutions, infrastructure, systems, markets, investments and capabilities all enable, rather than impede, the creation of a truly connected, smart society.

Our approach and a snapshot of our findings

This provocation paper is the first output from a year-long collaboration with Samsung UK. ‘Smart society’ is a very wide and all encompassing subject. Although there have been studies and publications of varying quality and depth on ‘smart’, these have nonetheless focussed only on specific pockets, or manifestations, of the subject, such as connected devices, cities, transport, healthcare and the home. We seek to integrate these disparate themes and examine their combined effect on **people**. We are interested in what ‘smart’ means to the UK society.

To this end, we have identified three interrelated questions that enable us to better understand the UK’s journey towards a smart society:

1. How far towards a smart society has the UK progressed? And how far can it go?
2. What are the barriers to the development of a successful smart society in the UK?
3. What do we need in place to give us the best chance of developing a smart society in the UK in the future?

As there is little precedence on the exposition of the subject, or prior research that covers a similarly wide area, an inductive method of research involving in-depth interviews with a carefully selected panel of well-informed experts, practitioners and commentators would best enable salient issues to emerge. We identified a group of 20 panellists, each with expertise in a particular area or domain of the smart society, who were selected following an extensive review of existing evidence on the impact of digital technologies on our lives.

Panellists were asked to answer the three questions above and to go into far greater depth on one thematic area which matched their particular expertise. Findings from these interviews allowed us to build up a core evidence base which underlines the scale of the shift towards a smart society, the trajectory of development going forward and the UK’s strengths in several interrelated areas. A clear pattern emerged from the evidence, which points to how the transformation to a smart society affects three distinct domains of our lives, namely how we **live, work and play**. We present the evidence and views from our panellists on these in the form of six mini cases in the next section.

We then analysed for key **implications** of ‘smart’ on people by synthesising the context-

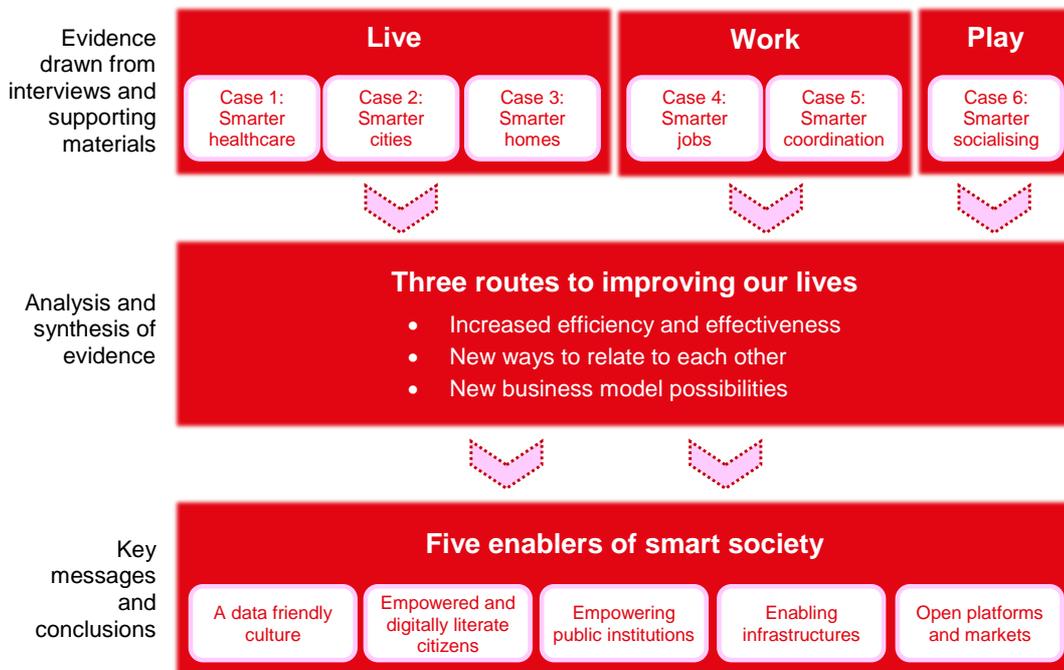
Expert panellists participating in this study, to whom we wish to place on record our thanks:

- Ben Hammersley, Wired
- Charles Cotton, serial tech entrepreneur
- Charles Leadbeater, author and opinion leader
- Clare Reddington, iShed / The Pervasive Media Studio
- Derek White, Barclays
- Ed Tallis, GSK
- Ella Jaczynska, GSK
- Martin Garner, CCS Insight
- Martin Hall, Salford University
- Mike Short, Telefonica
- Professor Irene Ng, University of Warwick
- Raj Sivalingham, techUK
- Roland Harwood, 100%Open
- Steve Bevan, The Work Foundation
- Tim Brooke, Future Cities Catapult
- Volker Buscher, Arup
- Will Hutton, Big Innovation Centre
- Wilson Wong, Chartered Institute of Personnel Development

specific evidence and wide array of views from the panellists to draw out and group common themes and recurrent constructs. This led us to the discovery that the smart society is improving our lives through three major impact areas: **efficiency and effectiveness, relationships and business models**. We elaborate on what each of these mean to people in the third section of this paper.

Drawing on the evidence and our analysis in the preceding sections, we conclude by setting out the way forward towards a smart society. We identify five **enablers** which will underpin the ongoing development of the UK's smart society, emphasising what is needed to get us there: **a data friendly culture; empowered, digitally literate citizens; empowering public institutions offering smart leadership; enabling infrastructures; and open platforms and markets**. These are the things we will need to focus on to make the most of the possibilities coming from the next wave of smart society development.

Our approach and snapshot of findings are summarised and illustrated in the figure below:



This paper represents our first iteration of the subject, and will form the basis for more in-depth discussion and debate of these issues at a project workshop on the 12th June. Further outputs from the research will include two case study papers focusing on particular areas of smart, and a final synthesis report.

2

How is the UK becoming smarter?

The opportunity presented by digital technology is simply enormous. Global social and economic systems are being reconfigured at an incredible rate. Connectivity is increasingly reshaping our world and in many ways redefining the way we work, live and play. It takes considerable effort to find anywhere in the world today unaffected by the internet. Newly released figures from the United Nations International Telecommunications Union show that the uptrend on internet penetration and mobile phone use will continue.¹ There will be 2.9bn internet users and 2.3bn mobile broadband subscriptions worldwide by the end of this year, while 43.6% of households globally will have internet access.

“Smart society will see the acceleration of the Internet of Everything.”

Will Hutton,
Chair of the Big Innovation Centre

Digital networks are now reaching far beyond our computers and handheld devices at a rapidly increasing rate. This agenda is about the development of a digitally linked network of objects sharing information. Gartner estimates that by 2020 we will have 26 billion devices connected to the internet excluding PCs, smartphones and tablets. ABI Research suggests that this figure could be in excess of 30 billion.²

Our research confirms that the UK is keeping pace with the rest of the world on this connectivity agenda. In 2012, 87% of the UK population used the internet, the 14th highest in the world and the 9th highest in Europe. The total was just 56.5% a decade earlier. 83% of all UK households have access to the internet, based on 2011 figures. Global mobile phone subscriptions will reach 6.9bn by the end of 2014. In the UK, 94.2% of the population used a mobile phone and there were 84.9m subscriptions in 2012.³ And how often we use our devices is increasing at an incredible rate, as Mike Short of Telefonica stresses:

“In the past 8 to 10 months, we have seen the same amount of data on our UK networks as we saw delivered between years 2000 and 2010.”

This shift reaches far beyond technology. Its economic impact is almost too significant to quantify. Many have attempted to measure the value of the digital economy and estimates vary depending on what is being measured. Booz & Co data shows that the connected digital economy contributed £860bn to world GDP between 2007 and 2012, and the use of digital technology can help firms to unlock £18.8bn additional revenue worldwide annually. The Boston Consulting Group estimates the global internet economy was worth \$2.3tr in 2010 and is expected to grow to \$4.2tr in 2016.

Digital technology, data and connectivity are collectively much more than just markets. They are best thought of as a cluster of general purpose technologies. As outlined throughout this

paper, they are things which are impacting on and changing every industry and every occupation and are likely to be the biggest source of economic growth over the next decade or so.

"We are on the right track, as the UK is very well positioned. We have a cosmopolitan society, we are strategically located between the East and the West, and we have a strong heritage in science and technology, as well as a diverse and creative economy."

Roland Harwood, 100% Open

In many ways it appears that the UK is at the forefront of this change and is exploiting these opportunities to improve people's lives. Our panellists were clear that the UK is becoming smarter. Some contended that we had become a digital society and that we were now in the process of trying to convert that into a smart society. Some argued that the move towards a smart society was inevitable, while others contended that the UK was already a smart society but that being smart is a

moving agenda. All identified key areas of UK strengths:

- The UK is already **the most internet-based economy of the G20**.⁴ This is a great starting point for embracing the next generation of digital technologies. It shows that **our population are perhaps more willing than anywhere else in the world to explore the possibilities and embrace the benefits** associated with digital technologies. Indeed in one survey, 17% of UK residents would be more willing to give up showering than using the internet for a year.⁵
- A further set of drivers underpinning the UK's strengths as a smart society revolves around our status as a hub for ideas. Many panellists identified **the UK's creativity as a driver of our success**. Design and design thinking were identified as core commodities for the smart society. As a global design hub and a leading location for related creative industries, the UK has an opportunity to be a leader here.
- Our **deep institutional architecture for knowledge sharing** was also identified by the panel as a key UK asset for the smart society. Academic-industry relationships have been invested in strongly and exist at depth. As with any area there is always room for improvement, but recent research from the Big Innovation Centre confirms that university-business collaboration is a key UK strength.⁶
- The UK was also identified by panellists as having a **culture for multidisciplinary working**, which is truly enabling collaborations. This is fundamental to exploiting a smart agenda which is cutting across such a diverse range of areas. Smart appears to be equally important for the future of transport, advertising and healthcare. This means that suddenly there are many more lessons to be learnt from looking across and joining up different domains of life.

"The UK's strength is in joining things up in smart ways."

Martin Hall,
Vice Chancellor of Salford University

In looking at the smart society, this project focuses on the impact that the changes associated with digital advances are actually having on people's lives. Through six mini cases, we explore how digital technologies are changing the way we live, work and play.

How we live is changing

Case 1: Smarter healthcare and health management

Digital technologies are not only creating new health products, but smart is facilitating a change in how we manage our health. Smart is supporting a shift from a reactive focus on cure towards a broader, more proactive view of wellness management and healthy living.

“70% of health spending is on preventable conditions, predominantly lifestyle related such as obesity and cardiovascular disease. Yet only 3% of spending is focused on prevention. If we could use data at scale to look at what helps to modify behaviour then we could make progress towards knowing what works to help avoid these risks”

Steve Bevan, The Work Foundation

The health sector has been at the forefront of using digital technology to develop new medicines and technologies which can improve our health. These range from digital hearing aids and generations of improved pacemaker devices to using massive datasets to better analyse the effectiveness of treatments. New sources of data are revolutionising how doctors diagnose us.

A number of panellists nevertheless identified a greater shift associated with digital technologies. They are being used to help improve our quality of life as well as to help cure what ails us. Smart

monitoring of our health is offering not only early detection of health issues, but also better understanding of their nature and causes. There also appears to be a trend towards making this fun – the ‘gamification’ of health through digital devices such as activity monitors represents a real shift. Certain digital technologies are also giving opportunities for older people to maintain their independence for longer, for example by making it easier for their families to keep in touch, or be contacted when things go wrong. This is changing how we relate to our doctors.

One vision of the future would be a world in which digital sensors scan your body, communicate remotely with healthcare professionals who are able to use massive health datasets to analyse the information. Based on this, highly personalised and daily sets of medication could then be 3D printed as a pill for you to take with next to no interference in your daily routine.

These shifts require a rethinking of how our healthcare system is configured. New sets of collaborative relationships between technology companies, pharmaceutical and medical device manufacturers, and healthcare professionals are emerging. These relationships will need to further develop as this agenda advances.

A key enabler of these relationships will be trust around how these players use and share our data, as health data is highly personal and sensitive. Panellists contended that we will need a new generation of smart health consumers to advance this agenda. These will be able to fully understand and evaluate the opportunities associated with various calls on their

data. Smart healthcare consumers will be able to take responsibility for controlling their data as well as managing how it is used.

The UK was also identified as a key location for the development of smart solutions because of the unique structure of our healthcare system. Panellists felt that this was an opportunity we could potentially exploit further. There may be possibilities to link and share knowledge between multiple initiatives. Different parts of the country appear to be proceeding at different rates, and there may be ways to better handle the implementation of new approaches and change management within NHS budgets.

Case 2: Smarter cities

Intelligent systems are improving how we interact with the urban environment. We now have buildings which monitor pollution. In years to come, we could have buildings that can offer their users personalised, real-time and location specific updates on dust or pollen levels across a site, helping to mitigate health issues. We now have up to the minute data on our transport networks and systems which can not only tell us exactly where the nearest bus to work is, but also chart the best route for us into work given the road works around the corner, the likely knock-on effects of a broken track 10 miles away and our preference for longer walks to work on sunny Fridays, but not cloudy Tuesdays.

The notion of a smart city is a well developed narrative. The smart city agenda was described by panellists as “the use of technology to shape a better world”. It involves the capture of data to make our urban systems more efficient. By measuring more things, and by measuring them more accurately it is possible to optimise the system to perform more strongly.

Increasing urbanisation is a recognised global driver and this is putting increasing pressures on urban infrastructures. Official estimates suggest that London’s population is increasing by 100,000 every year,⁷ yet the space for roads within inner London is largely fixed. A key smart city agenda for London is improving how efficiently we use our systems – transport, planning, air quality control, public service delivery etc. The core idea is that by integrating digital technologies into how we think about and manage the built environment, we can better integrate different systems and deliver more efficient cities.

Across the globe we can see plenty of digital technologies being used to tackle issues as diverse as energy management technology, water management systems, transport management, waste management, and assisted living.⁸ The central theme to all of them is using digital technologies to join up and better link services and operations at the urban level.

This is an area of global growth. Ove Arup has identified a smart city opportunity of £400bn globally by 2020.⁹ The Transport Systems Catapult estimates the global market for intelligent

mobility and integrated transport solutions could be worth £900bn by 2025.¹⁰ Our research has identified that the UK is widely seen as a global leader in developing smart cities. This is perhaps a surprise given that unlike in many of the examples above, we are not currently building new cities. However, it appears that we do have a critical mass of individuals with expertise in many of the key areas for the development of the smart city agenda. The Future Cities Catapult has recently been established with a view to linking up these strengths. Their initial assessment identifies these assets:¹¹

“The UK has a business ecosystem full of top companies in project management, data analysis, engineering, architecture, energy, the digital economy, finance and professional services – all the expertise needed to develop workable solutions is here. It also has world-class research capabilities in the built environment and city systems. And a unique culture of innovation.”

A UK example cited by a number of participants was the Oyster card system in London. The introduction of a single digital payment technology hasn't just saved passengers the hassle of buying tickets, it is helping to improve how the London transport system runs. For example, data on how we use the system makes it possible to plan maintenance in ways which minimise disruption by focusing on routes when most users have an alternative.

The Oyster card system was also praised as a user-focused development. It changes the transactional model – passengers are not so much paying to enter the tube network, but because of integrated ticketing are paying to get from A to B. This is a shift from selling access, to selling the ability to move. One panellist suggested that the next smart step will be to implement systems that not only help us get from A to B but also that work out where and what B actually is for us. Rather than asking our phones to navigate us to Oxford Street so that we can buy some jeans, we would ask our phones to help us buy some jeans. They will then be able to lead us to where people who seem a bit like us buy jeans.

Several panellists contended that the next set of smart city advances will depend on a relentless focus on user-centred approaches. As with any technology, smart city approaches appear to have been prone to implementation issues. Case examples were put to us of models or a transport management system being transplanted from one city to another, even when the two cities were not similar (one was in the USA and the other was in Denmark). The implication is that the benefits from the technology suffer because of a poor link to its context. Maintaining a user-centred approach was seen as a key enabler for the successful future development of smart cities. Panellists felt that securing this user-centred focus will depend on both a new generation of empowered urban citizens and enabling, visionary urban authorities.

“What is required is a paradigm shift, not just sensors and technology.”

Will Hutton,
Chair of the Big Innovation Centre

Smart city solutions, and indeed any public smart solutions, embody democratic decisions.

They involve choices about what to measure, how to measure it, what to do with this data (some of which will be personal, some private, and some public), and what to optimise the system for. Are we more concerned about traffic speeds, or how safe it is to ride a bike? When implementing a digital system to help drivers find parking spaces, should this target all users? Should it prioritise those with health conditions? Should it prioritise free spaces for those on low incomes? Engineering solutions can only take us so far. The next stage of smart city development will depend on the emergence of urban populations and governments who fully understand these topics, and are able to engage in open democratic debate about how best to implement these systems.

Panellists suggested that better building a sense of play, fun and creativity into the design and development of these systems could help to engage users by delivering a human side to understand technological opportunities. As Charles Leadbeater argued in a recent paper,¹² smart cities work best when they combine systems and empathy. Systems are needed to ensure effective and efficient running of the repeatable, transactional and quantifiable. Empathic engagement means people are able to use efficient systems to have highly convivial, shared experiences that enrich their lives.

Case 3: Smarter homes and the empowered individual

The way we live our lives in a 'smart' domestic context transcends the much talked about smart homes that are powered by connected devices that 'talk' to each other. While machine-to-machine communications enabled by the Internet of Things will undoubtedly make our living spaces smarter, smart homes will also empower us – the individual – through ownership and control of our own data.

What is quite well known by now is the trajectory of connected devices and a future where the hardware in our homes are intelligent and interconnected enough to work with minimal human supervision and capable of making our lives more pleasant and productive. Smart televisions, refrigerators, dishwashers and washing machines are already starting to connect with our mobile devices, enabling us to remotely control or programme our appliances. Intelligent sensors and thermostats will not only automatically tell the blinds to shut, turn the lights on or off and adjust heating levels, but also learn of our preferences over time and respond accordingly. Safety and security worries can now be attenuated as intelligent smoke and carbon monoxide detectors, as well as cameras and sensors, keep us informed of any untoward developments in the home even while we are away. Many of these devices can also respond to voice or motion command. The development and adoption of these connected and intelligent devices in the home are set to escalate in the next five years, and they are poised to create homes that make living smarter, easier and more delightful.

What is not very well known, however, is the concept of a smart home making **us** smarter and more empowered, rather than just making **things** smarter. Genuine concerns that

people have regarding smart homes replete with ever more intelligent connected devices can usually be boiled down to these two. One, many fear connected devices will enable firms to collect by stealth even more data about themselves and their behaviours, thus infringing on their 'right' to data privacy. There are clear worries about digital visibility and exposing our personal data – the fear of firms knowing too much about us and sometimes abusing that knowledge for commercial gains. There is also the unwelcome and already much loathed situation where we are constantly bombarded with an ever increasing barrage of offers and recommendations of products or services that we neither need nor want.

“A smart is society is an empowered society. Most research inevitably focuses on technology. For some reasons, the human being is excluded. I’m very keen not on the smart ‘thing’, but the ‘smart me’.”

Professor Irene Ng,
University of Warwick

Two, they fear the loss of autonomy and homogenisation of choice and behaviour. Having smart appliances do everything for us – from automatically switching to our favourite television channel at a given hour or playing our favourite tracks the moment we turn on music streaming, to suggesting what we should wear today based on information from our diary and the weather forecast – may render the human being less autonomous, less 'mindful' and in some taken-for-granted way

more subservient to machines. Most people welcome smart automation of 'mindless', i.e. routine and low discretion, tasks, such as lights that work based on sensing human presence in the room and dishwashers that automatically turn on during cheaper tariff periods and when fully loaded. But most people, while aren't anti-machine assistance, wish to remain in control of their lives and have the final say in making choices. Besides choice, people also value variety. Few want a pizza automatically ordered this weekend just because they happen to be at the same location and having broadly similar conversations on Facebook and Twitter when one was ordered for each of the past three weekends. As Charles Leadbeater remarks:

“We need to create conditions where people work it out for themselves and be in control, rather than be enslaved by technology.”

The smarter, more empowered 'we' will be made possible by the Hub of All Things (HAT), which is both a personal data warehouse and a multi-sided market platform.¹³ Smart sensors embedded in multiple home devices and appliances, as well as placed in appropriate and strategic places within the home, collect personal data that represents our 'quantified selves'. The data collected is different from secondary data generated by companies, such as supermarkets (through our loyalty cards), e-tailers (through our online buying and browsing behaviour), programme streaming providers (through our watching behaviour) and internet giants (through our search and browsing patterns). These are siloed, vertical data on a relatively small part of our lives, but to which we are not usually accorded access in return.

The HAT, on the contrary, creates a repository of data about us, generated by us and, most importantly, **owned by us**, so that we can apply our own data onto new services and offerings. Because the personal data collected is in essence highly contextual, and because

we own it and control how it should be used, it becomes valuable for trading with companies in exchange for highly customised and personalised products and services that better meet our needs. For example, contextualised data that integrate how much and which brand of yoghurt we consume (e.g. five tubs of Alpro a week), when and where we consume (usually during EastEnders and in the living room), what we do at the time of consumption (usually while also watching television), how frequently we replenish the stock in our refrigerator (once a week) and what other food products we usually consume (dairy-free and organic products) can be mashed with demographic/household data – but they are all on our fingertips; we decide if we would like to share it with the likes of Tesco, Sainsbury, Alpro, Müller, Netflix, Amazon, Google, Aviva, Barclays, or even our own GP.

The HAT therefore augments digitally sophisticated smart homes by empowering the individual to participate in the ‘personal data economy’, make better everyday decisions, and generate smarter monetary and time savings. As the HAT is obviously a very appealing concept to individuals and households, its adoption is widely anticipated to dramatically escalate once launched, thereby creating huge network effects. Birmingham City Council is already embarking on an 18-month £485,000 project to trial the HAT with volunteer households and individuals.¹⁴ Given its appeal, and the fact that the value of our personal data held and controlled by ourselves is worth more than the value data generated by stealth and held by businesses, it is likely that recognition of a change in the ‘balance of power’ will compel businesses to join the platform, as those who are reluctant are likely to count the cost of missing out. But firms signing up must conform to the rules of the game and in full acknowledgement that they do not have the right of access to our data for any other purpose except using them to provide us with better products or services, and unless we expressly give them permission to do so.

Smart homes are creating opportunities for both business and individuals. Connected and intelligent devices make our lives easier, more productive and more delightful; data owned by individuals preserve privacy, put us in greater control of our lives and enable us to make better and more autonomous decisions; a market for exchange of data and commercial offerings can emerge, leading to innovative business models and new markets; and we are all incentivised to generate more data with confidence.

How we work is changing

Case 4: Smarter jobs

Digital technologies are opening up new areas of work, new industries – for example, the UK employs 850,000 information technology and telecommunications professionals¹⁵ – and throughout this paper we have offered examples of digital technologies driving increasing value across other industries.

A key feature of the digital agenda is as an enabler of jobs through the complementarity between workers and digital devices. To date, digital technologies appear to have often been a driver of increasingly complex work. One panellist gave the example of a call centre where the use of more sophisticated technology had enabled it to increase the number of issues which each call handler could respond to from five to 30.

As technology progresses, the nature of this complementarity between digital technologies and jobs is evolving. In the past, the technological limit for computerisation appeared to be its ability to handle highly variable, non-routine and cognitively complex tasks. There is no simple set of rules for how to manage a legal practice, for example. However, it appears that digital technologies are entering a new era of complexity.

Massive data sets, machine learning and other advances mean it is increasingly possible to break large problems down, by for instance cutting problems up into manageable challenges which can be modelled by computers. Dr Carl Benedikt Frey argues that this already and will increasingly continue to place a premium on three types of work in our society.¹⁶

- Perception rich activity – our ability to rapidly discern between different objects and ideas in highly complex environments.
- Creative intelligence – computers and digital networks struggle to discern between creative ideas and value them. Eric Schmidt puts it that “there’s something about humans that technologists always forget. Humans are creative and unpredictable”.¹⁷
- Social intelligence – our ability to understand people and the subtlety of their messages means that we can add the greatest value to computers when roles focus on understanding people.

These actions are where human activity and digital technologies show the greatest complementarities. The significance of perception, creative, and communication based work is important. It implies that training in arts and humanities, our ability to understand people and to think imaginatively, could be just as much of an enabler for the smart society as a good grasp of science, technology, engineering and maths.

Case 5: Smarter coordination at work

Digital technologies are allowing us to rethink how we manage our workplaces. Panellists focused on three areas in which digital technologies are augmenting and improving people management practices.

Recruitment appears to be changing most quickly. Using automated systems to manage applications and algorithms to scan CVs is changing the role of the human resources department. There is a shift from delivering a recruitment process towards managing a process. This is freeing up resources to invest when recruiting for a non-standard position, to invest more in each face-to-face meetings with candidates or to look for the truly creative or distinctive individual. Panellists suggested that this employer-side change is being matched

with applicants exploiting new technology. It was suggested that together this shift is improving the functioning of our labour market and delivering finer and stronger matching between roles and employees.

Secondly, panellists suggested that data driven metrics are also becoming more significant performance management tools. Metrics reach far beyond estimates of the value of productive capacity by including indicators as diverse as company/sector networks, locational information, as well as health and wellbeing measures. Termed human capital metrics, over the next five to ten years we can expect the digital information, which some managers have and use to support decisions, will become the organisational norm.

Thirdly it was suggested that many organisations report that a new generation are entering work and seeing new opportunities to introduce and use digital technologies. Often termed 'Millennials', they are keen to use technology to work more flexibly than before. There also appears to be a very high willingness among younger workers to either use their own devices (a trend known as Bring Your Own Devices, BYOD) or to invest their own money on technology to improve how they work.

This trend was identified as an incredible opportunity for many organisations to unlock user-led solutions and to improve productivity. It appears that unlocking the next level of gains from this agenda is requiring a major reconfiguration, not only in IT support infrastructures, but also in line management support. Survey evidence indicates that high users of technology are also likely to be caused the greatest stress by it.¹⁸

A vision of a smart world of work has often been articulated. A combination of connected work devices, smart joined-up reporting systems and intelligent sensors can usher in a truly post-bureaucratic workplace, where, instead of hierarchical supervision and overly intrusive monitoring being the norm, everyone takes responsibility for the success of the whole and trust replaces suspicion as the default behaviour.¹⁹ Technology can be a 'leveller' by democratising the organisation and empowering employees at all levels with information – the frontline sales representative is not only equipped with all the real-time information that he needs for performing his job and making decisions on the spot, but also has as much access to information as senior management. Open book organisations can now truly live up to the billing. These enhance the sense of parity and increasing the motivation to participate and engage. Smarter coordination through platform technology fosters stronger collaborative organisational cultures.

An afterword on how we work is changing: does the smart society mean the end of commuting?²⁰

Digital technologies, such as tele-presence, are making it easier and cheaper to communicate over distance. However there is little evidence to suggest that in-person

contact is diminishing in economic terms.

- Urbanisation appears to be as strong a driver as ever across the globe as well as within the UK.
- UK 2011 census data suggests that a small but growing minority now work more flexibly on average we are all traveling further to work than ten years ago.
- Finally, while only anecdotal evidence, few would suggest that a strike on the London Underground creates less disruption now than ten years ago – we do still need to travel to work.

This appears to be a paradox. Why, if new technologies make it easier to do things remotely, are we not seeing distance become less important? Many have boldly predicted the 'death of distance' in the past, but technology and geography have a much more complex, iterative and reflexive relationship.

There are many things which make a city valuable; of particular note is the opportunity for repeated personal interactions with a diverse group of individuals. This is especially important for communicating complex ideas which are difficult to articulate or codify. In economic terms these are often associated with either innovation, or high value knowledge intensive work. Successive waves of advances in communications appear to reinforce the importance of this activity.

As long-distance communication becomes cheaper and easier, ideas and activities which can now be codified, parcelled up and shared over distance can be opened up to competition and delivered anywhere in the world. This typically means that their price falls relative to activities which stayed in nodes. Urban activities can therefore develop, become more specialised and more valuable.

The implication is that digital communication technologies are opening up new opportunities for peripheral areas, but this doesn't come at the expense of urban nodes. It may even re-enforce their economic importance.

How we play is changing

Case 6: Smarter socialising through social media platforms

Few will argue that digital technologies have revolutionised the way we communicate and socialise. The emergence of online virtual communities has created new opportunities for us to socialise and connect, and has changed the way we do so. The use statistics for UK social media hint at how highly people value these services. Facebook has 31.5 million UK users (24 million of whom log on each day),²¹ Twitter has 15 million,²² and LinkedIn 10 million.²³ A recent Ofcom report shows that people are using social media more regularly.

60% those with an active social media site profile visited these sites more than once a day last year, up from 5% in 2012.²⁴

These mass-use platforms offer people new ways to keep in touch with the people they are interested in. Here, or on blogs, we are able to passively push out information about our lives, offering others the choice to interact with or ignore us. Alternatively, we can choose to use more active, even ephemeral communication platforms such as Snapchat.

Social media enables us to know more about each other, providing a richer context for our conversations. Now when we meet up, our friends already know that we went to Hong Kong last month, and can jump straight into discussing how it was. Platforms such as Glimpse allow us to keep track of and check on the health and safety of our families. Our loved ones no longer worry if we got home safely because they see we have checked in. Likewise, most of our MPs and public figures nowadays keep us informed of their activities and whereabouts through social media.

The era of smart has the potential to push the use of social media and platforms to another level, one where we are able to innovatively harness the power and potential of the crowd to improve everyone's lives. We have already seen the possibilities for these platforms to help in mobilising communities and mass groups in recent years. For example, social media was crucial to Barack Obama's victory in the American Presidential Election.²⁵ The Guardian suggested there was an important link between social media and the Arab Spring.²⁶ While social media was criticised as an inadvertent driver of the 2011 London riots, they also became an enabler that galvanised social action to tidy up the streets in the following days.²⁷

Social platforms that mobilise the financial resources of the masses, or better known as crowdfunding, enable us to pursue both business and leisure ventures where traditional forms of funding are impossible. Platforms such as Kickstarter and FundingCircle blur the boundaries between work and play – the smart watch Pebble, a project funded through Kickstarter, is a prime example of this. In a similar fashion, social media and platforms are also increasingly used to connect crowds of people with specific or even obscure interests, whether it be a dating site for people with a particular interest, a DIY forum, or the subset of eBay's 14m users²⁸ with an interest in trading and collecting novelty paperclips.

Panellists, however, contended that it would be down to users to ensure we find ways to get the greatest benefits from the next wave of advances in social media. Building a deeper appreciation of privacy implications associated with social media use as well as users finding ways to prioritise and manage the flow of information from multiple social media platforms were perceived as key enablers for such advances.

3

How is the smart society improving our lives?

Based on our evidence, we can see smart technologies are improving our lives through three broad routes. We're beginning to do everyday things more efficiently and effectively. Digital technologies are changing the norms of relationships, making new types of relationships possible, and broadening and strengthening our ties with each other. They are also unlocking new types of business models that create, deliver and capture value through increased efficiency and effectiveness, new forms and norms of relationships, and novel and complementary products or services.

Smart technologies enable us to do things more quickly and more effectively

Efficiency and effectiveness are at the heart of how we live, work and play in a smart society. While we used to think of the search engine and online shopping as the epitome of efficiency and effectiveness, the era of smart is far more ambitious. Connected devices, digital networks and smart systems enable us to get domestic and everyday tasks, especially the mundane ones, done more quickly and in ways that better meet our needs. They are also capable of achieving increased productivity at work, as well as enabling us to reduce the stress and hassle that detracts from our leisure.

"A smart society is where there are possibilities for the 'faster, cheaper and smaller'."

Charles Cotton, serial technology entrepreneur

At the very basic level, smart communication technologies enable us to get in touch more easily and more quickly with people in other parts of the world. Intelligent appliances, however, are increasingly able to do a lot more. Smart washing machines, for example, can intelligently detect the most effective combination of detergent amount, wash cycles and spins to deliver a good wash. Distributed systems that include our local grid and telecommunications exchange are able to optimise electricity and broadband within a neighbourhood, thus enabling us to save on energy usage and spend, and enjoy faster internet connections.²⁹ Mobile payment systems allow us to order and pay ahead for our lunch so that it is ready for collection at the desired time, letting us skip the queue. Likewise, precious time can be saved and reinvested in other tasks or relationships that matter when we are spared the long queues at the bank, the station ticket machines and theatre ticket offices.

The advance of the Oyster card system has given Transport for London the chance to generate better information on how people move around the city, from which we can optimise our transport system to reflect this information and to eventually facilitate intelligent mobility. Autonomous vehicles are able to help us get from one place to another more quickly, because self-driving cars 'talk' to each other as part of a M2M constellation, and are therefore able to optimise speeds and routes. Remote health monitoring devices provide a

continuous flow of information for analysis that can improve the accuracy of monitoring and the flexibility of those living with health conditions to pursue a normal life. More importantly, they also enable faster and more effective intervention upon detection of potential problems. Ben Hammersley captures this succinctly:

“[Smart is about] ambient data capture that you can use to make your system more efficient.”

It is undeniable that throughout the history of economic production, advances in automation have greatly increased productivity. It is now possible for our shopping to be delivered overnight when it used to take several days. Advances in drone technology may even reduce this to a matter of a few hours. Smart tracking technology enables goods to be tracked all the way from production floor to retailers’ shelves, thus enabling speedy intervention should any untoward circumstances occur along the way.³⁰ People management metrics can complement traditional approaches to human resource management by improving decision making and therefore productivity.

“A smart society is one that generates and uses knowledge to be more successful.”

Charles Leadbeater, author and opinion leader

Public services delivery can be more efficient and effective with the aid of smart technologies. Wearable devices are capable of enhancing law enforcement by capturing suspect visuals and applying algorithms to search social networks and databases of known offenders or outstanding warrants for a match. These devices are likewise able to help healthcare

professionals instantly check patients’ medical history, perform quicker and more accurate diagnoses, and applying the right treatment – all without having to trawl the archives or leafing through papers.³¹

Smart is enabling new ways for us to relate to each other

Relationships are at the heart of the smart society notion, and digital technologies appear to be changing the ways we relate to each other. Whether it is about the way we connect with each other, the spatial and temporal dimensions of our communication, the breadth and depth of our connections, or the meanings that are conveyed and experience shared, the use of new connected technologies and networks changes the dynamics of our relationships through the following five levers:³²

Directness

We can see and interact with each other more directly in real time as a result of digital technologies that enable real-time visuals such as video conversations via smartphones or conferencing devices. Richer, non-verbal cues detectable in face-to-face contact enable candid and quick exchange of ideas, and minimise the possibility of messages getting lost in interpretation or being wrongly decoded, thus avoiding future misunderstandings. For example Corning, the manufacturer of glass and ceramics, discovered that 80% of their innovative ideas came from face-to-face contact, and that the engineers were only willing to

walk a maximum of 100 feet from their desks to talk to somebody else.³³

Greater directness means the world is effectively shrinking. Whether virtually or physically, smart applications are giving rise to what Charles Cotton calls 'cluster societies'. He adds:

“Societies are in a way becoming more ‘local’, particularly as people are better connected.”

These clusters, however, are not meant to be a perfect substitute for in-person communication, which is the ultimate form of directness and is most appropriate for certain types of interactions, for example consulting the GP regarding a potentially serious condition, or interviewing candidates for a vacant position. But when we really and urgently need to be there in person or to get home for the important events – the birth of a child, our kids' school play, Christmas, or our nan's 80th – smart cities' intelligent mobility systems powered by real-time data and synchronisation of end-to-end journeys facilitate seamless travel, thus enabling, as they say, the unmissable to become actually unmissable.

Continuity

Digital technologies also allow for continuous and more regular interactions, particularly when it is neither possible nor desirable to meet in person, or when we are geographically dispersed. Think about still being able to call home to wish mum happy birthday whilst caught up at work, or to hold routine weekly catch-ups with a client based in another region, or enable our GP to monitor our condition without stepping into the surgery. The increased continuity in interactions that communication technology promotes can be instrumental in strengthening family bonds, and a study shows that three quarters of teenagers feel having a mobile phone makes them closer to their parents.³⁴

Multiplexity

Increased directness and continuity in relationships often lead to higher levels of multiplexity, that is having deeper knowledge of others and wider understanding of situational contexts in relationships. Thanks to the health devices we choose to use, our GPs are able to monitor our health conditions more closely and regularly. This makes it possible for healthcare professionals to better understand our health history and lifestyles, and repurpose the relationship towards a deeper discussion focusing on potential interventions, management of conditions and education. The wise and prudent use of social media, for example, allows us to regularly keep loved ones and friends informed of each other's activities or whereabouts.

Teachers at all levels are also able to use increasingly sophisticated student performance data, new communication platforms and advanced digital tools to better connect with their students. Smart sensors, connected devices and smart systems that enable automatic performance logging and data reporting cut out paperwork or bureaucracy, thus freeing up time for teachers to interact with pupils and to build a stronger relationship and understanding. This in turn allows for the building of greater empathy, which Charles Leadbeater believes is an important ingredient of a smart society:

“Technology can actually enhance relationships, as it helps us become more empathetic. We need more empathy, not just technical proficiency, in society.”

Parity

Digital technologies are a leveller – they enable all sections of society to engage with each other on equal footing. Digital technologies in personal banking are moving us towards a culture of DIY where we can take more control. We can manage more aspects of our accounts ourselves, and have the choice of when and where to do it. In other words, we now have a big say in how we wish to use banking services. Digital technologies ‘democratise’ the organisation and empower employees at all levels with information – the frontline sales representative is not only equipped with all the real-time information that he needs for performing his job, but is also accorded access to much wider organisational information befitting the concept of ‘open book organisations’.

Commonality

We are increasingly able to focus our relationships on striving towards common goals when there is shared purpose in our relationships. In the workplace our managers have increasingly large amounts of information about our performance which can be used to better support development. The use of technology within teams means that individual roles can be more specialised with an improved division of labour among colleagues, or even across our labour market. Digital technologies also enable the attainment of high levels of social capital, which is the collective value of all social networks and the inclinations that arise from these relationships to do things for each other.³⁵ The empathy and shared purpose that comes from possessing high social capital ensures our lives are mutually enriched.

Smart is opening up new business model possibilities

The most radical effects of technological innovation are nearly always associated with new business models, yet this is often the part of innovation we understand the least. Our evidence suggests that smart technology creates new value through novel business models that are capable of unleashing meteoric efficiency improvements and allowing for stronger and more meaningful relationships. Business models in the era of smart are characterised by the following five interrelated key features.

Platforms and networks

The Internet of Things and machine-to-machine communication technologies will underpin hyper-connectivity, the crux of the smart society, meaning that business models harnessing the power of platforms and networks will be increasingly common. Platforms create multi-sided networks, where consumers, businesses and government interact in smarter ways to create value.³⁶ This will have profound implications on the way we live, work and play.

For example, the smart home augmented by the Hub of All Things platform effectively

creates smart households. Businesses use the HAT platform to provide more personalised and tailored products and services to households. Armed with real-time information and being in control of our personal data, households will be able to make better everyday decisions, including spending on food and non-food items, energy usage, choice of diet and amount of exercise to be undertaken. The already-pervasive social media in our society today are essentially platform-based business models that enable the creation and spread of networks. From Facebook and Twitter to Instagram and YouTube, an unprecedented number of people around the world can now be connected to each other, thus reducing the so-called 'six degrees of separation' and enabling new, or closer, relationships that could never have been imagined just a generation ago.³⁷

Platforms and networks will only escalate as our society powers ahead towards the era of smart. They will soon be quite ubiquitous – they already form the basis of our smartphones, our digital newspapers and news portals are in fact platforms, mobile payment platforms will soon turn our smartphones into our wallets, entrepreneurs are turning to crowdfunding platforms to raise funds, and we will soon find them in our autonomous vehicles.

Big data

If platforms and networks are the engine of smart applications, big data is the fuel that powers that engine. Business models where platforms are an integral part harnessing the potential of huge amounts of data to deliver products and services that improve our quality of life. As one technology expert argues, connectedness alone doesn't mean 'smart'. In making a point on the importance of exploiting opportunities afforded by big data, he suggests:

“Smart is the next step that requires data exchange that is purposeful, that solves some known problems and that joins up different categories.”

Autonomous vehicles combine high volumes of real-time structured and unstructured data – 1GB per second, or 2 petabytes a year³⁸ – and predictive algorithms through Complex Event Processing (CEP) giving us the convenience of getting around safely without actually driving,³⁹ an undoubtedly welcome assistance in heavy rush hour traffic. Similarly, the HAT combines massive amounts of our personal data collected by smart sensors, and layers them with context through triangulation, to help us make better decisions and obtain products and services that better meet our needs.

Big data-powered services also help us work smarter. For example, services like Reuters Market Light combine localised real-time weather information and the latest forecast with near pin-point accuracy with tailored and context-specific technical advice to help farmers optimise their farming operations. Personalised healthcare, one of the features of a smart society, is similarly powered by unprecedented mash-up of data from sources as disparate as our health history, our diary, the weather, levels of pollution, propensity to take public transport, the conditions of those around us, our recent diet and our exercise activities.

Deep personalisation and mass customisation

Digital technologies enable fresh approaches to the manufacturing, design and delivery of

almost everything, hence allowing products and services to embed digital interfaces for personalisation and connectivity. Smart defies paradox – the emergence of novel business models that allow the masses to custom-purchase by deeply personalising their acquisition means products and services can better fit our lives.⁴⁰

Deeper personalisation and mass customisation generate new ways for individuals to receive different experiences from a common platform, whether the use of 3D printing to create individually tailored shoes, or using an algorithm to tailor the experience of a video-on-demand service such as Netflix. Our smartphones are arguably the most deeply personalised device we own. High-end hotels similarly offer highly tailored hospitality down to the minute details. But in the era of smart, this trend becomes the norm, and is accessible to the masses, as it will commonly extend to personalised healthcare services, energy tariffs, financial products and even dining and leisure experiences.

Horizontalisation

Thanks to connected devices and smart platforms, business models of the future are also able to increasingly transcend verticals and provide a previously unimaginable array of services on a single hub. The smartphone is the catalyst of this revolution. While we previously needed to purchase and carry the camera, alarm clock, calculator, DVD player, laptop, mp3 player, maps, satnav and notepads as separate items, they all now form a neat, and easily obtainable, collection in our smartphone. There is no doubting the convenience and efficiency gains we enjoy from a one-stop shop.

The era of smart living will usher in many more of such hubs. For instance, our smart TVs and tablets, too, can be the ‘control centre’ of the HAT at home, enabling us to adjust everything from radiator levels and lighting to washing machine and dishwasher timers. Perhaps even more engaging for the family is the role of the smart TV in further enhancing our omnichannel shopping experience. Not only can we use the smart TV for online shopping similar to the way we currently do so on the PC or mobile devices, we are also able to identify a dress seen worn by our favourite actress and instantly discover where we can purchase it, place an order and arrange for collection – all these while sharing the discovery with the family. Smart TVs with smart sensors, or those connected to other smart devices, can also perform a quick scan of our irises, or read data from a diagnostic patch applied on our wrist, and produce basic diagnoses of our health condition every day, and thereafter provide a range of lifestyles options we can choose from.

*“Every company needs to ask:
‘What are our horizontals?’
Horizontal business models are
the most innovative and able to
understand where value
creation comes from.”*

Professor Irene Ng,
University of Warwick

Co-creation and democratisation of production

Our role within production networks and value chains in a smart society is radically transformed. No longer are we passive buyers of goods and services that firms roll off the production line and market to us. Due to the boundless possibilities enabled by a combination of connected devices, big data, digital technologies and smart platforms, we are

able to actively participate in the production process and engage more closely throughout the value chain. The era of smart is the era of co-creation. Roland Harwood, describes one client's strategy as open and smart because:

"...even as a relatively small company, it is able to harness the power of the crowd and creativity of its network to create new products that the market wants."

Through the HAT, for example, we can co-create products and services that fit our needs and wants almost perfectly by supplying our context-rich personal data to businesses of choice and public services. No longer do we simply consume drugs that can supposedly cure our condition, but participate with healthcare providers and pharmaceuticals to co-create personalised and integrated healthcare solutions that better meet our needs. We increasingly co-create a variety of entertainment, leisure and productivity content via platforms such as video-sharing, self-publishing and open source software.

The smart society will also experience a democratisation of production as a result of deep personalisation and co-creation that is enabled by 3D printing. Smart additive layer manufacturing technologies have the potential to place production choices much more in the hands of individuals, resulting in disruption to traditional supply chains in similar vein to what happened in the music industry. The individual will enjoy an unprecedented level of autonomy and choice.

4

Five enablers of smart society UK

The evidence presented above confirms that the UK is becoming a smarter society. To date four factors have been highlighted as underpinning our progress: our society's willingness to embrace the digital revolution; our capacity for design and creativity; our deep institutional architectures for knowledge sharing (i.e. academia-industry-government collaboration); and our ability to link up, join or combine multiple agendas to create value. Nevertheless, as with any technical, economic and social shift on this scale, society must continue to evolve so as to keep on benefiting.

Progress in the last decade has been immense, but more needs to be done. As some of the panellists suggested, the path towards a smart society is unlikely to be straightforward. Professor Irene Ng, for example, describes the journey as follows:

"It's not linear progression; it is quite a step change, but a discreet step change."

Our research has identified five areas where we will need to focus on if we want to maximise the gains from the next wave of smart society developments:

A data friendly culture, reinforced by trust and responsibility

Every now and then we hear the pronouncement 'data is the new oil'. Whether that is entirely true is open to debate, but what is beyond doubt is that data is the currency of the smart society. Flows of information are at the core of almost all of its benefits. The growing popularity and applications of big data are creating countless possibilities out of the rapidly increasing volume, velocity and variety of data. However, just as the veracity of data is becoming increasingly important, these possibilities will not be realised without a culture of trust and confidence about how data is used.

On the one hand, we need a society that is more proactive and ambitious in generating, using and consenting to the use of data for genuinely beneficial purposes. On the other, we need those who are entrusted with data to exercise responsibility and good stewardship, thus reinforcing a virtuous circle of trust and responsibility. Over time the virtuous circle becomes a norm, and when widely embraced by society it becomes an integral part of our culture.

Empowered and digitally literate citizens as enablers of the smart society

A key element of building trust is developing understanding and knowledge. It is important that consumers understand the benefits when they share data – that they know when and

where they are taking risks. This means knowing how to avoid sharing data with organisations which they do not trust, not unlike most email users who by now are sufficiently prudent to disregard attachments or hyperlinks from suspicious senders or spam. This ability of citizens to be in control of their own data was highlighted by a number of panellists as a vital enabler of greater trust in data and a way to drive the responsible use of data across our ecosystem. This may also require us to think very differently about data ownership as well as data education.

The smart society and digital technology in general have the potential to be an incredible force for inclusion. The internet is a fantastic open source of knowledge, and many digital markets have low access barriers and require only low levels of capital for start-ups.⁴¹ Delivering empowered and digitally literate citizens will be crucial for realising this opportunity. After all, a society is only as smart as the people that collectively constitute it.

Empowering public institutions offering smart leadership

Smart is much more than a technology question. The case of smart cities above shows the complex interactions between technology, citizens and democracy. There are increasing opportunities for the government to help invest in the platforms, relationships and networks that are needed to open up new opportunities for a smart society.

“To become smart, the players involved must have greater vision.”

A technology expert and analyst

Radical innovations and many of the smart society advances identified above depend on the formation of new markets to bring people together in new ways. The formation of new markets is, however, complicated and inherently prone to market failure.⁴² A key strength to date has been the UK’s ability to support the emergence of new activities. The work of the Technology Strategy Board, our new Catapult Centres and the Cabinet Office was highlighted by many panellists as crucial to our future success. Nevertheless, more investment in this type of activity will be an important enabler. It is also essential that these institutions are able to work with regulators to help them to adapt flexibly to the new regulatory environments demanded by new markets.⁴³ For instance, this could mean championing the emergence of new general purpose technologies, such as 3D printing and digital applications of big data.

Enabling infrastructures

The rise of digital technologies is inevitably making increasing demands on our infrastructure. Increasing public and private investment will be required to meet these demands and to put in place an environment in which creativity and innovation can flourish.

It is important to consider both hard and softer enabling infrastructures. A number of panellists identified one area of data management as a key enabler: the idea that more consistent data regulations across Europe could help to open up new possibilities for the UK. Panellists suggested that by moving us towards a more complete EU single market could

help to transform the scale of the UK market for digital solutions. However, the success of any changes will depend on consumers having trust in arrangements and confidence that their privacy is maintained.

Enabling open platforms and open markets

Connectivity, a theme that is central to a smart society, is not just about technology. It is also very much about people; in fact, it is *ultimately* all about people. Success in building a smart society will depend on our ability to bring people together. This agenda is not about citizens in isolation, nor businesses, governments or universities on their own. It is not even about the bilateral interactions alone. It is about engagement in smart networks. The collective efforts of all are needed to co-create open platforms, new products and services, and new markets that will ultimately serve the purposes and needs of society. The importance of concerted efforts is well expressed by Charles Leadbeater:

“A smart society also requires greater civic and public sector involvement, not just the private sector driving it.”

Our ability to establish open platforms, where networks of individuals and communities can share ideas and information and mobilise collective action, is an indication of how ready we are to enter the era of smart. The most optimal architectures for data-sharing must not come from businesses alone, but also from individuals actively participating in shaping those architectures – the HAT, for example – that will ultimately affect the way they live, work and play. Business models can no longer be developed in isolation from what consumers really need or want. Instead, smart business models are those that are co-created with those who will eventually consume the products or services. Similarly, public services of the future are not just about across-the-board digitisation to enable remote access, or the stripping back of red tape to increase efficiency. Instead, they must also be about enabling truly joined-up services, which can be best created only when the public engage with the government to shape them. The private and public sectors must work alongside the third sector, universities and individuals using open innovation approaches to stand the best chance of spawning solutions that can truly, and more effectively, improve our lives. Getting this right is an agenda for us all.

“We need integrators and platforms and an underpinning reference architecture.”

Volker Buscher, Arup

5

Next steps

Smart is an evolving and an aspirational concept. As a society we need to continue evolving and aspiring towards a better, smarter future. The UK is broadly on the right track, although the future development of our smart society will depend on our ability to build a data friendly culture, support the development of truly empowered digital citizens, develop the capacity of our public sector to support this work, invest in key elements of infrastructure, and collaborate to unlock new open platforms and open markets.

This paper reflects the views expressed to us in interviews with our panel of experts as well as our supporting research. This work draws on the Big Innovation Centre's three core themes: mapping innovation ecosystems, enabling open innovation, and capturing value from the rise of general purpose technologies.

The next steps for this project will be for us to test these messages with our panel of experts as well as a number of wider stakeholders. We will be selecting a number of topic areas to investigate in greater depth, and will be reporting the findings from our research later in 2014.

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