MAKING WALES BETTER

GWNEUD CYMRU WELL

Our *Smart* Region

using *smart* technology
in the Cardiff Capital Region
to improve public services,
infrastructure, and the economy

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About us

We are the Institute of Welsh Affairs (IWA), Wales' leading think tank. We challenge, inspire and drive change, making Wales a better place to live and work for everyone.

We are independent of government and political parties.

We bring together experience and expertise from all backgrounds to collaborate on the most important issues facing Wales.

We come up with ambitious but practical and informed ideas to improve the economy, education, governance, health and social care and the media.

Our vision is to create a Wales where everyone can thrive.

For more information about the IWA, its policy work, and how to join, as either an individual or corporate supporter, contact:

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Foreword

The challenges facing Wales are well known and well rehearsed. They include, but are not limited to: increasing demand for already strained public services; significant regional inequalities; and ageing infrastructure. In times of pressure, it is tempting to retreat, to batten down the hatches and try to protect what we know as the status quo.

But we also have much to celebrate. Even in these most difficult of economic climates, and facing considerable uncertainty, Wales is innovating and exploring new ways of doing things. Across the public sector, private sector, academia, and civil society, people are exploring how digital tools can provide new solutions to long-standing challenges that are not going away.

Yet none of us has the answers on our own. To make the greatest progress, we need to draw on all of Wales' diverse resources. We need to create spaces in which our skills, experiences, ambitions and hopes can collide. Spaces which value the input of citizen activists as much as that of more traditional organisations and institutions.

This project is about more than just envisioning a smart and futuristic reality for the Cardiff Capital Region. We offer our report and recommendations in the hope that we can help shape the approach and the ambition of the Cardiff Capital Region itself.

We firmly believe that though this report focuses on the Cardiff Capital Region, its recommendations will be equally applicable to other city regions and growth bids across Wales and indeed the UK.

To deliver this project we sourced practical support - both financial and advisory - from a diverse group of partners across academia, the private sector and civil society, bringing together a mix of organisations who might otherwise not come across each other but who similarly shared our belief that the City Deal could be transformative for the region.

We spent time over the following months engaging with the Valleys Taskforce Digital Workstream, and the leadership of the Cardiff Capital Region City Deal to understand the challenges from their perspective. We have also looked outward, finding great examples so that we steal with pride from around the world.

We want to inform, inspire and catalyse collective action. We are aiming to start a conversation, a wider conversation than the one that is currently happening, and a better conversation between citizen activists, people in communities, civil society organisations who work in the region, businesses large and small, academia and local authorities. The benefits of the Cardiff Capital Region City Deal need to be known and felt by everyone.

We are particularly grateful to The Open University for the discussion we shared in the summer of 2017 that sparked this project. Our thanks also go to all those who have given their time and expertise to this project so far.

There is plenty still to do.

Auriol Miller
Director, IWA

Messages from the Advisory Group

Arup

'Digital technology – when it's used with purpose – has great potential to support communities. *Smart* approaches can encourage greater economic participation, improved public services, fairer and more sustainable governance, and enhanced social connectivity. Unlocking this promise requires new and often unfamiliar approaches to collaboration between public and private bodies, and must be underpinned by shared values. Arup welcomed the opportunity to participate in IWA's *smart* region study and to work alongside a diverse set of stakeholders. We were pleased to contribute to this report's clear set of recommendations about how the Cardiff Capital Region can take positive steps toward becoming a *smart* region.'

Dan James – Digital Strategy Associate

BT

'As a leading employer within the Cardiff Capital Region, BT is excited to support the IWA *smart* region project. Without great connections, the Internet of Things is just 'things', separate objects, ideas and innovations that might well be great in their own right but aren't fulfilling their full potential. At BT we see the CCR City Deal in the same way. It is a fantastic opportunity to leverage new connections, collaborations and technologies to deliver better social and economic outcomes for the region and the people who live and work here'.

Jeremy Smitham - Commercial & Service Management Director, Business & Public Sector

Cardiff University

'The Cardiff Capital Region has many of the ingredients it needs for a digital future. However to thrive, the region needs a common identity to synchronise its efforts and resources - including its people, public services, institutions and businesses. Cardiff University is pleased to support the IWA's *smart* region project, which has brought together a uniquely diverse group of partners to consider the steps towards a shared vision for the future with digital innovation and citizens' well-being at its centre.'

Prof Kevin Morgan - Professor of Governance and Development.

Centrica

'Centrica is helping Wales get smarter. Data, digitalisation and decentralisation are giving our customers more control – from the *smart* meters we're installing in homes and businesses to the sensors, battery storage and other solutions that are cutting carbon and costs for industry and across the public estate. As we transition from a traditional utility to a technology-driven energy and services company, we want to collaborate with others to gain a better understanding of what these changes mean for smarter cities and smarter regions.'

Nick Speed - Head of Public Affairs and Policy

Microsoft

'Microsoft has been delighted to be involved in helping to shape the opportunities that the Cardiff Region City Deal will bring. Significant opportunities are available for all when we focus on digital transformation which can enable information, collaboration, productivity, and prosperity for the region. Supporting this transformation is the need for improving digital skills and its positive effect on enabling employment and growth. We work to drive greater economic opportunity, inclusion, and empowerment of people through our broad set of resources, in our quest to empower regions, communities and individuals.'

Neil Aubin - Digital Adviser for Wales

Next Generation Data

'NGD builds and operates Data Centres at its Campus in Newport. Founded by a group of entrepreneurial Technologists, its focus is to provide quality and robust services to Local business, mid-size enterprise and Multinational organisations. NGD therefore operates at the forefront of the digital economy and believes that technology should be available to all. It is for this reason that NGD supports the IWA in the *smart* region project. It is our belief that strong commercial and public sector links will continue to facilitate and enhance the digital transformation across the region.'

Justin Jenkins - Managing Director

The Open University

'The Open University's Knowledge Media Institute has over 25 years' experience in data science and emergent technology and has been active in Smart City research and application for over 5 years. The wider university has strong research and application capability in the technological and social aspects of urbanisation.

I was an executive member of MK:Smart (the pioneering Smart City project in Milton Keynes) and work globally with corporate, academic and government partners in Smart City delivery. I am proud to be a part of the IWA activity, bringing experience and knowledge together to consider options and recommend actions to help the Cardiff City Region deliver *smart* solutions for all of its communities.'

Alan Fletcher - Business Development and Lab Manager, Knowledge Media Institute (STEM)

The Valleys Taskforce

'As the lead member for digital on the Welsh Government's Valleys Taskforce I was very pleased when the IWA took up the gauntlet on this most important topic. Digital/*smart* technologies are at the core of the new global industrial revolution. Their impact on the economy and the well-being of citizens is already immense and will become even more pervasive and impactful. IWA's report contains concrete proposals on how listening to citizens and working with partners allow us to maximise the benefits.'

Ann Beynon - Member of the Valleys Taskforce

The Wales Co-operative Centre

WCC is an economic development agency supporting inclusive growth. It delivers Welsh Government's digital inclusion programme, Digital Communities Wales.

'Opportunity knocks for the Cardiff Capital Region to become a world leading smart city region. The prize includes better public services, a stronger economy and an improved quality of life for citizens. As we take this work forward it is vital that new technologies are used to serve the interests of local people and we equip citizens with the skills and confidence to take advantage of what these technologies have to offer. WCC was pleased to support this important IWA project.'

Derek Walker - Chief Executive Officer

Y Lab

'Through our work at Y Lab, the Public Services Innovation Lab for Wales, we have witnessed how public services in the region are under considerable strain. Despite the challenges these strains pose, we have seen many examples of innovations that embrace the power of technology. We see this report as a way for Y Lab to contribute to a process of building collaborations, sharing learnings, and supporting new smart approaches. All key features of a healthy system and co-ordinated approach to a Welsh *smart* region.'

James Lewis - Academic Director

Contents

Glossary

CCR	Cardiff Capital Region – the geographic area
CCRCD	Cardiff Capital Region City Deal – the agreement between the councils and governments
the City Deal	Refers to the governance structures in the CCRCD
IoT	Internet of Things
GVA	Gross Value Added
LoRa	Technology developed by the LoRa alliance of companies to allow Wide Area Networks to be used openly by different technologies
WAN	Wide Area Network – wireless computer networks spread over several kilometers
IWA	Institute of Welsh Affairs
AI	Artificial Intelligence
GDPR	General Data Protection Regulation
WIMD	Welsh Index of Multiple Deprivation
CSA Catapult	Compound Semiconductor Applications Catapult
5GRIT	5G Rural Integration Testbed – investigating the uses of the next generation (5th) of mobile connectivity in rural areas
AR	Augmented Reality – an interactive experience where real-world objects are 'augmented' by computer generated images or information
ISP	Internet Service Provider
CIGI	Centre for International Governance Innovation
MOOC	Massive Open Online Course

About the IWA project 'Our *smart* region'

The aim of the IWA *smart* region project is to produce practical short to medium term recommendations and secure commitment to using *smart* technology to maximise the positive impact of the Cardiff Capital Region City Deal for the people who live and work in the region.

This project has three objectives:

1. **Inform:** to understand and capture *smart* activity already happening within the CCR
2. **Inspire:** to collate and present inspiring examples from *smart* cities and regions around the world
3. **Catalyse:** to generate collective commitment to action to build a *smart* region in CCR and other regions of Wales.

We want to capture this learning so this approach can be translated to other regions of Wales and the UK.

We would like to thank Arup, BT, Cardiff University, Centrica, Microsoft, Next Generation Data and The Open University, who came together to fund and support the IWA's *smart* Region Project. They did so because they shared our belief that the Cardiff Capital Region City Deal could be transformational for citizens and businesses, but only if the region works collaboratively to become greater than the sum of its individual parts.

We would also like to thank the project Advisory Group, which was established to provide expert oversight and support for the project. This group includes representatives from the seven funders as well as representatives from the Valleys Taskforce, Wales Cooperative Centre, and Y Lab.

Finally, we would like to thank all those individuals, businesses and institutions that have shared their expertise with us during the project's development.

Executive summary

This report explores how the Cardiff Capital Region City Deal could use *smart* technology to improve the lives of the people who live and work here – and at the same time strengthen the region's economy. It proposes six steps to accelerate the introduction of *smart* technological approaches and to move the CCR toward becoming a *smart* region.

What is *smart*? *Smart* is a term with its origins in computing, as an acronym for *s*elf-*m*onitoring, *a*nalysis and *r*eporting *t*echnology. Today, *smart* is used to describe a diverse range of networked and data-driven technologies designed to sense and analyse conditions in order to adjust their function automatically and improve performance.

Smart cities or *regions* are those that deploy *smart* technologies in ways that automate aspects of key systems or operations, improving their performance quality and efficiency. A central element of *smart* systems at a city or region level is the automated use of data to optimise services and make better decisions.

Why *smart*? The power of *smart* technology is not what it is, but how it is deployed and whether the purpose of *smart* technology is of social value. Leaders in both the public and private sectors in the CCR have the capacity to make critical choices about how *smart* technology will transform daily lives.

Smart technology is already beginning to change how we live. When we use a watch to tell us how active we have been, an app to see when the next bus is coming, or a *smart* meter to manage our energy use, we are using *smart*, data-driven technology to understand ourselves and our environments better – and to make decisions.

If *smart* technology is already making our lives easier in small ways by providing us with new information to make better choices, imagine the difference *smart* could make if delivered at scale to improve our public services, our infrastructure, and our economy.

It is clear already that *smart* technology will become a central pillar of infrastructure design, spatial planning and the transformation of public services. Communities around the world are beginning to use *smart* technologies to create new solutions in essential areas such as healthcare, essential public services, resource management and democratic engagement. This is how *smart* technologies can improve well-being and environmental quality.

Why *smart* now? The Cardiff Capital Region City Deal (CCRCD) provides a time-limited opportunity to drive action on *smart* technology in south east Wales. We have used the region to consider the type of approach and actions needed to create *smart* regions across Wales and beyond.

Concerns have been raised by a range of organisations in Wales about the power of city deals to improve the lives of the most disadvantaged. We agree that the CCRCD should not be seen as a panacea, capable of resolving all of the region's problem. A package of initiatives will be required to address inequalities. However, we believe that if the right steps are taken, the CCRCD could play an important part in improving the region's infrastructure, services and economic performance. In this way, CCRCD has the potential to improve outcomes for people across the region. This report argues that taking action to move toward becoming a *smart* region should be a priority for the CCRCD.

We have worked with partners to explore *smart* region thinking and how it could be applied within the CCR. To that end this project has:

— engaged across the region to uncover what is already happening

— looked around the world to find inspirational best practice

— proposed six recommendations designed to catalyse action and accelerate movement toward the emergence of a *smart* region.

We believe by taking a *smart* approach to developing the region, the potential benefits of the CCRCD could be far more significant and lasting than its stated economic aim of a minimum 5% rise in Gross Value Added (GVA).

What's already happening in the Cardiff Capital Region?

Governance and decision-making

The Regional Cabinet of the Cardiff Capital Region City Deal, comprised of the 10 leaders of the 10 local authorities which make up the deal, has begun making decisions that affect the region, such as agreeing a strategic business plan and providing a loan to the Compound Semiconductor Cluster.

However, the work of the Regional Cabinet and the groups that support it is not yet well communicated or understood by the public. Meeting minutes, agendas and papers are not readily available via the CCRCD's website. Other communication channels, such as social media, provide limited information and are often used to broadcast rather than to initiate conversations.

In discussions we have had with CCR stakeholders, it is clear that many do not know how to engage with the CCRCD. This includes businesses, academic bodies, healthcare providers and community groups. With no clear routes for communication and engagement, we are concerned that the number and variety of ideas brought to the table will not reflect the diversity, talent and expertise within the CCR. This could have a particular impact on the region's future progress – or lack of it – in recognising how best to use smart technology for better performance and to improve people's daily lives.

A fragmented start

Within the region, there are promising examples of work being done to bring *smart* thinking and technology into wider use, including:

- Cardiff's SmartPark App, which provides real time information on available car parking. The system of SmartSpots that supports this app has the potential to support a Cardiff Internet of Things network.
- The Princess of Wales hospital in Bridgend is trialling a *Patients Know Best* app across 10 departments. This allows patients access to their care plans, medical records, test results and secure video links for remote consultations via mobile phones.
- The Monmouthshire 5G rural integrated testbed will trial 5G technology across rural areas, addressing *smart* agriculture, tourism and increasing internet speeds for poorly-connected communities.
- Thethingsnetwork is a tech community group working to establish a free-to-use LoRaWAN in the Cardiff Urban Area, which will allow sensors and other devices deployed anywhere in the area to connect to the internet.
- Cwm Taf University Health Board has trialled the use of sensors that transmit vital data on unborn babies' heart rates to midwives and consultants while mothers are at home.
- The Wales Co-operative Centre's Digital Heroes project helps develop the confidence and skills of the 15% of people in Wales – around 400,000 adults – not online. The scheme trains young people as Digital Heroes to pass on their digital skills so people learn to use YouTube/iPlayer, email and Skype and how to shop online.
- Cardiff University trialled use of social media analytics to carry out live community impact assessments during the NATO Summit. In future, geolocation analytics like this could allow police to monitor crowds in certain areas during large-scale events to obtain real time information, such as the size of crowds, their mood and where they are going.

There is good work to celebrate. But these small initiatives are fragmented, with no means to join them up or for them to feed into a region-wide plan for *smart* systems and solutions.

What can we learn from elsewhere?

An increasing number of cities and communities label themselves *smart*. They take different approaches based on their social, political, economic and environmental circumstances. This means there is an increasingly rich patchwork of *smart* trials, prototypes and testbeds from which to learn lessons on what works well, and what should be avoided.

We looked for examples of inspirational best practice and key lessons learnt. We have provided short examples throughout the report as well as longer case studies to highlight how *smart* thinking or technology have been used to improve quality of life, including:

- Toronto, which illustrates the scale of ambition *smart* cities are showing, but also the pitfalls if decisions are taken without an open and transparent dialogue with the public.
- The app Waze, which shows how technology and data can enable communities to solve shared problems and respond quickly and effectively to disasters.
- Australia's *Smart City Plan* which aims to attract and retain highly mobile workers and businesses by curating productive, accessible, and liveable cities through ideas like 30 minute neighbourhoods.

What steps need to be taken in the Cardiff Capital Region?

We have identified three priority areas for action for the Cardiff Capital Region to make progress towards becoming a *smart* region and to capitalise on the advantages *smart* technology can offer. To make progress in these three areas we recommend **six specific steps** the region should take to make without delay. The full recommendations are presented in Chapter 4.

In summary, we urge the leaders of CCRCD to take action on three priority areas:

— *Smart* governance and leadership

— Communication about *smart* technology and spaces for collaboration

— Empowering everyone to play a part in building a *smart* region.

To make progress in these three areas we recommend six specific steps the CCRCD should take without delay:

1. Appoint a **Digital Futures Champion** to lead the region's digital strategy
2. Create a clear, meaningful and motivating **Vision Statement**
3. **Deliver a regional digital strategy** that makes **open, transparent communication** a priority
4. Build an **Innovation Hub** to co-create digital solutions that tackle regional challenges
5. Launch a **Challenge Fund** to encourage innovation and ideas from communities, businesses and organisations across the region, stimulating cross-sector collaboration.
6. Build a **Digital Skills and Employment Platform** to up-skill the regional workforce.

Introduction

Smart technology provides data-informed solutions to improve the everyday experiences we all have.

Yet *smart* is about more than just technology. It is a way of thinking that can improve public service delivery, enable economic growth and make sure everyone has a say in improving their communities.

Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, calls for leaders and citizens to

> **'together shape a future that works for all by putting people first, empowering them and constantly reminding ourselves that all of these new technologies are first and foremost tools made by people for people.'**

Today, *smart* is used to describe a diverse range of networked and data-driven technologies designed to sense and analyse conditions in order to adjust their function automatically and improve performance.

Smart technology is already beginning to change how we live. When we use a watch to tell us how active we have been, an app to see when the next bus is coming, or a *smart* meter to manage our energy use, we are using *smart*, data-driven technology to understand ourselves and our environments better – and to make decisions.

As well as citizens increasing adoption of *smart* technology, the private sector is innovating rapidly across a wide variety of sectors. For example, in resource management, *smart* technology is enabling private companies to respond to the multiple challenges of reducing energy consumption and carbon emissions, lowering costs for consumers and reducing the requirement to expand networks to cope with increases in demand.

At the same time, there are many examples of the private sector engaging customers in behaviour change and seeking their views to improve services. For instance, in Cornwall Centrica's Distributed Energy and Power business is exploring flexible and *smart* energy solutions to support a secure, affordable and lower carbon energy system in the region. The project is an 'Ebay-style' platform that facilitates the buying and selling of energy on the distribution network. Blockchain technology will support peer-to-peer energy trading across businesses and residential, shifting the balance of power between suppliers and consumers in a local energy market.

If *smart* technology is already making our lives easier in small ways by providing us with new information to make better choices, imagine the difference *smart* could make if delivered at scale to improve our public services, our infrastructure, and our economy.

A *smart* region has the potential to be greater than the sum of all its people, communities, businesses, third sector organisations and institutions by:

- improving the lives of citizens by giving them a say in their region's priorities
- boosting innovation and competitiveness through collaborative networks and good digital infrastructure
- increasing the visibility and transparency of the region, and providing clear leadership to build a collective vision and achieve measurable improvements.

The IWA *smart* region project has worked to produce practical short to medium term recommendations and secure commitment to using *smart* technology to maximise the positive impact of the Cardiff Capital Region for the people who live and work in the region. We want to capture this learning so this approach can be translated to other regions of Wales and the UK.

Through this project we have sought to:

1. **Inform:**
   to understand and capture activity already happening in the CCR

2. **Inspire:**
   to collate and present inspiring examples of smart cities and regions around the world

3. **Catalyse:**
   to generate collective commitment to action to build a smart region in CCR and other regions of Wales.

Chapter 1:
Context

Chapter 1: Context

Why have we focused on the Cardiff Capital Region?

Wales has two City Deals, the Cardiff Capital Region and Swansea Bay City Region. The North Wales Economic Ambition Board is leading the charge for a similar arrangement in north Wales, whilst mid Wales is considering how regional economic development can work for their area.

This project chose to investigate the potential of the Cardiff Capital Region, as an exemplar for other regions in Wales and the rest of the UK, due to the complexity of the governance arrangements: 10 local authorities, Welsh Government and the UK Government operating in a tripartite funding arrangement. Governance and accountability in CCRCD provide a unique challenge for the region which, if overcome, can provide useful learning for other regions.

Our intention is not to get in the way of existing processes and governance arrangements, but to offer ourselves as an authoritative, independent, non-political partner. We have brought together key partners across business, academia, civil society, the public sector and politics to identify practical solutions and drive action.

What do we mean by *smart*?

Smart is a term with its origins in computing, as an acronym for *s*elf-*m*onitoring, *a*nalysis and *r*eporting *t*echnology. Today, *smart* is used to describe a diverse range of networked and data-driven technologies designed to sense and analyse conditions in order to adjust their function automatically and improve performance.

Smart cities or regions are those that deploy *smart* technologies in ways that automate aspects of key systems or operations, improving their performance quality and efficiency. A central element of *smart* systems at a city or region level is the automated use of data for service optimisation and better decision making.

But the power of *smart* technology is not what it is, but how it is deployed and how it improves quality of life.

Villages, towns, cities and regions around the world are labelling themselves *smart*. It is becoming a central pillar of global urban planning. From Rio to Helsinki, *smart* is being used to focus the minds of citizens and politicians on the future, and to attract external investment.

However, there is little agreement on what a *smart* community looks like. Loosely it is a community that effectively utilises technology and data, but to what end? For example:

- Tokyo envisions a state planned robotic city[1]
- Australia seeks success through curating productive, accessible, and liveable cities[2]
- Singapore focuses on how robots can be extensions of existing systems[3]
- Dubai covets the goal of the happiest city on Earth through public service AI innovation[4].

> **'Creating happiness is the final result of the *smart* city agenda,'**
> Ahmed Bin Byat, CEO of the investment group Dubai Holding

Across the world the goals of becoming *smart* vary depending on political, social, economic and environmental factors. The particular blend of these factors drives individual approaches to technology, digital connectivity, *smart* transport and public engagement.

Wales' Cardiff Capital Region will be no different, and technology can be used to support the wider ambitions of the region. Technology and *smart* city thinking has the potential to drive wide benefits for the economy and to improve public services, well-being and democratic engagement.

Our ambition for the potential benefits of *smart* go far beyond the Cardiff Capital Region City Deal stated aim of a minimum 5% rise in Gross Value Added[5].

Case Study

Smart Kalasatama, an innovation test bed and 'living lab' in Helsinki, enables co-creation of new services. One third of the population is actively involved in projects through workshops and events. These events bring the city government, large and small companies, property developers, planners and residents together to define needs and to test services. Ultimately this network seeks to accelerate new ideas into prototypes, new businesses and new jobs[6].

1 The Headquarters for Japan's Economic Revitalization, *New Robot Strategy - Japan's Robot Strategy: Vision, Strategy, Action Plan*, February 2015.

2 Australian Government, *Smart Cities Plan: Department of the Prime Minister and Cabinet*, 2016

3 The Independent, Robot cities: three urban prototypes for future living, 06/05/2018

4 The Guardian, Dubai wants to be 'world's happiest city', 16/03/2016

5 HM Treasury & Office of the Secretary of State for Wales, Press Release: Cardiff Capital Region City Deal signed, 15/03/2016

6 Future Cities Catapult, *Smart City Demonstrators: A global review of challenges and lessons learned*, March 2018

Technology

Smart communities use technology to unlock new opportunities across areas such as healthcare, leisure, and traffic management. Technology is steadily penetrating every aspect of our lives, be it:

- the bluetooth enabled toothbrush which times you and tracks pressure used
- the *smart* phone
- the sensors in the road telling us where available parking spaces are[7].

Fact file

Research in the UK has found that the average driver spends over 6.45 minutes searching for a parking space on each journey. Traveller Needs and UK Capability Study, Transport Systems Catapult [8]

The benefits derived from these examples on an individual level seem obvious: improved dental health, greater connectivity and fuel saved by not having to search for parking. When scaled up across the whole of the region these examples can have significant impacts on:

- the cost of delivering public services
- local economies
- public health.

More and more of this technology is connected to each other and to the internet, growing the internet of things (IoT). There have been more 'things' on the internet than people since 2008, and there are expected to be four things for every person by 2020. Across a region like the CCR this will mean more sources of general data – such as environmental data on noise – and more data on individuals' activities, such as parking in an area which is in high demand.

Through having direct information about how individuals and communities behave, public services can be refined and tailored. Organisations like the NHS or local authority waste departments will be better able to understand need, and so target resources based on better intelligence.

Case Study

Turin, in Italy, is using IoT networks to connect low power devices. This has allowed the city's government to place sensors on bins, in an attempt to track citizens' household waste habits and subsequently provide tax discounts for those who recycle. [9]

7 Cardiff Council, Smart Parking Map. Accessed September 2018

8 Transport Systems Catapult, *Traveller Needs and UK Capability Study*, April 2016, accessed August 2018

9 ITProPortal, Smart cities must do more to deliver value for citizens, 26/01/2018

> **‘When wireless is perfectly applied the whole earth will be converted into a huge brain, which in fact it is, all things being particles of a real and rhythmic whole... and the instruments through which we shall be able to do this will be amazingly simple compared with our present telephone. A man will be able to carry one in his vest pocket.’**
>
> Nikola Tesla, 1926

Data

‘Big data’ offers the potential for detailed understanding of how services, products and infrastructure are truely used, and any interrelationships. It has the potential to allow detailed behavioural analysis – what you do and when – and predictive analytics, what you will do next. This has led to data often being touted as a planner’s panacea. However, as with all tools, it is how you use it that counts[10].

Layered analysis of quality data on the environment, such as noise levels, pollution and temperature, can be combined with data on citizens’ transport use, entertainment preference and public service use to allow for effective infrastructure planning. At present in the CCR there is limited real time data to provide the necessary insight to planners to prepare future-ready *smart* communities or to respond to real time issues in the community.

However the potential is there. Institutions and public bodies hold vast quantities of data that, if made open and collated, could help begin the *smart* journey. Combined with data from individuals via private sector services, this could paint a detailed picture of the region.

Some private companies, such as Waze, already work with public bodies to better inform decision makers, and take action in real time. Having data to back up decision making allows planners, politicians and activists to make more informed choices when comparing options.

For example, Barcelona has seen citizen data activists use data to improve their communities[11]. Noise complaints, due to the night time economy in the Placa del Sol, were backed up by data showing noise levels exceeding 100 decibels, far higher than World Health Organisation limits. The data was collected by a group of residents using sensors locally developed in the Barcelona Fab Lab[12], a makerspace. Residents were then empowered to make changes to the Placa del Sol, including planters and play areas for children, which reduced noise levels.

The data in Barcelona is live and open, accessible from smartcitizen.me[13]. This means other citizen data activists, community groups, charities or companies can use the data to uncover, or prove, that there are opportunities for improving infrastructure or services and so bettering people’s lives.

10 StateScoop, How smart cities can overcome ‘the data paradox’, 18/07/2018

11 BBC news website, Tomorrow’s Cities: How Barcelona shushed noise-makers with sensors, 03/06/2018

12 Barcelona Fab Lab Homepage, accessed September 2018

13 Smart Citizen Sensors Homepage, accessed September 2018

Case study: thethingsnetwork

Within the CCR tech community, organisations such as thethingsnetwork are bringing people together to learn about the potential of new technologies, how they work and develop new skills. Thethingsnetwork are currently looking at the practicalities of establishing a free to use, open access network which will allow sensors, and other devices, deployed in the Cardiff Urban Area to connect to the internet.

They base their work on the Amsterdam branch of thethingsnetwork who established a community and, in just six weeks, built a free to use LoRaWAN network for internet of things (IoT) sensors and other devices. This network allows low-powered devices to communicate with online applications over long range wireless connections. The total cost was around €10,000.

None of thethingnetwork's work in Cardiff has been facilitated by government. They work as a community to plan and build. Through engagement, and explanation of the benefits of IoT, there is now growing support among businesses, and landowners in the city.

Unfortunately thethingsnetwork's work has not been integrated with other initiatives in the region. They are not working as part of a Cardiff Capital Region challenge or towards a regional vision of an IoT network, because there is none. So they are working isolated from other initiatives such as Piniclin Newport.

Similarly, access to infrastructure such as the SmartSpots installed for the SmartPark app has not been forthcoming.

Data in the region is being collected right now via interconnected sensors and devices in public or private, be it from *smart* parking sensors, *smart* phones, *smart* toilets, *smart* fridges or *smart* beds.

These internet enabled *smart* devices 'ping' their servers at least daily. The Amazon Echo for example is reported to ping Amazon's servers every 3 minutes, meaning that, even when empty, connected homes will not have a single 'digitally quiet' hour[14].

More and more data is being harvested by corporations and public bodies. The public are freely giving data – both consciously and unconsciously – which is driving decisions which shape the world around us. Unless a concerted effort is made to make data open and transparent, only a select few will have input into those decisions shaping our environments.

Data sharing and privacy

Debate on private and public bodies use and sharing of data is characterised by the trade-offs between the potential benefits – providing services the public want – and the risks, ie compromising individual privacy.

As many of us live our lives increasingly online – including through smartphones, apps and social media – online data privacy has become an increasingly prominent issue for policy makers and the public. The implementation of the General Data Protection Regulation (GDPR) in the UK, via EU regulation, has begun to reassert citizens' rights over the data they share. As

14 Kashmir Hill and Surya Mattu, What your smart devices know and share about you, TED, April 2018

a point of comparison, in the USA 'third party doctrine' has been upheld by the courts. This means that citizens have no reasonable expectation of privacy or personal data ownership when they give information to a third party like Amazon or Google.

Recent scandals, like the Cambridge Analytica scandal, have increased public awareness that 'free' online services come with a cost, namely, that their usage data is monetised by the service provider. However, a recent survey by Which found that whilst 24% of UK homes now contain a smart home device of some sort, 55% of people surveyed admitted they did not fully understand it[15].

There is increasing evidence that the majority of people in the UK are concerned about data privacy. A new report, *Online Data Privacy from Attitudes to Action*[16], published by the Carnegie UK Trust and delivered by Ipsos MORI Scotland, provides a comprehensive evidence review of existing data privacy research, investigating the range of available UK studies. The report quotes a 2015 Big Brother Watch Survey which found that 79% of individuals are concerned about their personal privacy online, of whom 29% are very concerned.

The report also draws on evidence which shows how attitudes vary amongst different demographic groups, where evidence is available. The available data shows that attitudes vary by age: 'the general pattern appears to be that there are higher levels of concern about a variety of privacy issues among older people than younger people'[17]. There are a small number of studies that have looked at attitudes to data privacy by socio-economic status, from which the authors conclude: 'there is an emerging pattern: individuals of higher economic status are more concerned about, but more confident in dealing with, data privacy issues than those of lower socioeconomic status'[18].

These findings present a particular challenge for the Cardiff Capital Region, which has an ageing population[19] and significant variation in levels of deprivation. The region is home to both the most and least deprived communities in Wales, according to the Welsh Index of Multiple Deprivation. It also perhaps presents an opportunity, as the region currently has a higher than average proportion of young people who, having grown up in a digital age, may be more prepared to accept the potential risks of data sharing for the gains in the quality of service they receive.

At present, the public are often freely giving data to both public and private bodies – both consciously and unconsciously – which is being used to make decisions when designing products, tailoring services or advertising. However, the public often have no access to these discussions and there is evidence they are not fully informed of how their data is used.

To make progress towards being a *smart* region, the City Deal will need to actively consider how to have effective conversations about data with the public. These discussions need to include how to ensure the public are informed about, and can play a part in, decisions that are taken about the future of the region.

15 Which?, A quarter of UK households now contain a smart home device, 26/10/2018

16 Carnegie Trust and Ipsos Mori Scotland, *Online Data Privacy from Attitudes to Action*, 2018

17 Ibid

18 Ibid

19 Growth and Competitiveness Commission, *Report and Recommendations*, December 2016

AI and automation

Silicon Valley, Tel Aviv and Seoul are all examples of *smart* cities focused on an autonomous future to attract technology heavyweights, car companies and rising startups. There is no escaping that some tasks can be more effectively performed by using AI and/or automation. PwC has highlighted that AI alone has the potential to increase UK GDP by 10.3% by 2030, with 1.9% through productivity gains and 8.4% through stimulated demand[20].

However automation of services is expected to lead to a significant global shift in employment. Across all sectors over 800 million jobs worldwide are threatened[21] and a third of jobs in Wales are at risk of automation[22]. This is not a conversation Wales can afford to ignore, and we must decide how to seize the benefits whilst mitigating the greatest risks.

Automation will impact most industries by the 2030s[23]. In the immediate future the largest impacts could be on sectors like financial services and logistics. Both industries are data driven and based on arithmetic tasks or analysis of structured data. 8% of jobs are at risk in the short term rising to 30% by 2030 according to PwC's *Will robots really steal our jobs?*[24].

Algorithmic technologies and distributed ledgers – aka blockchain – can outperform humans and could lead to faster, more efficient analysis in financial services. In the logistics sector blockchain could lead to the automatic processing and payment of contracts without human approval in a supply chain when all tasks – from manufacturing to delivery – are automated. As this change happens people will need opportunities to re-skill and upskill if they are to play a role in the job market of the future.

AI and automation have the potential to improve almost every aspect of public services from public consultations, education, health, taxation, transport planning and waste collection. Productivity can be improved by utilising AI and automated services for repetitive tasks, freeing up resources for more complex tasks requiring a human element.

The use of chatbots and virtual assistants is already being considered by local authorities in the City Region, such as Cardiff[25] and Monmouthshire. The company We Build Bots, based in Cardiff's Tramshed, is developing a chatbot for use on Monmouthshire's website and via Facebook Messenger[26]. It will add to the MyMonmouthshire app, allowing for a new route for engaging with the council. Automating responses to Frequently Asked Questions (FAQs) by using bots should free up council employees to handle the less routine or more complex cases.

Machine learning, speech recognition and data analytics are all areas where AI and automation will help enhance current government services. The biggest public sector productivity gains will be in the complete automation of payroll, tax reminders or regulatory enforcement through fines. For example, through using CCTV combined with pattern recognition software, drivers could be fined immediately for breaking traffic laws.

20 PWC, *The economic impact of artificial intelligence on the UK economy*, June 2017

21 McKinsey & Co., Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages, November 2017

22 Future Generations Commissioner's Office, Media release: The Impact of AI in Welsh Constituencies, 20/04/2018

23 PWC, How will automation impact jobs?, Feb 2018

24 PWC, *Will robots really steal our jobs?*, Feb 2018

25 BBC Wales News, AI could answer Cardiff bin collection questions, 11/07/2018

26 Monmouthshire Council, Council develops Chatbot to improve customer experience, 04/05/2018

This kind of technology is sometimes called computer vision. However, it is not without its controversy. South Wales Police have used mass facial recognition to police a number of large events[27] which has led to a public and legal debate about the use of this kind of technology to monitor the public[28 29].

However, there are other applications which present benefits for infrastructure and asset management[30]. For example, the technology can be used to redirect traffic around congestion or an accident. It can also be used to plan maintenance schedules for assets, such as bridges, with condition updates in real time. This would remove the health and safety risks that surveyors face, streamline maintenance budgets and limit closures which are costly to the economy. As with all uses of technology, the risks and benefits needs to be weighed against each other.

Research into the use of digital assistants for telecare/health in the CCR by the Innovate Trust[31] has shown potential improvements to care delivery. Innovate Trust has 94 supported living schemes across three CCR council areas – Cardiff, Rhondda Cynon Taff and the Vale of Glamorgan – and believes 10 schemes using digital assistants, such as Alexa, could initially make annual savings of £248,000.

The political, policy and financial context

The Cardiff Capital Region came into being through the UK Government's City Deal programme. In 2012 8 cities were the first to sign City Deals - the 8 'core' cities of England[32]. Since then, City Deals have been agreed across the UK[33]. The aim has been to promote economic growth and infrastructure development by pooling the resources of multiple local authorities, while shifting control of decisions from UK Government to those local authorities.

Greater Manchester Combined Authority[34]

- economy bigger than that of Wales or Northern Ireland
- population 2.7 million people
- directly elected mayor – role also subsumes Police and Crime Commissioner
- 10 councils
- history of working together as a metropolitan county after Local Government Act 1972
- low carbon hub, with a plan to reduce emissions by 48% by 2020

27 South Wales Police, South Wales Police Facial Recognition, accessed September 2018

28 The Guardian, Welsh police wrongly identify thousands as potential criminals, 05/05/2018

29 WalesOnline, Legal Challenge to use of facial recognition, 13/06/2018

30 Cambridge Centre for Smart Infrastructure and Construction, Introduction to CSIC, accessed September 2018

31 BBC Wales News, Smart speaker technology trial to aid supported living, 19/11/2017

32 HM Government, *Unlocking growth in cities: city deals – wave 1*, July 2012

33 House of Commons Library, *City Deals: Briefing Paper*, 22/11/2017

34 Greater Manchester Combined Authority web page, accessed September 2018

The UK Government defines City Deals as:

> **A City Deal is an agreement between Government and a city or city region. It gives the city and its surrounding area certain powers and freedom to:**
>
> **— take charge and responsibility of decisions that affects their area**
>
> **— do what they think is best to help business grow**
>
> **— create economic growth**
>
> **— decide how public money should be spent**
>
> **A Growth Deal is very similar in purpose, but is less geographically restrictive[35].**

City Deals were championed by George Osborne during his time as Chancellor of the Exchequer, between 2010 and 2016. Since his departure there has been no clear political champion within the UK Government driving the City Deals, which have since morphed into examples of regional devolution.

The current focus of the UK Government's drive for spreading prosperity to all regions is now the Industrial Strategy: *Building a Britain fit for the future*[36]. The industrial strategy identifies five foundations which the UK government argues are 'essential attributes of every successful economy'. These are:

— **ideas** (R&D, innovation);

— **people** (skills and education);

— **infrastructure** (broadband, energy, transport);

— **business environment** (support for specific sectors and SMEs);

— **places** (tackling regional disparities).

Through a series of Challenge Funds, the UK Government is supporting collaboration and innovation in sectors where it is perceived Britain could develop world-leading industries and services. These Challenge Funds are intended to build on the five foundations, but also respond to a series of 'Grand Challenges'. The Grand Challenges are:

— **AI and the data revolution** (how to embed and maximise the advantages of AI and data)

— **clean growth** (low carbon technologies across the economy)

— **mobility** (low carbon transport, automation, infrastructure)

— **ageing society** (healthcare and labour market challenges)

35 Written evidence from the Secretary of State for Wales quoted in the National Assembly for Wales' Economy, Infrastructure and Skills Committee, *City Deals and the Regional Economies of Wales*, November 2017

36 HM Government, *Industrial Strategy: Building a Britain fit for the future*, November 2017

There is some overlap here with the calls to action identified in the Welsh Government's *Economic Action Plan: Prosperity for All*:

- decarbonisation
- innovation, entrepreneurship and headquarters
- exports and trade
- high quality employment, skills development, and fair work
- R&D, automation, and digitalisation.

Routinely, the establishment of Challenge Funds is accompanied by regional events to encourage applications from around the country. For City Deal regions, including in Wales, this could provide an opportunity to secure further funding, outside the City Deal funds, in line with the priorities in their area.

The UK Government's City Deal policy has an exclusive focus on growth in GDP, whilst the Welsh Government's economic policy twins the goal of economic growth with reducing inequality, such as through a focus on 'foundational sectors'. In the CCRCD these two approaches meet, along with the local political priorities of the 10 local authorities.

Welsh legislation, such as the Well-being of Future Generations Act, places different burdens of expectation and responsibility onto City Deals in Wales, compared to those elsewhere in the UK. Every choice made in the CCR has to be balanced between meeting UK Government's City Deal review criteria, Welsh Government policy drivers, and local priorities. It is easy to see the challenges this will present, as decision makers are pulled between differing priorities.

The National Assembly for Wales' Economy, Infrastructure and Skills Committee's inquiry into City Deals and the Regional Economies in Wales recognised this tension and reported[37]:

> **'It is clear that Deals and the investment that follows them have given the UK Government a role in economic development that (as a devolved area) would normally be the preserve of the Welsh Government.**
>
> **If this joint working is harmonious, then there is strong potential for it to benefit all parties. However, there is a history of fractiousness and finger-pointing between the two governments, particularly when it comes to economic development and infrastructure projects in areas where devolved responsibilities are not 100% clear.'**

The Committee concluded they would continue to monitor how the two governments and other partners are working together. They also made an explicit recommendation that:

> **'As tools are established to measure the effectiveness of City Deals, it is important that the responsibilities on Public Authorities under the Well-being of Future Generations Act are taken fully into account in Wales.**

37 National Assembly for Wales' Economy, Infrastructure and Skills Committee, *City Deals and the Regional Economies of Wales*, November 2017

> Concerns have been raised by a range of organisations in Wales about the potential of city deals to reach the most disadvantaged. We agree the City Deal should not be seen as a panacea to all challenges faced, and a package of initiatives will be required to address regional inequalities. However we believe if the right opportunities are seized, the City Deal can play an important part in improving infrastructure, the economy and outcomes for people in the region.'

The deal itself

The Cardiff Capital Region City Deal is one of two City Deals in Wales. It was in the third wave of City Deals and was signed on 15th March 2016. This made the CCR City Deal the first 'tripartite' deal of its kind, bringing together the 10 local authorities of south east Wales with the Welsh and UK Governments, to drive forward the region's economic prosperity.

Local Authority	Lead Group	
Blaenau Gwent	Independent	majority
Bridgend	Labour	minority
Caerphilly	Labour	majority
Cardiff	Labour	majority
Monmouthshire	Conservative	majority
Merthyr Tydfil	Independent	majority
Newport	Labour	majority
Rhondda Cynon Taf	Labour	majority
Torfaen	Labour	majority
Vale of Glamorgan	Conservative	minority

The region is made up of diverse communities, local economies and environments. It includes the cities of Cardiff and Newport, several major towns, rural areas and the south Wales Valleys, as far west as the Llynfi. Valleys further west are part of the Swansea Bay City Deal.

Together the 10 local authorities have a combined population of 1.7million[38] with an economic output equivalent to half of Wales' total[39]. By agreeing to the city deal they have committed to the key economic target of raising the Capital Region's gross value added by a minimum of 5%, bringing it more in line with the UK average[40].

38 Cardiff Capital Region FAQs, accessed 04/06/2018

39 Cardiff Capital Region City Deal, *Cardiff Capital Region City Deal*, accessed September 2018

40 Office for National Statistics, Statistical bulletin: What is the GVA in your local area: Regional gross value added (income approach), UK: 1997 to 2015, December 2016

Gross value added (GVA) is the measure of the value of goods and services produced in an area, industry or sector of an economy. In national accounts GVA is output minus intermediate consumption: it is a balancing item of the national accounts' production account. CCR's GVA is around 80% of the UK average[41].

The City Deal aims to achieve a 5% uplift in GVA by delivering programmes which increase connectivity, improve physical and digital infrastructure, and regional business governance. By 2036, it is expected that the City Deal will deliver 25,000 new jobs and secure an additional £4 billion of private sector investment, on top of the £1.2 billion public investment[42].

The £1.2bn of public funds[43] has been split into two pots[44]:

1. The £734m South Wales Metro budget. This is comprised of £314m from the Welsh Government, £314m from HM Treasury, and £106m from the EU Regional Development Fund.

2. A £495m Wider Investment Fund which will support projects to stimulate the economy. This is comprised of £120m from the ten local authorities and a £375m grant from HM Treasury.

In February 2018 the five year Strategic Business Plan was agreed containing the four theme areas of focus for CCR City Deal:

1. skills & employment
2. connecting the region
3. innovation
4. regeneration and infrastructure.

In most city deals, directly elected mayors commit to programmes as a result of the democratic process – the pitch they make in manifestos – and are held to account by their electorate. Should the electorate be unhappy with progress, they can vote in a new mayor, with a new focus at the end of his/her three year term.

In Wales, the decision was taken not to have elected mayors for city regions. An elected politician with a democratic mandate from half the population of Wales would likely have posed a significant challenge to Welsh Government and the 10 local authorities, and a threat to the existing political culture.

The result is that there has been no opportunity for people in the CCR to inform or respond to the approach taken by the City Deal. How can the region shape a future that works for all people, when people have had no say in its design or priorities?

41 Office for National Statistics, Statistical bulletin: What is the GVA in your local area: Regional gross value added (income approach), UK: 1997 to 2015, December 2016

42 Cardiff Capital Region City Deal, *CCR City Deal Strategic Business Plan Wider Investment Fund*, February 2018, accessed September 2018

43 WalesOnline, Everything you need to know about the £1.2bn City Deal for the Cardiff Capital Region, 12/03/18

44 Cardiff Capital Region City Deal, *CCR City Deal Strategic Business Plan Wider Investment Fund*, February 2018, accessed September 2018

There has been little public engagement in the vision for the Cardiff Capital Region City Deal. We need only look to the Greater Manchester City Deal for a example of how it could be done. To create Manchester's Green Vision[45], 4,000 people contributed and 700 attended a summit. Together they informed and created a collective goal, prepared by the community and owned by the community.

Closer to home, during the course of this project the 4theRegion initiative has been underway in the Swansea Bay City Region[46]. 4theRegion has hosted events to bring together people from different industries and sectors to discuss priority issues and develop solutions for the region.

Features of the region

When thinking about the difference *smart* technology could make to the region, it is important to start from a shared understanding of the region's features, the strengths we can build from as well as the challenges to overcome. Through this section we provide an overview of some notable features of the region. It is intended to be indicative, rather than exhaustive, of some of the region's characteristics.

Transport

The CCR has a large number of daily commuters, which can put strain on the region's transport systems. Cardiff is the main receiver of theses commuters, with approximately 82,000 commuters from within the region[47] and more travelling from outside the region. Swansea, Neath Port Talbot, Carmarthenshire, Powys and the City of Bristol combined contribute a further 3,000[48]. The demand being placed on the transport infrastructure was one of the catalysts for the CCRCD and is being tackled through the plans for the South Wales Metro[49].

Passenger numbers on the railways are also rising. During 2016-17 in Wales there were more rail passenger journeys than the previous peak in 1995-96[50]. The growth of rail journeys in the Cardiff area was faster than anywhere else in the UK outside of London[51]. Across the whole region between 2012-13 and 2016-17 eight of the local authorities saw growth in passenger numbers of between 3.6% and 8.5%. The two local authorities which saw a drop were Bridgend (-0.3%) and Merthyr Tydfil (-9%)[52].

45 Greater Manchester Combined Authority, *Springboard A New Environmental Vision For Greater Manchester*, 2018

46 https://www.4theregion.com/, accessed September 2018

47 Cardiff Partnership, Cardiff Capital Region, accessed September 2018

48 Commute Map England & Wales Data Visualisation, accessed September 2018

49 WalesOnline, All you need to know about the new stations for the South Wales Metro, 21/06/18, accessed August 2018

50 Welsh Government, Rail Transport Statistics, 28/03/18, accessed August 2018

51 BBC News, What's wrong with Wales' trains?, 24/01/17, accessed September 2018

52 Statistics for Wales, Table 3, Rail Transport Statistical Bulletin, 28/03/18, accessed September 2018

Population

The population of the Cardiff Capital Region is around half the population of Wales. It has been growing and is expected to continue growing, helped in part by Cardiff's 11% growth between 2005-15. Cardiff is one of the fastest growing cities in the UK[53]. All the local authorities of the region have experienced an increase in the number of inhabitants, except for Blaenau Gwent. Blaenau Gwent's population decline is predicted to continue and Monmouthshire is predicted to join in that decline.

The population of the Cardiff Capital Region is ageing and it is likely that a quarter of the population will be aged over 65 years old by 2039[54]. All 10 of the region's local authorities are expecting to see a decline in youth age groups, with rates of decline ranging from -0.7% in Newport to -23.6% in Blaenau Gwent[55].

60% of the region's young people call Cardiff, Rhondda Cynon Taff and Caerphilly home. 16-24 year olds represent 12.2% of the total inhabitants of the region, which is higher than the UK regional average[56]. In Rhondda Cynon Taff and Caerphilly around 1 in 4 of the men in this age group are unemployed[57]. There is a slight unequal gender distribution in the region with women outnumbering men.

Skill levels

Within the region an increasing number of people have qualifications above NQF (National Qualification Frameworks) level 2, which is GCSEs and equivalents. The percentage of the population with these rose from 68.2% in 2008 to 78% in 2018. The percentage of people with NQF qualifications at level 4, HNC and equivalent, or higher is 1.8% more than the Wales average.

The Learning, Skills and Innovation Partnership for the region, now known as the Regional Skills Board, surveyed businesses in 2017. Common skills gaps within their workforces were reported as ICT/digital literacy along with leadership, management and soft skills[58]. According to the *Employment and Skills Plan*: 'There is high demand for ICT/digital skills across the infrastructure and services foundational economy'[59]. Table 13 of that report, also below, shows the education level of people with ICT/Digital skills, and how much they contribute to the creative economy. It is clear that digital skills have the potential to contribute significantly to the economy of the region, and that they will be an increasingly important requirement in all sectors.

53 Cardiff Partnership, A rapidly growing City, accessed August 2018

54 Growth and Competitiveness Commission, *Report and Recommendations*, December 2016

55 Lorena Axinte, Cardiff Capital Region Youth Profile, July 2017, accessed August 2018

56 Lorena Axinte, Cardiff Capital Region Youth Profile, July 2017, accessed August 2018

57 Bevan Foundation, Our Valleys, Our Future, 09/07/2018, accessed August 2018

58 Learning Skills and Innovation Partnership South East Wales, *LSkIP business skills survey 2017*, p.15, September 2017, accessed August 2018

59 Learning Skills and Innovation Partnership South East Wales, *Cardiff Capital Region Employment and Skills Plan 2017*, p.61, 31/07/17, accessed August 2018

Sector Skills	Those with degrees	Subsector as percentage of creative economy
ICT workforce	64%	32%
Advertising and marketing	59%	18%
Film, TV, video, radio and photography	56%	17%
Publishing workforce	62%	9%
Architecture	69%	5%

Source: CCR LSKiP employment skills plan, p.61

Employment

By comparison to the rest of Wales, the CCR has higher levels of economic inactivity and unemployment. However employment rates rose in the year to March 2018 in nine of the 10 local authorities. Merthyr Tydfil saw the largest growth, 5.4%, whilst Caerphilly was the only area where employment fell, by 1.3%. Overall employment is up 1.6% in the CCR, for Wales it is up 1.3%.

The average full-time weekly earnings in south east Wales during 2017 was £507.80. This was higher than the Wales average, £498.40, but lower than UK average, £550.40.

According to the *Regional Economic & Labour Market Profile – South East Wales, July 2018*[60], the largest sector of employment in the CCR is public services at 35.3%. This is higher than the Wales and UK levels by 0.3% and 5% respectively.

The region outperforms Wales' employment sector averages in the finance and business services sector, with 21.1% of people working in this sector compared to the Wales average of 17.7% and the UK average of 27.1%.

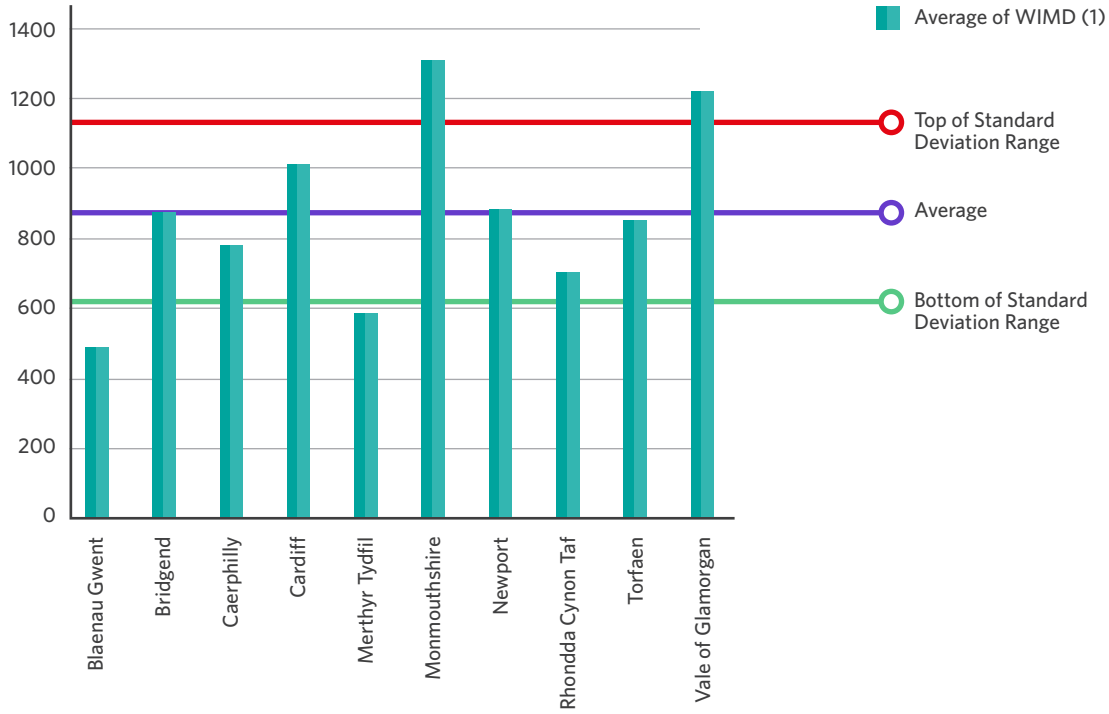
Deprivation

The Welsh Index of Multiple Deprivation (WIMD) ranks communities in Wales from 1 (most deprived) to 1,909 (least deprived). This index shows that across the CCR there is significant variation in the levels of deprivation.

Blaenau Gwent and Merthyr Tydfil both average below the standard deviation from the average for the region, whilst Monmouthshire and Vale of Glamorgan both averaged above the standard deviation from the average.

60 Stats Wales, Chart 7: *Regional Economic & Labour Market Profile – South East Wales*, July 2018, accessed September 2018

The Welsh Index of Multiple Deprivation[61]



According to the WIMD, the region has Wales' most and least deprived communities: the most deprived community being St. James 3 in Caerphilly, the least deprived being St. Kingsmark 1 in Monmouthshire.

Health

Data for each of the City Deal's 10 local authorities shows that 22% of people in region have health conditions which limit their day-to-day activities in some way. This is in line with the Wales average of 23%, however the range across the 10 local authorities is from 18% in Cardiff to 27% in Blaenau Gwent[62].

At the 2011 census data was gathered on the amounts of unpaid care being given by individuals. Unpaid caring is defined as any help or support provided to family members, friends, neighbours or others because of their long-term physical or mental health or disability, or problems related to old age. Across the 10 local authority areas 10-13% of people give some unpaid care, with 2-4% giving in excess of 50 hours. This in line with the Wales average of 12% of people giving some unpaid care, and 3% giving more than 50 hours of unpaid care.

61 Stats Wales, Welsh Index of Multiple Deprivation, accessed September 2018

62 Stats Wales, Limiting long term illness or disability by local authority, accessed September 2018

What are the 'success criteria' for this *smart* region?

The formal goal of the City Deal is to achieve an increase in gross value added of 5%, raising it from 80% of UK average. However, to only look at the potential of the region through an economic lens would be a huge missed opportunity.

In Wales, the Well-being of Future Generations Act provides an overarching framework for guiding public policy decisions. There is significant cross over between the well-being goals and global *smart* city thinking goals[63]:

Well-being Goals	Smart City Thinking Goals
A resilient Wales	*Smart* living: culturally vibrant, safe, healthy and happy
A healthier Wales	*Smart* environment: green buildings, renewable energy and sustainable urban planning
A more equal Wales	*Smart* people: inclusive society, creative and well educated
A Wales of cohesive communities	*Smart* government: transparent, open and eGov
A Wales of vibrant culture and Welsh language	*Smart* mobility: mixed modal, active travel and integrated with ICT
A globally responsible Wales	*Smart* economy: entrepreneurial, innovative, productive, local and globally connected
A prosperous Wales	

In order to achieve these goals, everyone will need to be able to contribute to and play a part in shaping the future of the region[64]. In order to do this, they first need to understand what they are moving towards – a tangible vision that can be visualised.

During its inquiry into City Deals and the Regional Economies of Wales, the National Assembly's Economy, Infrastructure and Skills Committee gathered evidence from the Glasgow City Deal. They summarised the key lessons from Glasgow as:

> **"— develop a clear strategic vision for your area;**
>
> **— agree the plan, with buy-in from all partners;**
>
> **— put in place effective monitoring – including a strong set of benchmark measurements so that the impact of investment can be tracked, and a reasonable estimate can be made of what might have happened without the deal investment; and**
>
> **— do not just take old plans off the shelf to shoehorn them in to the new funding arrangements."**

63 Z. Tahir & J. Malek, UKM, *Main criteria in the development of smart cities*, November 2016, accessed August 2018

64 Nesta, *Reclaiming the Smart City: Personal Data, Trust and the New Commons*, 23/07/2018, accessed August 2018

These lessons from Glasgow make clear the importance of a clear, shared vision and plan which everyone can contribute to. At present, there is no clear or formal means for people and businesses in the region to engage with and contribute to designing the CCRCD's future. There is also limited awareness of the existence of the City Deal, or the vision for the CCR's future: in December 2016 the independent Growth and Competitiveness Commission reported that only 33% of surveyed residents were confident that knew what the Capital Region was[65]. Ensuring the region reaches its full potential will require a wholly different approach to communication from the City Deal, founded on much greater openness and transparency.

At present:

- the website provides limited, accessible resources on the form, function, progress or effectiveness of the City Deal
- the website is routinely out of date
- meeting minutes and agendas are hidden at the bottom of pages
- no named contacts are provided
- live tweeting of meetings only provides agenda points, not quotes or themes from discussions, and no public input is requested
- there have been no public events to establish a dialogue with the population of the region.

There is much further to go until everyone in the region is informed and empowered to play a part in shaping its future.

65 Growth and Competitiveness Commission, *Report and recommendations*, December 2016

Chapter 2:
What is already happening in the region?

Chapter 2: What is already happening in the region?

How does the City Deal make decisions?

Regional Cabinet – decision makers

The 10 leaders of the 10 local authorities sit together as the Regional Cabinet – also known as the Joint Cabinet or City Deal Cabinet – which is the decision making body of the City Deal. It was first established as the Joint Shadow Cabinet which drove the early creation of the City Deal.

The Regional Cabinet is chaired by Andrew Morgan the leader of Rhondda Cynon Taff. Councillor Morgan is the default figurehead for the City Deal, but it is not a full time role. Each member of the Regional Cabinet has also taken on leadership of an area such as transport or digital, but again these are not full time roles. For comparison, Greater Manchester's mayor, Andy Burnham, is a full time figurehead with two full time deputies.

As a result of the CCRCD's structure there is no one within the cabinet for whom the City Deal is their sole focus. The primary responsibility of each member lies with their own council and their ward electorate. Without a leader with a primary focus on the region, the CCRCD risks acting as a collection of local authorities rather than a singular entity with focused goals.

The Regional Cabinet of the Cardiff Capital Region City Deal has already begun making decisions that affect the region, such as agreeing the Strategic Business Plan and providing a loan to the Compound Semiconductor Cluster.

The Regional Cabinet is advised and supported by a series of groups:

— **Economic Growth Partnership** – responsible for reviewing the economic strategy and proposed investments

— **Regional Business Council** – the voice of business in the region

— **Employment and Skills Board** – advises and comments on investment options from a skills and employment point of view

— **Regional Transport Authority** – will lead the delivery of the transport vision for the region.

These groups have little or no input from the parts of civil society that represent the people of the region. They are mainly comprised of business representatives and public bodies. The work of these groups is not well communicated or publicly understood.

Scrutiny

The regional joint overview and scrutiny committee of the CCRCD will be hosted by Bridgend Council. At the time of writing it is understood that the committee has not met yet despite the City Deal having been signed in March 2016. It is also understood that member authorities are in the process of choosing their representatives, with Caerphilly selecting theirs in July 2018[66].

Project management organisation

The Project Management Organisation has been supporting the Regional Cabinet in taking forward and developing key elements of the City Deal. They are based in Nantgarw.

Due to: 'unforeseen delays... the temporary staff structure was never fully recruited. Vacant posts have been reviewed and redesigned to directly support CCRCD projects. 5 of the 8 posts have been recruited on 3 year secondments'[67].

Kellie Beirne, former deputy CEO of Monmouthshire Council, took up the post of Programme Director in August 2018.

Strategic business plan

The Strategic Business Plan for the Wider Investment Fund (£495m) was agreed by the Regional Cabinet in February of 2018. The plan outlines four priority areas: business and innovation, regeneration, skills and employment, and connectivity. At the time of writing, the following investments have been confirmed:

- £734 million has been allocated to the South Wales Metro
- £38.5 million loan via a Special Purpose Vehicle in the compound semiconductor cluster, CS Connected.

Investments agreed in principle, but awaiting final business cases, include[68]:

- Cardiff Central Station improvement works, dubbed Metro Central
- Regional Housing Investment Fund
- Digital Strategy
- Skills for the Future.

66 Caerphilly Observer, Councillor to represent Caerphilly on City Deal scrutiny body, 23/07/2018, accessed August 2018

67 Cardiff Capital Region City Deal, *Q4 performance report and annual review 2017/18*, 18/06/2018, accessed August 2018

68 Cardiff Capital Region City Deal, *CCR City Deal Strategic Business Plan Wider Investment Fund*, Feb 2018, accessed September 2018

What can we celebrate in the region?

Through this project, we have engaged across the region to develop an understanding of what is already happening through technology and *smart* city thinking. This has included engaging with private companies, academic organisations and tech community groups. What has become clear is that a great deal of work is happening in the CCR, with some of it world leading.

For example, ParkCardiff is Europe's first city-wide application of smart parking technology[69]. Deployment of 3,000 infrared sensors has taken place in Cardiff through the Park Cardiff initiative[70]. Users of the Park Cardiff App can see in real time which of the on street spaces are available and be directed to the space via other map apps. Having 3,000 infrared sensors in Cardiff's roads could have significant extra applications given that they required SmartSpots for signal access.

These SmartSpots[71] currently have low utilisation of their bandwidth. They could be used as internet of things (IoT) gateways and public WiFi hotspots. However there does not appear to be an active plan to fully utilise them. Collaboration within the council with the environmental monitoring team to install air quality sensors would be an obvious first move.

Unfortunately little of the region's innovative work is joined up or implemented across similar silos. Due to limited communication, low acceptance of open data, siloed funding and a lack of collaboration, organisations are duplicating efforts. Similarly, the lack of a clear figurehead to focus and cultivate collaboration at strategic level has seen opportunities for wider benefits missed.

Within industrial sectors, there are good examples of collaboration in the CCR. For instance, the CS Connected umbrella for the compound semiconductor cluster, which has received funding from the CCR Wider Investment Fund, has worked to develop and champion a whole supply chain based within the CCR.

As a mark of confidence in the collaboration, the UK Government Catapult programme has located a catapult – The Compound Semiconductor Applications (CSA) Catapult – in south Wales to support the cluster. The CSA Catapult[72] is the only one of Innovate UK's Catapults to be based in Wales. Its purpose is to deliver long-term benefits to the UK economy and accelerate UK economic growth through building on competitive advantages, and creating new products or markets. UK Government gave the CSA Catapult £51.3m[73] of funding in August 2018.

Previous attempts to grow industry in south Wales, and replace industrial jobs lost in last decades of the 20th century, have had mixed success. Examples such as LG did not have the desired effect[74] of combating long term unemployment, partly because global companies can be highly mobile. Through using some of the infrastructure put in place for LG, there is hope that the semiconductor cluster, and other digital businesses, will grow industries deeply rooted in south Wales and provide stable, high tech jobs for future generations.

There are many other examples of innovative work that are laying the foundations for a *smart* region.

69 Traffic Technology Today, Cardiff launches Europe's first citywide deployment of smart parking bay sensor technology, 24/01/2017, accessed August 2018

70 SmartPark, SmartPark Cardiff Case Study, March 2017, accessed August 2018

71 SmartPark, SmartSpot Gateway, accessed August 2018

72 Catapult, Catapult Centres, accessed August 2018

73 HM Treasury et al, Billion-pound backing for British innovation, 10/08/2018, accessed August 2018

74 BBC News, 315 jobs to go as LG plant closes, 18/08/2006, accessed August 2018

Innovation

Monmouthshire has been chosen as a 5G rural integrated testbed (5GRIT) site. 5G technology will be trialled across rural areas on schemes addressing: smart agriculture, tourism and increasing internet speeds in poorly connected communities. This will be done using shared spectrum used by television and a mix of local internet service providers (ISPs) and self-provision.

The aim is to ultimately make high quality connectivity available across Monmouthshire. 5G-ready augmented reality (AR) apps for tourists will be developed alongside investigations into how farming yields could be improved through use of: sensors, AR and unmanned aerial vehicles (aka drones)[75].

Education

The CCR is home to the National Software Academy. Based in Newport, this partnership between Cardiff University, Welsh Government and industry aims to address the supply and demand gap in south Wales for software engineers.

Demand for software engineers in Wales sits at around 3,000 annually[76]. The Academy has committed to changing how software engineering is taught. Close collaboration with industry in the development of course content aims to ensure that students have hands-on industry experience in software development, using current commercial tools and techniques. The Academy also works to support regeneration of Newport's economy and the school outreach programme works to raise awareness of the opportunities available in the software sector. This won it the ESTnet Wales Technology Awards 'Trailblazer of the Year' award in 2017[77].

It is an example of collaboration which helps people develop new skills, enter highly rewarding careers and meets the needs of the CCR's talent hungry companies.

Health and well-being

Cwm Taf University Health Board was the first UK health board to trial sensor technology with expectant, low-risk mothers. The sensors use Bluetooth and a mobile phone to transmit vital data on unborn babies' heart rates[78] from the comfort of home.

The scheme allowed pregnant women across Merthyr Tydfil and Rhondda Cynon Taff to send real-time information about their baby's heart rates to the hospital midwife or consultant. Analysing this data remotely allowed for decisions to be made for or against the need for hospital visits. Reports on the trial include expectant mothers who were saved long journeys on public transport, which they would have made every other day for 20 weeks in some cases[79].

75 Office of the Secretary of State for Wales, Monmouthshire chosen as 5G Testbed site to improve rural connectivity, 10/03/2018, accessed August 2018

76 WalesOnline, The UK's first software academy has been launched in a partnership between Cardiff University and the Welsh Government, 11/08/2015, accessed August 2018

77 Cardiff University, National Software Academy wins Wales Technology Award, 26/06/18, accessed August 2018

78 Cwm Taf UHB, Cwm Taf UHB first in UK to pilot innovative technology to benefit pregnant women, Nov 2016, accessed August 2018

79 Wales Online, Mums-to-be can now monitor their baby's heart rate from their own home in a UK first, 09/02/2017, accessed August 2018

Recently the Princess of Wales hospital in Bridgend began trialling an app called Patients Know Best across 10 departments. It allows patients access to their care plans, medical records, test results and secure video links for consultations, via their mobile phone from wherever they are. In the future the app may provide a link to wearable devices which track heart rate or blood sugar levels. The hope is that better informed patients will both save hospital staff time, and support more informed conversations between medical staff and patients about the right kinds of care.

Sharing skills

The Wales Co-operative Centre's Digital Heroes scheme helps to develop the confidence and skills of the 15% of people in Wales – around 400,000 adults – not online. The scheme trains young people as Digital Heroes to pass on their digital skills to the community. After two years 1,250 Digital Heroes have been trained across Wales from primary and secondary schools, colleges, scout groups, girlguiding groups and police youth volunteers.

Recipients of support from the Digital Heros learn new digital skills, enjoy the company of the young people, and share quality time together building community bonds. The Digital Heroes themselves pass on their knowledge giving them a boost in self esteem, and are introduced to volunteering at a young age.

Summary of key challenges

There are a number of key challenges to overcome in delivering a *smart* Cardiff Capital Region.

Governance and leadership

1. CCRCD is a partnership of 12 different governmental bodies (10 local authorities, Welsh Government and UK Government) plus funding from the EU specifically for the Metro. Amidst this complexity, there is no single full-time figurehead or leader to drive the *smart* agenda forward. There is also a lack of political incentive to work regionally.

2. There is no clear route for external engagement with the region's stakeholders, including businesses, academic institutions and citizens. The CCRCD website is rarely updated and does not provide accessible detailed information. There are advisory groups mandated by the City Deal conditions, however there is limited publicly available evidence of their active engagement in developing priorities.

Communication and space for collaboration

3. There is plenty of good work to celebrate already across the region, but at present initiatives are fragmented with no formal means of joining up activities to amplify their impact, and create a shared culture of innovation.

4. Communication by the City Deal with the public is poor. Access to meeting minutes and agendas is not provided easily, nor in an open and transparent way. The website and social media presence is poor, resulting in the City Deal 'broadcasting' rather than communicating through constructive conversations. As a result, awareness that the City Deal even exists is low.

Empowering everyone to play a part

5. There has been no opportunity for the citizens, communities, businesses, institutions or civil society organisations to have any input into a vision or strategy for a *smart* region. This lack of engagement is stopping the region from capitalising on all its resources, and is therefore preventing the CCR from reaching its full potential.

6. Digital skills are a critical resource needed for the delivery of the regional vision. Educating, reskilling and upskilling the regional workforce is a key strand of ensuring employers invest in the region and enabling individuals to engage in the opportunities as employees or as entrepreneurs.

Chapter 3:
What can we learn from elsewhere?

Chapter 3: What can we learn from elsewhere?

Introduction

Around the world communities have been labeling themselves *smart* for years. They have taken different approaches based on their social, political, economic and environmental circumstances. This means there is a variety of trials, prototypes and testbeds from which to learn lessons about what works well, and what should be avoided.

In this section we provide brief case studies from other *smart* schemes. They are a selection which highlight the different approaches, goals and outcomes from *smart* city thinking or use of technology.

Helsinki – co-production urban lab

The Finnish capital, Helsinki, is home to *Smart* Kalasatama, an innovation test bed and living lab. Its aim is that through engaging with residents, new urban services can be co-created with those that use them. Over the three years of *Smart* Kalasatama a third of people in the area have been actively involved.

This level of citizen engagement was achieved through an 'Innovators Club' which was created to bring together city government, large and small companies, developers, planners and residents. Together they examine which services are needed then collaboratively develop, change and evaluate services.

Helsinki's innovation unit, Forum Virium, acts as the coordinator for workshops and events around various themes and different focuses. By doing so they provide a space to facilitate smaller demonstration projects and, through programmes which facilitate funding, accelerate new concepts into service prototypes and new business.

An example of this practice is a tech start-up called Auntie which developed a chat therapy service. They had the technical skills to deliver a service, but no experience with real users. Support from the living lab enabled Auntie to test service packages with a diverse cross section of users, to get an insight into user experiences and how effective different digital communication channels are at delivering therapy.

Auntie was able to develop and prove their service over a period of six months. Through this they also built an understanding of who might procure their service, and they have gone on to secure deals in several countries with insurance companies. This example highlights how access to, and input from, people is as important as access to built infrastructure in *smart* city test beds.

What could this mean for the Cardiff Capital Region City Deal?

Within the CCR there are tantalising glimpses of this kind of working. The Barclays Eagle Lab, a joint enterprise between Barclays Bank and Legal & General, provides a space in Brunel House, Cardiff which allows companies to co-work, network, innovate and experiment with input from the two supporting companies. What is lacking is input from government, planners and citizens.

Decision makers would benefit from being present in co-working spaces. Through being visible and accessible to each other, understanding on all sides of the conversation could be improved. Companies working out of the Eagle Lab have expressed support for having Welsh or local government staff working alongside them in co-working space.

Toronto – Sidewalk Lab

The Toronto experience highlights important lessons to the CCR on the the scale of ambition for *smart* cities, but also the pitfalls if decisions are taken without an open and transparent dialogue with the public

In the USA and Canada there are increasing amounts of private sector investment in the pursuit of the *smart* agenda. Sidewalk Lab's involvement in Toronto's Eastern Waterfront redevelopment is an excellent example of this.

Sidewalk Lab, an Alphabet company (the parent company of Google), is an urban innovation organisation which targets infrastructure improvements through technological solutions. Through collaboration with the Toronto Waterfront Revitalization Corporation, Sidewalk Lab want to create a 'laboratory for innovation across every urban system'.

These initially include: mobility, sustainability, building design and public space, then community and social services. By focusing on how physical space in cities can be used differently through utilising technology, Sidewalk Lab aim to 'bend the curve' on quality of life metrics[80]. Innovations in areas such as autonomous vehicles drive their reimagining, which they combine with the potential for social change, such as culture and habits.

For example, autonomous delivery – if easy and accessible – could encourage people to store more items outside their home in storage facilities. This would lower housing costs as people store fewer of their belongings at home. Similarly, use of autonomous vehicles and active travel in the district could reduce mobility costs. Sidewalk Lab claims that these two ideas combined could reduce the cost of living in their district by 10%.

80 Freakonomics, How to Build a Smart City with Dan Doctoroff CEO of Sidewalk Lab, 06/06/18, accessed August 2018

Not all is well in Toronto, though, as a campaign against the approach and nature of Sidewalk Lab is gaining traction. Campaigning was spurred on when details of the deal between Sidewalk Lab and Toronto Waterfront Revitalization Corporation were kept from the public for nine months. This was despite repeated promises of openness and public pressure.

A more recent agreement discusses the use and ownership of data in high level language, with no specifics on public data ownership and public digital infrastructure. There is now growing scrutiny from public and press on whether the best interests of Toronto citizens are really at the heart of the project.

Founder of Tech Reset Canada and senior fellow of the Centre for International Governance Innovation (CIGI) Bianca Wylie has criticised the close and not transparent relationship of Sidewalk Lab and government[81]. Her article *Searching for the Smart City's Democratic Future* is especially compelling on the democratic accountability of smart cities[82].

What could this mean for the Cardiff Capital Region City Deal?

If the CCR City Deal is to maintain citizen and business support, it must allow public scrutiny, and be open about any procurement or agreements. This can only be truly effective if the public are informed about and have a say in the region. Lessons from Toronto also remind us of the importance of honest conversations with the public about the use of technology and data.

Greater Manchester – collective green vision

Shortly after his election in 2016, Andy Burnham, Mayor of Greater Manchester, announced his ambition that Greater Manchester become one of the leading green cities in Europe. In pursuit of this goal a Green Summit was organised.

A series of engagement exercises were run to allow people to put forward their ideas, stories, priorities and calls to action ahead of the event. These included:

— **42 'listen events'** – 1,200 people participated

— **online survey** – more than 2,200 people completed an online survey

— **social media** – via the hashtag #GMGreenCity

The Green Summit brought together environmental experts, interest groups, business leaders, academics and local people for a day of speakers, workshops and panel sessions. Engagement was high and approximately 4,000 people directly contributed to the event.

81 Washington Post, The fight against Google's smart city, 08/08/18, accessed August 2018

82 Centre for International Governance Innovation, Searching for the Smart City's Democratic Future, 13/08/18, accessed August 2018

More than 700 people attended the Summit with hundreds more watching through a live stream. In total 200 pledges from organisations, businesses and individuals were received: commitments toward a greener and carbon neutral city region. At the event Greater Manchester Combined Authority brought forward their targeted carbon neutral target by a decade to 2040[83].

Combined, this process has seen the co-creation of the Green City Springboard[84]. This is something that the community of Greater Manchester has shown support for, developed together and can pursue together. A second event is in the pipeline that will bring together findings from the first summit and shape the next steps.

What could this mean for the Cardiff Capital Region City Deal?

This approach is in marked contrast to the Cardiff Capital Region City Deal. Much of the work to develop plans or strategies has not taken place in an open way, preventing collaboration with the wider community of the CCR. This is worrying since public engagement and giving people a sense of ownership in the collective project will be key to its long term success.

Australia – curating productive, accessible, liveable cities

The Australian *Smart City Plan*[85] recognises that regional centres are where the majority of citizens live and work in Australia. Around 75% of the population lives in a major city. The report shows an awareness that the knowledge-based economy in which many of these citizens work is highly mobile. Both workers and businesses can relocate easily, around the country or even the planet. This is a very different set of circumstances compared with Australia's resource industry.

In essence that is why Australia has produced a *smart* city plan. Its purpose is to attract and retain highly mobile workers and businesses – both homegrown and from overseas – to maintain and grow the knowledge economy. The plan recognises that key to attraction and retention will be:

- quality of life
- the environment
- low congestion
- housing affordability
- cultural offering, and
- access to services.

This approach is typified by the readily understood concept of 30 minute cities. A 30 minute city is one where all the places you would need to access on a daily basis are easily accessible within 30 minutes of travel. That travel would ideally be active or on public transport which is integrated, efficient, convenient and environmentally friendly.

83 Greater Manchester Combined Authority, Green Summit, March 2018, accessed August 2018

84 Greater Manchester Combined Authority, *Springboard A New Environmental Vision For Greater Manchester*, 2018

85 Australian Government, Dept. of the Prime Minister and Government, *Smart Cities Plan*, 2016, accessed July 2018

Australian cities are already working towards this concept. For example, Sydney's *A Plan for Growing Sydney*[86] seeks to use the existing infrastructure of the city to progress to being a 30 minute city. The strategic vision for Melbourne is more ambitious with a goal of 20 minute neighbourhoods.

What could this mean for the Cardiff Capital Region City Deal?

Setting clear and understandable goals like 20 minute neighbourhoods helps people understand the purpose of activity. The CCR City Deal needs to be setting and communicating goals like 20 minute neighbourhoods which are tangible, visual and easier to connect with than a 5% increase in GVA.

Waze – showing the way

Waze[87] is a global traffic and navigation app which is entirely community based, or crowdsourced. The app allows users to share information on roadworks or traffic in real time. As one the world's largest community of this type, there are literally millions of drivers working together to save each other time and money when driving.

Waze work through the Connected Citizens Program[88] to alleviate traffic congestion and remove vehicles from the road. They work with 600 departments for transport around the world to provide access to the Waze app's backend. This allows transport authorities and emergency services to respond more quickly to incidents, as people will often update Waze faster than calling 999.

Users can also update the Waze maps. They can make updates that show changes in road layouts such as new roundabouts, one-way systems or closed roads. By doing so they remove the day-to-day annoyance of drivers and can provide an important service during emergencies.

During the London Bridge attacks in June of 2017, Waze users updated the app with virtual road closures[89] in real time. This diverted some traffic away from the area, helping emergency services access the area and keep people safe.

They did similar work during hurricanes Emma and Harvey. A push notification via the app saw 154 people volunteer their homes as shelters. Notifications also went out to 2.3 million people to highlight the closure of 2,500 roads due to floodwater, helping people evacuate the affected areas.

What could this mean for the Cardiff Capital Region City Deal?

Community input apps like Waze provide an excellent example to the CCR of how a community can act to improve something through collective input, enabled by technology. Waze also highlights how communities can react and come together in times of crisis when facilitated to action.

86 New South Wales Government, *A Plan for a Growing Sydney*, December 2014, accessed September 2018

87 Waze, Live Map

88 Waze, Connected Citizens Programme, accessed August 2018

89 Acast, Intelligence Squared, The Rise of the Smart City: Urban Wonderland or Fool's Paradise?, 20/07/2018, accessed July 2018

Chapter 4:
What steps do we need to take to maximise the potential of *smart* technology in the region?

Chapter 4: What steps do we need to take to maximise the potential of *smart* technology in the region?

Throughout this project, it has become increasingly clear there is much to celebrate across the region in terms of *smart* technology and infrastructure. Firm foundations for success have been built organically by communities, businesses and public services throughout the region.

However, we have found that many initiatives are fragmented, and there are no means of joining them up or ways for them to feed into a strategic vision for the region's *smart* future.

We have identified three priority areas for action for the Cardiff Capital Region to make progress towards being a *smart* region and capitalise on the advantages smart technology can offer:

- governance and leadership
- communication and spaces for collaboration
- empowering everyone to play a part.

The following recommendations provide an interconnected series of short to medium term steps that, taken together, will catalyse action and collaboration.

Governance and leadership

1. The Cardiff Capital Region City Deal should appoint a **Digital Futures Champion** for the region by Spring 2019. This will allow the appointed individual good time to make progress ahead of the first UK Government review of progress which begins in 2020. The role should last for at least five years, to be reviewed in line with the review of the city deal's progress in 2021.

The Digital Futures Champion will be responsible for agitating the status quo; sharing best practice between sectors; driving action from all partners in the region; and securing additional resources to deliver *smart* transformation.

They will be responsible for delivering a Cardiff Capital Region digital strategy, developed in collaboration with all stakeholders, and should report on progress to the Regional Cabinet.

The Digital Futures Champion should be a high-profile ambassador, a natural leader with the credibility within and outside the region to raise the profile of activity and build support.

A core responsibility of the role should be to attract private sector investment and other funding into opportunities in the region, showcasing leading edge work so that Cardiff Capital Region becomes **the** place to do exciting digital transformation projects.

The Digital Futures Champion should enable collaboration between public, private, voluntary sectors and communities to explore new means of delivery and define a digital strategy for the region.

This role should be filled by open recruitment by a cross-sector panel representing the public, private and third sector. The role should be at a competitive salary so as to attract candidates with strong experience, including those outside the public sector.

Communication and collaboration

2. The Cardiff Capital Region City Deal requires a clear, meaningful and motivating **Vision Statement** for its digital future to provide a shared focus which everyone in the region can contribute to.

A primary task for the Digital Futures Champion should be to develop a shared vision statement with public, private and voluntary sectors and communities through open engagement activities.

This vision statement should distill these responses into a clear statement of ambition for the region. It should make explicit the difference digital transformation will make to the region's citizens, communities and businesses, and should include social as well as economic value.

3. The Digital Futures Champion should lead development of a **digital strategy** for the Cardiff Capital Region City Deal in an open, collaborative style to encourage wide involvement. The strategy should make **open, transparent communication** a priority.

The Digital Futures Champion should maintain a high public profile to ensure they invite and enable contributions from the region's stakeholders and are able to share information in a timely, accessible manner.

The approach should model best practice of encouraging digital engagement in the democratic process. Non-digital tools must also be used to involve all parts of the community.

The Digital Futures Champion should develop an agreed working definition of what being a *smart* region means for the Cardiff Capital City Region City Deal.

The Digital Futures Champion should strengthen communications so that their work is open and transparent, building on existing areas of expertise in the region, and clearly reporting and communicating their progress against publicly agreed measures of success. There should be no doubt of what they are trying to achieve, how or why.

As an initial step, we expect specific operational tasks arising from the strategy to include:

— clearly identify contact names and their areas of responsibility on the Cardiff Capital Region website so that people have clear points of contact

— make clear how people, communities and organisations can get involved in the Cardiff Capital Region, including how to apply for funding so that they can play a role in developing solutions to the region's challenges

— create areas of the website where strategic documents and minutes of meetings are available in an accessible format so that people have access to transparent information on which decisions are made and why

— use social media to host discussions and connect people on the future of the region to create a shared conversation which everyone can understand and contribute to.

Empowering everyone to play a part

4. The Cardiff Capital Region City Deal should establish and support a **Digital Innovation Hub** to co-create digital solutions to the region's challenges.

The Digital Innovation Hub will bring together citizens, civil society organisations, businesses, universities and public services to define the region's needs and collaboratively develop, test and roll-out new digital solutions. It should harness the capacity of existing expertise, catalysing collaboration between existing hubs such as the Life Sciences Hub, ICE, Y Lab and Tramshed.

It should have a physical and virtual presence across the region, and should take an open data approach so that learning can be shared and built on. We envisage a small team that could nimbly flex its size, depending on its priorities, over time.

It should organise collaborative exercises such as workshops, hackathons, social and formal events in multiple locations across the region to provide open spaces to define regional challenges and identify and digitally enabled solutions that are available now, or could become available in the near future. It should work to ensure those solutions are adopted.

The Digital Innovation Hub should use innovative ways of engaging with stakeholders. It should demonstrate the ambition of the shared vision and drive the identified outcomes for the digital economy in the region.

A primary objective for the Digital Innovation Hub should be to engage and inspire the region's young people in helping to define its future.

5. As part of the work of the Innovation Hub, Cardiff Capital Region City Deal should create a **challenge fund** to encourage innovation and ideas from communities, businesses and organisations within the region, the key aspect being to stimulate cross-sector collaboration.

The aim of the fund should be to support communities and smaller organisations with the necessary funding and support to play a full role in delivering the region's digital future. It should fund small to medium scale initiatives that develop digitally enabled solutions to regional challenges. Participatory budgeting techniques can be used to allocate the funds, and so give citizens and communities a say in how money is allocated.

We suggest 1% of the wider investment fund (£495 million) be allocated to this challenge fund, and be overseen and promoted by the Digital Futures Champion.

This challenge fund should learn from existing challenge funds of other organisations. The fund should be structured so as to respond to the Well-Being of Future Generations Goals, as well as the City Deal objectives. Successful bids should be supported by the region's developing digital capability and opportunities for scaling up identified.

The Cardiff Capital Region's Employment and Skills Board should be closely engaged with the challenge fund. It should be open to schools, colleges and universities so that young people can be inspired to get involved.

6. To ensure everyone can play their full part in the region's digital future, the Cardiff Capital Region City Deal should create a **Digital Skills and Employment platform** to equip people with the knowledge and skills they need to benefit from the digital revolution.

This should be aimed at citizens, employers, local government, civil society organisations and the private sector, and should bring together existing initiatives in the region.

The platform should host resources that offer a mix of free and paid for education at all levels, along with information on local learning and knowledge exchange events to upskill the region.

The platform should be designed in partnership with the Regional Skills Partnership, employers and education bodies to ensure it builds on learning and best practice already developed. It should set out potential skills pathways for people looking to build their future in the region.

The Digital Skills and Employment Platform should as a minimum:

— facilitate learners' journeys at all levels, amongst specialists and the general population of the region, including those people who are currently digitally excluded

— signpost resources and good practice guides that support organisations to help people who are digitally excluded to get online

— offer individuals and organisations access to free resources such as MOOCs (Massive Open Online Courses) or other semi structured learning environments, such as Open Learn

— ensure content has regional relevance and links skills needed with local economic needs and employers

— facilitate employers' sponsorship of formal education for specific skills, including sponsoring employees to study, commissioning focussed education programmes for their business or by supporting digital inclusion initiatives for their staff and customers

— aggregate information and content which supports digital skills, including: events such as skills workshops, coding meetups and digital interest groups; a digital jobs noticeboard; local education offerings at all levels.

MAKING
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