Smart Perth and Kinross

Creating a smarter city and region with data and technology

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Foreword – Leader of the Council

This strategy complements the Perth City Plan 'Smarter Growth for Perth City' which sets out an ambitious vision for physical and economic development to boost the economy of Perth. Smart Perth and Kinross addresses the digital infrastructure and smart projects that Perth needs to become a smarter and more efficient place to live, work and invest.

Perth, the UK's newest city, has all the advantages of a growing urban city but with the additional benefits of thriving and beautiful rural areas. These areas add to the overall quality of life and economic prosperity of the region. This strategy reaches all areas of Perth and Kinross and through working collaboratively around the Tay Cities Deal impacts on the wider Tayside region.

Implementing this strategy increases our ability to compete with other city regions in an ever more connected world. Using technology and data to manage the city and its infrastructure more efficiently enables Perth City and the wider economic region to grow in size and population over the next few decades.

Projects in this strategy show how we can use data and technology to help the traffic flow more freely by providing advice on travel choices and real time public transport information. Others suggest how we can make better use of energy in Council buildings and reduce the cost of street lighting by creating intelligent street lighting. Technology can help us manage our waste more efficiently by using sensors that tell us when litter bins need emptying. These initiatives not only make the city cleaner and more attractive but also make services cheaper to deliver.

This strategy also shows how we can make our data more open, enabling people to see what is going on in the city, what services we are delivering and make suggestions on how we improve services.

Technology is playing an increasing role in everyone's lives. Everyone in Scotland will have superfast broadband internet access by 2021. Smartphones and tablet devices are now used by the majority of the population and when citizens provide us with information, we can use that information in the design and delivery of our services and help us to better manage the city and region.

This strategy will be adapted and changed as the city and region evolves and as technology changes. It will take many years before Perth becomes a truly 'smart' city and region but this is our starting point to help achieve the change that this great new city needs to make.

Cllr Ian Miller, Leader of Perth and Kinross Council

Part 1: Strategic Focus

Perth and Kinross in common with many other areas faces significant challenges. Perth is growing in population size and new housing will place demands on existing infrastructure and community services. As more and more people are attracted to live in this beautiful part of Scotland, we need to get better at managing our infrastructure and resources such as energy and waste. At a time of restrictions in public spending, we also need to deliver health and social care, education and transport services in a way that we can still provide quality outcomes but at reduced costs.

Technology has the potential to deliver many of the solutions that will make Perth and Kinross an even better place to live. If we support this with data gathered by the Council and many other organisations, individuals and devices across the area, we have the ability to make transformational change and also create jobs. We already have many of the projects and tools in place to make these changes and the aim of this Strategy is to set out a vision of how this can be achieved and a plan to sequence and deliver the various initiatives.

Smart Growth for Perth City (Perth City Plan)

This Strategy supports the vision for Perth and Kinross as a smart city region set out in the *Perth City Plan 'Smart Growth for Perth City'* i.e. for Perth to be an ambitious, achieving, smart city region and for Perth to be one of the best small cities in Europe. This Strategy helps to implement the following particular aspects of the Plan:

Digital Connections and Services – the aim is to make Perth one of the best digitally connected cities in Scotland. The ambition is to enhance broadband connectivity so that 100% of the area is covered by superfast broadband by 2021. The aim is also to enhance 4G and 5G mobile coverage across the city region. This will provide the connectivity that is needed for the 'internet of things' and for personal and business communications.

Smart city services greater connectivity will enable the delivery of smart city services from smart waste to smart energy, transport and digital health services.

Smart Growth Prospectus –This provides a design guide for the creation of smart and sustainable new development that will shape the future of Perth region.

This Strategy describes many aspects of a smart city - from the use of technology to make the transport and energy networks perform more efficiently to the efficient collection and disposal of waste. These and other techniques will form part of a smart growth design guide.

Our Vision: Perth Will Be One of Europe's Great Small Cities
The Perth City Plan 2015-2035

The Tay Cities Deal

The Tay Cities Deal is a partnership between Angus, Dundee, Fife, and Perth and Kinross Councils which aims to develop the economic opportunities within the area. The Tay Cities Deal will help realise the economic benefits of the digital and technology based economy by improving workforce skills and mobility and stimulating growth. Home to four high ranking Universities, and with a diverse economy, the region has the potential to become a smart city region through growth and innovation in digital and creative sectors and renewable energy resources.

A key theme of the Tay Cities Deal[1] is infrastructure provision – both transport and digital –improving connectivity across the region. Collaboration on this digital connectivity agenda and the link to innovation and inclusive growth is an important context for this Strategy. The development of a transport and 'digital corridor' of high connectivity between Perth and Dundee in particular will increase productivity and mobility across the region. The overall vision of the Tay Cities Deal is to create a cohesive region of knowledge with a culture of creativity within Scotland and the UK and to boost innovation, growth and productivity.

Creating a super-connected region is critical to this ambition and will mean connecting assets - wireless and fibre networks, CCTV, street lights, traffic lights, buildings and other street furniture - and the data that they produce. This will then form a seamless data and technology platform that can provide better information, more choice and improved services for citizens across the Tay Cities region. A greater manbition is for the area to have 'world class' digital connectivity which means technology that can achieve speeds of around 1 Gigabit (1000Mbps) which is now being delivered in cities such as Hong Kong and New York. Several UK cities are also aiming to become Gigabit cities through the installation of ultra-fast pure fibre infrastructure.

[1] See www.pkc.gov.uk/taycitiesdeal and @taycities

What is a Smart City?

Smart cities are at the forefront of global thinking on urban development. A smart city is:

"A city that uses information and communications technology to enhance its liveability, workability, and sustainability." [2]

The Scottish Cities Alliance similarly defines a smart city as one where there is:

"Integration of data and digital technologies into a strategic approach to sustainability, citizen well being and economic development."[3]

Smart cities are attractive places to live, work and visit.. The Perth and Kinross area already has many amenities and a good quality of life, becoming a smart city will only add to its appeal and competitiveness.

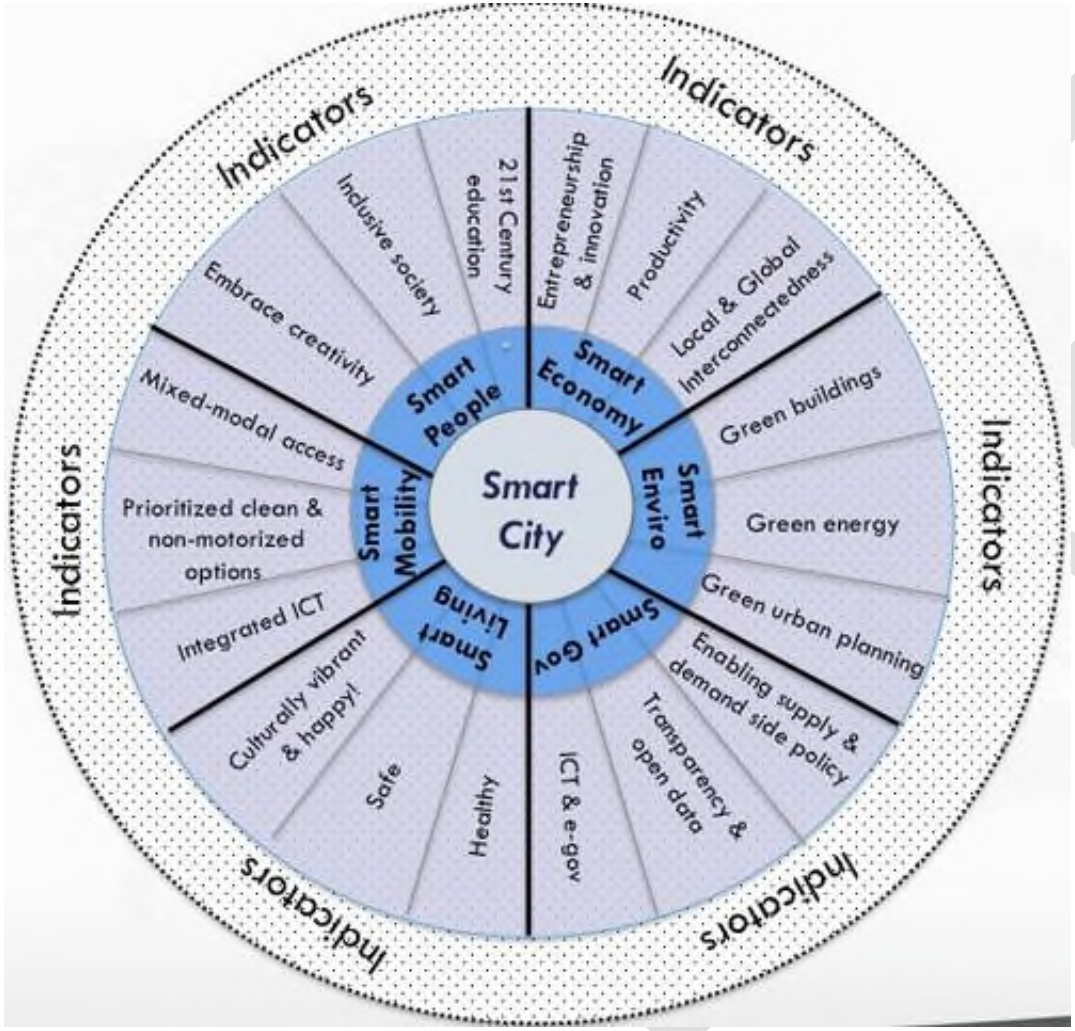
The smart cities approach was devised by climate strategist Dr Boyd Cohen. Dr Cohen designed the "Smart Cities Wheel" (Figure 1) incoperating six key components each with three drivers for that component. The context for the development of the wheel – that has been adopted by this strategy – is that we need to move beyond one-off ICT projects and develop holistic smart city strategies in collaboration with citizens. The six key components of the wheel are: Smart Economy, Smart Environment, Smart Governance, Smart Living, Smart Mobility, and Smart People.

This Strategy develops these components of a smart city by harnessing the potential that data and technology can give, developing open data, engaging with citizens, and innovating in service delivery through new forms of collaboration across the public, private and voluntary sectors.

[2] Smart Cities Council

[3] Smart Cities Maturity Model and Self-Assessment Tool Guidance Note.. Scottish Government/SCA/Urban Tide. October 2014

Figure 1: The Smart City Wheel



'Smart cities use information and communication technologies and data to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life and reduced environmental footprint – all supporting innovation and the low carbon economy'. **Boyd Cohen, Climate Strategist**

Source: Boyd Cohen, PhD, Urban and Climate Strategist

Smart Cities Partnerships

Scotland's cities collectively have produced a 'Smart Cities Scotland Blueprint'[4] which sets out a number of 'Pathfinder Projects' including smart and healthy living, smart mobility and the circular economy.

Many projects in this Strategy are assisted by funding from the European Regional Development Fund (ERDF). This funding - known as the '8th City' Strategic Intervention - is enabling cities to work together to invest in Open Data; Intelligent Street Lighting; a City Operations Centre; an Innovation Lab; and Smart Waste. Transport and mobility projects, energy efficiency and digital health are also being implemented by other cities which will benefit Perth.

At the European level there is a strong smart cities initiative supported by the EU smart cities and communities platform. Perth and Kinross is also part of the Open and Agile Cities Network which is committed to the use of open data for smart cities innovation

Perth and Kinross smart city projects in development

Smart Waste Bins fitted with wireless sensors that measure and forecast the fill-level of waste have been installed in Perth High Street and more are being installed in Highland Perthshire. The bins are only emptied when they are full and the software produces efficient schedules and routes based on the data generated by the sensors.
Health. Technology in the home can support independent living across Perth and Kinross. Sensors track daily routines and a lack of movement can alert carers to unexpected behaviours. Alarms are being upgraded to digital so that the Council can then respond to clients faster.

Open Data Platform – An Open Data Platform is being developed which will present data to enhance the efficient running of the city, for example: traffic information, cycle routes, home and business energy use, air quality data and CCTV locations.
Intelligent street lights with dimming control and sensor capability that can detect motion and gather information will be installed on Mill Street and in two car parks as a trial prior to further deployment.
Intelligent Parking. Ground sensors can detect when bays are occupied and direct drivers via an app to unused spaces reducing the need to drive around looking for spaces. The Council is looking to deploy sensors into coach parking bays.
Online Services. Citizens can report streets that need cleaning, street lights that are out and road faults including potholes online. The number of services that can be accessed in this way is being increased.

[4] Smart Cities Scotland Blueprint. Prepared for Scottish Cities Alliance by Urban Foresight. July 2016

Smart city challenges and opportunities

For Perth and Kinross to become a truly smart city, a number of challenges need to be addressed. These challenges are similar to those faced by many other city regions around the developed world but there are a number of issues which are distinct to Perth and Kinross.

Demographic

Perth is one of the fastest growing cities in Scotland and may grow in population size by 20% over the period to 2035. This level of demographic growth creates challenges in the provision of housing and transport infrastructure and provision of services such as primary schools, community and health services. This strategy ensures that this response is both smarter and more sustainable.

Perth's growing elderly population is higher than the average in Scotland and ongoing constraints in public services funding, means that demand is rising faster that services can deliver. We will work together to look at innovative and smart ways to tackle this.

In some areas of the city region, there are pockets of deprivation where unemployment is higher, skills are lower, housing is less good and health is poorer. In other areas, there are very high levels of affluence, high levels of skills, low levels of unemployment and good health. These variations present challenges to the delivery of services but also in terms of digital exclusion.

Go ON UK (now combined with Doteveryone) considers that Perth and Kinross is at high risk of digital exclusion due to the fact that 25% of households don't receive broadband at speeds of over 10Mbps; 99.98% don't have 4G mobile data; and 16.6% of adults have never been online.[5]. Engaging with citizens at risk of digital exclusion and improving digital skills will help improve participation in the labour market and boost productivity.

[5] https://doteveryone.org.uk/resources/heatmap/?area=Perth%20and%20Kinross&metric=total

Economic

Perth & Kinross has lower unemployment levels (3.6%) than the Scottish national average (5.4%)[6] However, the city region is reliant on a small number of sectors such as tourism and food and drink which are not considered to be high skill or high wage sectors. As a consequence Perth and Kinross has slightly lower than average wage levels in Scotland. The city region needs to attract the high skill, high knowledge sectors of the future – such as digital technologies - in order to attract higher wage and high skills jobs to the city.

The Tech Nation Report 2016[7] identifies clusters of technology companies around Perth and in Edinburgh, Glasgow and Dundee all offering much higher average wages than are available in Perth and Kinross. The challenge is to attract some of these companies to locate in the area or to develop our own cluster of digital and creative companies to form a distinctive offer in Perth and Kinross. The creation of a Creative Exchange Perth and an Innovation Lab within this facility - to be part funded by the ERDF 8th City Programme – will play a key role in attracting, incubating and accelerating new businesses in the area.

Environmental

Climate change remains one of the main challenges that the city region faces and this will affect many aspects of the way that society and the economy operate. The consequences of climate change for Perth and Kinross will be warmer weather, more rain, sleet and snow and more flooding.

About 3,000 houses and 59 square kilometres of land are at risk from flooding or sea level rise in Perth and Kinross and already Perth and other major towns and villages have flood prevention schemes in place.

Despite international efforts climate change will continue and we need to continue to adapt to the effects while at the same time mitigating the impacts by encouraging smarter and more sustainable forms of transport and development. These will include providing district heating schemes, generating more renewable energy and encouraging more sustainable transport.

[6] NOMIS July 2015 – June 2016 figures www.nomisweb.co.uk
[7] http://www.techcityuk.com/technation/

Smart mobility, a transport system that functions efficiently and effectively for the user, will make the best of the existing infrastructure to promote more sustainable modes of travel such as walking and cycling and the Council will establish a City Operations Centre to manage traffic and public safety more effectively.

Digital Skills and Exclusion

The ability of the city region to rise to these challenges is dependent on the data, technology and innovation that we can use, improve and develop. People will need to have and will expect to be able to use a range of skills, including using digital technology to do things that improve their lives. Improvements include the ability to access the internet using WiFi or broadband, to apply for jobs and to access services such as shopping online.

A challenge for Perth and Kinross is the provision of adequate superfast broadband infrastructure across the entirety of the region. Fibre broadband is being delivered by the Digital Scotland Superfast Broadband Programme but will only reach 95% of premises. For the remaining 5% other solutions will be delivered by a Scottish Government initiative known as the R100 (Reaching for 100%). which aims to meet a target of 100% of premises having superfast broadband by 2021.

Developing the smart city

> '*Smart Cities use information and communication technologies and data to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life and reduced environmental footprint - all supporting innovation and the low carbon economy".* Boyd Cohen

The integration of public services using data and technology is key to the smart city approach.

Joining up city systems and processes helps a city to function more efficiently and effectively. Silos and organisational boundaries reinforce poor data and information flows and prevent a shared and integrated approach across city services Developments such as the establishment of an Integration Joint Board for health and social care between the Council and the NHS in Tayside are good examples of innovation in service delivery and can be furthered by the use of data and technology to tackle the service demands.

The smart city is a connected city where traffic systems such as traffic lights, CCTV, digital signs, air quality monitoring, lighting, parking bays etc. are connected through a communications network. Data from the sensors in each of these systems is used to help manage the city. Air quality, which can be an issue in Perth and Crieff, is improved as drivers can be advised of closest free parking spaces and don't drive around looking for one adding to emissions.

Glasgow has installed sensors on street lights in three areas of the city to adjust the lights when people are walking by. Noise sensors are being used in Eindhoven on main streets and raise the levels of lighting when crowds gather. These are enabled by a wireless mesh communications network. In Perth and Kinross, this will be installed on lamp posts as part of the Intelligent Street Lighting pilot. Separately we will also provide free public WiFi by installing wireless access points on street lights, buildings and other street furniture.

Creating a city where many different sensors and devices are connected together helps improve city services and the operation transport and other infrastructure. The vision is that we will use data and technology to make Perth and Kinross a better place. The priorities for implementation of this vision are:

- Reform services by investment in data and digital technologies and development of an Open Data Platform. This includes investment in system-wide data capture, integration and analytics capabilities which will improve access to data by the public and reinforce the Council's commitment to transparency and innovation.

- Investment in open, flexible, integrated and scalable ICT architectures that enable service innovation such as provision of automated and real-time dynamic responses to situations such as can be provided by the City Operations Centre.

- Adapting our organisational models of service delivery to realise the opportunities of data and digital technologies and invest in partnership models focused on shared outcomes, thereby becoming a more collaborative city in areas such as health and social care.

- Commitment to citizen & business engagement and improving take up of digital services and supporting the digitally excluded so that our risk of digital exclusion in the population becomes lower.

The achievement of this smart city vision will be a process rather than a static outcome, in which increased citizen engagement, infrastructure, social capital and digital technologies make Perth and Kinross more liveable, resilient and better able to respond to future challenges.

Smart City Maturity Model – measuring progress

Implementing this strategy will mean that Perth and Kinross will become a smarter place. The aim of the smart city maturity model – developed by Urban Tide to assist Scottish Cities - is to move the city from an adhoc state of implementation to an optimised state of implementation where there is city-wide smart city systems in place that are driving innovation and enhancing city competitiveness. The main levels in the model are shown in Figure 2 and Table 1 below:

Figure 2: Smart City Maturity Model

Table 1: Smart City Maturity Model Dimensions

Concept	Outline
Strategic Intent	Successful smart cities have a strategy and roadmap setting out how investment in data & digital technologies enables service reform and partner collaboration. An effective strategy focuses on delivering improved outcomes aligned to the city's strategic priorities
Data	Successful smart cities make effective use of their data assets to secure better outcomes. They invest in system-wide data capture, integration and analytics capabilities. Open data underpins their commitment to transparency and innovation
Technology	Successful smart cities invest in open, flexible, integrated and scalable ICT architectures that enable accelerated service innovation such as provision of automated and real-time dynamic response capabilities.
Governance & Service Delivery Models	Successful smart cities adapt traditional organisational models of delivery to realise the opportunities of data and digital technologies. They invest in system-wide partnership models focused on shared outcomes.

Concept	Outline
Stakeholder Engagement	Successful smart cities make best use of data and digital technologies to invest in enhanced Openness and transparency. Stakeholder engagement and stakeholder ownership of service reform is central within a smart city. Smart cities are proactive in improving take up of digital services while supporting the digitally excluded.

Table 2: Smart Cities Maturity Model – Stages of Maturity

Optimised	Continuously adaptive smart city deployments drives innovation and enhances city competitiveness
Managed	Technology and data enabled sense and response systems, improved prediction, prevention and real-time responses
Repeatable	Strategy led and outcome driven, enabled by system wide technology investment delivers shared accountability and system-wide investment programme
Opportunistic	Holistic system thinking and emergent sharing of data brings cross-boundary partnerships to focus on shared outcomes
Ad hoc	Siloed, operational, digital and data driven service improvement

Smart Cities Investment Roadmap

Following on from the smart city maturity model, the Scottish cities developed an Outline Investment Roadmap[8] so that the cities could advance projects collaboratively and seek funding from sources such as the European Regional Development Fund (ERDF). The roadmap was built out of city self-assessments which were collated to identify common priorities and opportunities across domains including transport, health, mobility, waste and so on.

Existing capabilities and opportunities across dimensions of maturity (data, technology, citizen engagement etc.) were also appraised and ambition levels and investments were reviewed across cities to identify where further investments were needed to reach ambition levels. The resulting report has helped to identify some of the projects we are now taking forward through the ERDF 8th City Strategic Intervention and which form part of this strategy

[8] Outline Investment Roadmap: Smart Cities Readiness Assessment May 2015 Scottish Cities Alliance

The Council's Transformation Strategy

The transition to a smart city will be greatly enabled if it is linked to and supported by the Council's Transformation Strategy 2015-2020 which is seeking to deliver major corporate and service re-design projects. The themes of the Transformation Strategy align with the smart city vision and principles: Greater collaborative working with partners and communities; focus on innovation and improvement; a less bureaucratic and more enabling culture will all help achieve the smart city vision. The programme of transformation reviews includes the following which are particularly relevant to the smart city:

- Open Data Review
- Procurement Reform Review
- Corporate Digital Services and My Account Review
- Mobile Working Review
- Modernising Performance Reporting Review

Importantly, the transformation agenda now extends across the Tayside area with reviews of waste; procurement and commissioning; digital transformation and corporate services across Angus, Dundee and Perth and Kinross.

Part 2: Strategic Projects

This Strategy consists of a set of initiatives and projects grouped by themes of the Smart City Model developed by Boyd Cohen. For each theme, there is a brief vision followed by a description of that theme and then a set of commitments and key open datasets that relate to the theme. When the Strategy is finalised there will be an action plan that summarises these commitments and allocates responsibility and timescales for their implementation.

Smart Government

Smart government is about having the right policy framework and the right ICT infrastructure, data and services to make the cities energy, water, transport and other systems function effectively. Citizens and businesses need to be able to access the internet and the services they need when and where they want, regardless of the device or channel used. Smart cities support citizens and businesses in their online interaction with the Council and its services. Successful smart cities also make effective use of their data assets to secure better outcomes, by investing in data capture, integration and analytics - so open data underpins their commitment to transparency and innovation.

The internet is changing how we do things. Scotland has embarked upon developing a world class, future-proofed digital infrastructure that supports any device, anywhere and at anytime. However, the availability of this infrastructure and speed of connections in parts of Perth and Kinross is still an issue to be resolved.

The Scottish Government has committed to provide 100% superfast broadband coverage by 2021, a strategy and Programme (the R100 Programme) to deliver this commitment is being developed presently. The Digital Scotland Superfast Broadband Programme will bring superfast broadband at speeds of 24Mbps to 95% of premises and at least 2Mbps to 100% of premises in Perth and Kinross by the end of March 2018. Meanwhile, other cities in the UK are already committed to becoming 'Gigabit cities' with ultra-fast speeds of up to 1000Mbps using pure fibre direct to the premises.

Enhanced digital connectivity will improve people's ability to access the internet, reduce social exclusion and improve quality of life, improve access to markets for businesses, and enhance services and information.

Fixed fibre broadband infrastructure will also allow the development of a connected Tayside as part of the City Deal, connecting the digital assets of four Councils and other public services. These include superfast broadband, wireless and fibre networks, CCTV, street lights, traffic lights, buildings and other street furniture and the data that they produce. Cloud services and business intelligence tools will then form a seamless data and technology platform that provides better information, more choice and improved services for citizens.

Intelligent Street Lighting, smart mobility, smart energy, smart waste management, city wireless and a City Operations Centre are all key projects under this theme that will help the city operate more effectively.

The Council is developing an increasing number of digitally enabled services that will boost the number of services provided online, provide savings to the Council and increase customer satisfaction. The infrastructure and connections necessary to offer end-to-end digital transactions to the customer is part of this project. A citizens account (MyAccount) will support this by providing a secure environment where people can register for and access services online and the Council can keep accurate, up-to-date records of their customers and customer contact.

Open Data is one of the foundations of the smart city. The Council has approved and will now implement an Open Data Strategy[9] by presenting open data and carrying out data analytics as a way of enabling transformation. An Open Data Platform developed in partnership with other Scottish cities will encourage data sharing and service innovation between the Council and its Community Planning partners. The platform will provide an open data catalogue where citizens and developers can view and download open data. Over time, the data platform will be open to host data from a wide range of Perth and Kinross organisations. Making data more freely and openly available cab help service design and delivery and also create economic value. Internally it will help progress data sharing and integration efforts between services.

Commitments

Connectivity and communications

- We will ensure the Scottish Government Digital Scotland Superfast Broadband and the R100 Programme delivers fixed line superfast broadband connectivity to domestic properties and businesses throughout the area and will help stimulate demand for these services.
- We will work with Digital Scotland and the R100 Programme. the Perth and Kinross Leader Programme and Community Broadband Scotland to find solutions for the most remote rural communities.
- We will use the opportunity presented by the Tay Cities Deal to masterplan the digital infrastructure needed for the city region to become a super-connected region with speeds of up to 1 Gigabit.
- We will develop a wireless mesh network of 'connected assets' to provide real-time data for city management and operations.

[9] http://www.pkc.gov.uk/article/13349/Open-Data

- We will develop mobile working in the workforce to provide data on real time events and link this to the City Operations Centre.
- We will develop a free public WiFi network in Perth to allow residents and visitors access to the internet and better mobile coverage.
- We will utilise the Tay Cities Deal to bring public WiFi to the major settlements in the Tay Cities area.
- We will provide wireless broadband connectivity in public buildings and public areas and in remote communities where fixed line broadband is not possible.
- We will encourage mobile network operators to expand and improve their mobile networks, improve 3G and 4G coverage and develop a strategy for 5G across the area working with Scottish Government to support this.

Digital Services

- We will re-design and upgrade the PKC website so that it is accessible and navigable using a variety of devices.
- We will increase the number and range of services that can be accessed online and provide access to citizens via MyAccount to give a single view of the customer.
- We will encourage mobile working – making greater use of mobile technologies and devices to provide services to citizens.
- We will use mobile networks to capture data in real-time from connected devices and machines, such as vehicles and handsets, that are moving around the city.
- We will realise the potential for connecting devices, machines and vehicles to create a smart city.

Open Data

- We will implement the Open Data Strategy to guide the publication of open data in Perth and Kinross guided by an Open Data Publication Plan.
- We will launch an Open Data Platform and encourage data sharing and innovation.

- We will develop Application Programming Interfaces (APIs) to support the sharing of content and data between applications as part of the Open Data Platform.
- We will develop an Open Service Directory database of groups, activities, services, venues, childcare provision, adult social care services available to use freely by partners on their own websites, apps, and event listings.
- We will contribute to the Code for Scotland Pathfinder Programme included in the Smart Cities Scotland Blueprint.
- We will support and run a number of Hackathons and similar events aimed at encouraging the use of data to tackle challenges faced by Perth and Kinross.
- We will support businesses that are using data to develop smart city solutions building on initiatives supported by the Data Lab; Censis and Innovate UK.
- We will seek to develop a community of coders, data science experts and developers in the Perth and Kinross and Tayside areas to support businesses activities in this field.
- We will develop pilot Intelligent Street Lighting (ISL) to complement the deployment of LED street lighting and connect the new Central Management System (CMS) to other systems to enhance transport and mobility.

Key Open Datasets

- Availability of superfast broadband in Perth and Kinross:
    - 100% of premises to have access to 2Mbps by 2018 and superfast broadband (30Mbps) by 2021.
    - 95% of premises to have access to 24 Mbps by 2018
    - All settlements over 1000 to have access to 24 Mbps by 2018
- Public Wi-Fi availability in public spaces, buildings and businesses in Perth and Kinross
- Freedom of Information requests and Customer Service requests – including date resolved, nature of request
- Number of services that can be accessed online and accessibility score
- Accessibility score of PKC website (for web and mobile device access)
- Number of data sets opened for innovation via the Open Data Platform
- Number of innovative services developed in Perth and Kinross from Open Data

Smart Living

Smart Living means making the city culturally vibrant, safe and healthy. Already the digital agenda is shaping a future healthcare system that will allow citizens to control and make use of personal data and direct their own health needs. We will seek to enhance this proactive, personalised health care for the benefit of individuals, society and businesses. In terms of community safety and traffic and incident management there we will develop a cross-service and cross-organisational intelligent City Operations Centre to better support the management of traffic and public safety. Culture is also very important to the smart city and we will encourage a diversity of sport, leisure and cultural activities and events to be linked to the smart city approach as we strive to become City Of Culture in 2021.

Through the new Integrated Joint Board for health and social care, we will continue to work with the NHS National Services Scotland on data analytics on care pathways for those with highest care needs, predicting demands and modelling potential new pathways. We will seek to make some of this information open data to encourage innovation.

We will employ customer focused digital technologies and new business models to support delivery of Technology Enabled Care (TEC) services in Perth and Kinross. This will address issues of integration and adoption of digital services in health-care processes. This will include the potential for GPs to offer remote consultations via video and also for surgeries to make better use of e-communications for appointment bookings/cancellation and test results. In time this will also involve the co-ordination of care between professional and non-professional carers towards self-support, co-ordination and co-production of care enabled by appropriate technology in the home.

Tele-healthcare will enable people with care needs and their carers to have greater choice and control over their own lives, and will enable people to remain living in their own homes for longer. Widening access to technology-enabled care, allows people to live a more self-reliant lives by accessing support which meet their individual needs, whilst maximising opportunities to engage with both their local communities, and global networks.

A City Operations Centre will be developed in co-operation with Dundee to provide operational management and control across traffic, community safety and public space CCTV, potentially bringing in community alarms and parking CCTV in time. This Operations Centre will have the capacity to expand, enabling innovation in the co-ordination of city management activities. Working

with Dundee we will upgrade to digital the existing analogue CCTV cameras and integrate the control rooms currently operated in separate centres by the Council and Police Scotland. In time the Centre will provide a co-ordinated, real-time, intelligence-led response to traffic and public safety events in the city.

Finally, in terms of smart living - the cultural diversity of Perth and Kinross can be promoted by using digital technology to enhance attractions, promote events and activities and develop innovative new ways of marketing and presenting the tourism offer.

Commitments

- We will work with the NHS on data analytics for care pathways and seek to predict when and where pressures occur and explore innovative new solutions.
- We will develop a technology enabled care programme by upgrading telecare/telehealth from analogue to digital; raising awareness of telecare; increased use of teleconferencing and tele-consultancy including from local community settings (community centres, libraries, health centres) and deploy technology in the home.
- We will upgrade the Community Alarm service so that it becomes a digital service and will increase the uptake of TEC and ensuring it is embedded in all of the major care pathways in Perth and Kinross.
- We will provide access to information and advice for self-management, including the use of mobile technology, and improving learning opportunities for older people in the use of technology.
- We will provide greater visibility and use of data e.g. social data, medical outcomes data, public health data, patient experience data, hospital admissions data to enhance knowledge and information via the Open Data Platform
- We will develop a City Operations Centre by upgrading the CCTV traffic and public safety monitoring through provision of IP cameras, bringing better integration between control centres and instituting enhanced data analytics.
- We will seek to co-ordinate and integrate all Council CCTV in the city so that data can contribute to holistic city management.
- We will see to promote and develop the city's cultural diversity by promoting events and activities, interpreting the attractions and collections through the use of apps.
- We will develop a PKC 'Match the City' type website and app for sports facilities and activities using open source apps.
- We will promote digital tourism within the businesses involved in this sector so that they can better market their offer.

Key Open Datasets

- Location and access to GPs surgeries; pharmacies and health services in Perth and Kinross
- Planned and unplanned Hospital admissions – by cause
- Locations of defibrillators
- Prescriptions data
- Council housing and Housing Association properties for rent
- Care Homes – by locations and type of accommodation
- Average house prices in Perth and Kinross
- HMO licenses issued
- CCTV locations in Perth and Kinross
- Crime and disorder incidents
- New services developed by the City Operations Centre.
- Visits to cultural attractions

Smart Mobility

Mobility and transport are essential for a city to function properly and are a critical part of the smart city agenda. Smart mobility means promoting multi-modal, sustainable and active travel using data and technology to assist. Initiatives to reduce pressure on the city's infrastructure by reducing congestion, air pollution and improving safety and efficient use of shared public space are a core part of this agenda. ICT provision will support the development of traffic management systems, smart parking apps, e-mobility initiatives and active travel such as cycling and walking through the use of data and the development of apps.

In Perth as in may cities, there is an opportunity to use technology such as parking sensors, urban traffic management, smart ticketing and similar initiatives to manage transport more effectively. The Council already has Urban Traffic Control (UTC) and traffic light co-ordination using the SCOOT (Split Cycle Offset Optimisation Technique) and this can be combined with smart mobility to improve the efficiency of the existing transport system and redistribute demand across modes, routes and time. As Perth grows in size both the existing and new transport infrastructure will have to be as efficient as possible.

Smart mobility projects can maximise the efficiency of the transport network by utilising data from the Urban Traffic Control system, air quality sensors, traffic signals, Real Time Passenger Information (RTPI), CCTV and parking information more effectively. We will seek to integrate traffic data with the City Operations Centre and also enable greater integration of traffic operations with Dundee. To improve parking, sensors can be fitted to parking bays to detect occupancy and then data can be provided to drivers via apps. Data collected in this way can also feed through to the Open Data Platform.

We will work towards real-time city transport planning bringing live travel information on buses, trains and traffic conditions to people's smart phones. Stagecoach already have real time information available on their buses and the Council will progress real time information signage at bus stops in the City Centre linked to digital signage. Abelio plans to install cross-modal customer information screens at some stations including Perth to improve integration with bus and other transport options

City-wide cycle hire schemes and segregated cycle lanes will help reduce traffic, reduce pressure on public transport and improve health. The network of electric vehicle (EV) charging points that is already instituted in Perth and Kinross will require further expansion to cope with anticipated increase in demand for EV charging points from an increasing number of electric vehicles.

Commitments:

- We will develop the existing Urban Traffic Control system to integrate data from sensors in parking spaces, air quality and other sources to provide holistic management across the city.
- We will develop real time, multi-modal travel information and link this to new digital signage in the city centre and bus shelters and link this to apps for smart phones.
- We will develop intelligent parking solutions including parking and payment options such as pay on foot, pay by mobile phone, automatic number plate recognition (ANPR), information displays and parking sensors to make parking more efficient and customer friendly.
- We will develop smart ticketing building on the recently launched ABC (All Bus Companies) pass in Dundee that can be loaded onto any bus company, National Entitlement Card or Young Persons Card.
- We will develop sustainable travel by extending Electric Vehicle charging infrastructure; developing multi-fuel distribution (electric, LPG, Hydrogen) and active travel hubs.
- We will promote active travel by extending the use of cycle hire schemes, developing the network of cycle lanes and green routes and promoting walking and cycling.
- We will look at the feasibility of a shared car hire scheme in Perth using a smart card system, allowing cars to be booked online.
- We will look to use data on freight movements in Perth to reduce number of delivery vehicles travelling into city centre.
- We will promote cycling and walking using apps which allow users to input and share their own data on routes and facilities.

Key Open Datasets

- Electric Vehicle (EV) Charging Points and usage in Perth and Kinross
- Real-time and recorded car parking space capacity (off-street and on-street) in Perth
- Safe cycle routes and cycle parking facilities in Perth and Kinross
- Car parks and car parking spaces (on and off street) and availability
- Bus stops and routes
- Taxi licenses and taxi ranks

Smart People

Smart people means providing a high quality education and an inclusive society with creativity to unlock all the opportunities that the smart city offers. Smart cities provide access for all citizens, especially young people to basic digital skills education and development based on citizens' needs and interests. They provide support for small businesses and entrepreneurs to gain value from digital connectivity and skills. Smartphones now allow citizens to access share information and this can be used to improve services. Community engagement is an essential ingredient for creating a successful smart city and citizens who live in Perth and Kinross can help improve it.

Although digital technologies are evolving and rapidly transforming organisations, business practices and societies, digital skills are developing more slowly. For the digital economy to advance in Perth we need people to have the skills to deliver it. Some of our most digitally literate citizens are young people and we need to make sure that we harness these skills to ensure their employability and inclusion in society. This is a key aim of the Developing the Young Workforce (DYW) initiative, working with employers to develop the skills needed for the new economy.

We also need to engage the community to build a successful smart city. By sharing the collective intelligence of Perth citizens and facilitating grassroots initiatives we can develop a network of local experts from citizens organisations working with local government, universities and businesses. The Open Data Platform can become a good way of sharing data and information and tackling local challenges. Digital exclusion is one key issue that can be tackled in this way so that all residents can develop digital skills and play a part in creating a smart city.

Local schools, higher education institutions, businesses and the wider community are all part of the vision for a smart city. Different levels of learners can acquire the knowledge and skills relevant to a smart and digitally enabled city. The overall outcome will be an educated population with learning at all levels, reducing the boundaries between schools, college and university education and all using data and technology creatively. This will help build the skills we need to develop the economy of the future and attract businesses to Perth.

Over time we will seek to build a network of coders/programmers and designers in the city who can help develop ideas into products and stimulate enterprise opportunities. A monthly coding club for young people – CoderDojo – is already happening in Perth helping develop the skills that the city needs for the future.

Commitments:

- We will provide learners in school access to personal learning devices or enable the use of personal devices in schools where WiFi is also available.
- We will connect schools with Perth College UHI to provide an increasing range of online courses and 'virtual learning' opportunities.
- We will support the Perth Online initiative delivered by LEAD Scotland (Linking Education and Disability) to teach digital skills.
- We will develop a digital technology development plan for schools and adult education classes.
- We will develop apprenticeships with local technology companies and UHI Perth College as part of the Developing the Young Workforce initiative.
- We will provide training and workshops in digital skills for small businesses through Perth Online and Business Gateway Digital Boost projects.
- We will share digital skills with communities and through Code the City events; Hackathons and – for younger people – Coder Dojo.
- We will establish through the Open Data Platform and social media a citizen based online research community.
- We will develop a range of apps for people to access Council services; find events and facilities around the city or travel around Perth and Kinross.

Key Open Datasets

- School catchment areas
- Locations of all schools by school type and numbers of pupils per school
- Pupil attendance, absence and exclusion
- Subjects offered by school
- Device usage in schools
- Adult Learning and ESOL enrolments and outcomes
- Graduates from UHI Perth College – grades and destinations
- Digital skills courses and enrolments in Perth and Kinross
- Open access to community internet facilities in Perth and Kinross

Smart Environment

Smart environment covers green energy, green buildings and green urban planning. The aim for smart cities is to manage energy, water, transportation, waste, public health and safety and other key services in a co-ordinated way to support the smooth operation of the city so that there is a safe environment in which to live, work and play. Data is important and if supplied to the public particularly through social media networks it can allow consumers to change their own behaviour to save energy, minimise waste and travel more sustainably.

Perth aims to become a smart and sustainable city, reducing energy use and carbon emissions in line with European, UK and Scotland targets. It aims to develop a more circular economy where waste and pollution are minimised. Projects include the development of electric vehicle charging infrastructure; low carbon transport hubs; district heating systems (Including a River Tay heat pump scheme); smart waste systems and more improving air quality. Perth is aiming to develop innovative energy and waste projects and services and capitalise on the economic value of the low carbon energy and waste sectors.

Perth and Kinross is developing a low carbon energy plan based on a better understanding of energy production and use. This will provide the basis for comprehensive retrofitting of buildings for energy efficiency, district heating schemes and renewable energy projects such as Tay Eco Valley. The Energy Plan will complement the policy and guidance framework provided through the Local Development Plan and guidance on renewable and low carbon energy. An equally important challenge is ensuring new housing developments are connected to superfast broadband and that buildings are energy efficient

Perth's growing population and the dispersed nature of the community presents challenges in waste collection and disposal. Data and technology can enhance management and disposal of waste and promote a more sustainable circular model of reducing, reusing and recycling waste. This will extend to some of the industrial sectors in Perth and Kinross including the food and drink sector. The deployment of sensors, use of data analytics, and route planning based on this will help the Council optimise refuse vehicle travel routes, improve recycling rates, boost material recovery and encourage waste awareness.

Love Clean Streets is an app that enables members of the public to report graffiti vermin, poor waste storage and fly-tipping. 'FlyMapper' is similar and allows the recording of flytipping incidents.

To help promote the Circular Economy a 'Circle City Scan' of Perth will be carried out in a partnership with the Chamber of Commerce. This will look at how to make the city an economy where products, materials and components are recirculated continually, so that we reap the maximum possible value from them.

Commitments:

- We will develop a Perth and Kinross Energy Plan linked to the LDP through a data-driven approach enabling a strategic approach to be taken to energy use and generation in the area
- We will map the potential opportunities for district heating and local renewable energy including solar PV and geothermal energy/heat pumps using data available from the Scottish heat maps project
- We will provide - through the Open Data Platform – data on energy that will empower local communities and business to better understand and conserve energy in Perth and Kinross
- We will measure, monitor and manage energy and heat consumption across PKC buildings and their connection to the energy generation systems
- We will develop the Building Management Systems and controls across PKC buildings with enhanced visualisation for user awareness
- We will use a new Smart City Prospectus to provide guidance for developers on sustainable and smart design principles.
- We will develop a smart waste system using technology to enhance the efficiency of waste collection; equipping waste bins with sensors; tracking of refuse collection; and use of apps to encourage reporting of incidents.
- We will complete a Circle City Scan of Perth to identify the products, materials and components used in the economy so that we reap the maximum possible value from them.

Key Open Datasets

- Energy consumption in Council buildings
- Air Quality Management Areas in Perth and Kinross
- Local air quality data
- Installed renewable energy in Perth and Kinross: (Wind, Solar, Biomass, micro HEP, CHP)
- Electricity and Gas consumption in Perth and Kinross
- Locations of recycling centres and bins in Perth and Kinross
- Locations of litter bins and waste fill levels in Perth and Kinross (waste sensor data)
- Volume of recycled materials (glass, paper, cardboard, plastic) by recycling centre

Smart Economy

A Smart Economy comprises local and global connections, productivity, entrepreneurship and innovation. It combines the elements an enterprise economy and the innovation or 'ideas' economy while promoting a high-quality environment, improving economic security and promoting inclusive growth. To be a successful economy in the future Perth will need to combine these attributes bringing knowledge capital; physical capital; environmental capital and social capital together to create ingenuity and creativity. This will drive a research, commercial and innovation ecosystem in Perth making it a hub for knowledge, innovation and entrepreneurs.

Perth and Kinross is one of the most prosperous economies in Scotland and most residents enjoy a high quality of life. However, the economy will benefit by developing further 'knowledge economy' sectors and by creating a more circular economy and ecosystem,that can support the growth of innovative and sustainable businesses.

However, there are communities and individuals in Perth and Kinross where worklessness, poor skills and other economic and social challenges exist. Perth can become an even more productive and prosperous economy if these challenges are tackled in a targetted way through inclusive growth helping families access employment opportunities and raise household incomes. Initiatives such as the Employment Hub in Perth city centre can help by providing skills, training and job search facilities.

The city already promotes entrepreneurhip encouraging new businesses through the Angel's Share entrepreneur-investor matching service. This has already matched Angel investors with new companies bringing funding, skills, experience, and business vision to start-ups who are also able to seek funds from crowd-funding platforms. Facilities such as city centre workspace and the opportunity to connect with other companies in the same field can assist businesses to develop commercially valuable products and services.

An Innovation Lab and business accelerator within the Creative Exchange Perth Hub in Perth city centre will provide office space, business advice and support, seminars, conferences and social events for a growing number of start-up and growing entrepreneurial businesses in the city. This facility will encourage entrepreneurs in Perth and Kinross; develop new skills in digital and technology industries and provide a pool of skills to meet future demand. Clustering knowledge and talents together in this facility will increase economic growth by bringing creative workers together in a way that will enhance interactions, generate ideas

and turn them into products and services faster than otherwise. An innovative city will, in turn, be more attractive to highly talented workers, creating a snowball effect promoting further growth.

Commitments:

- We will develop an Innovation Lab within Creative Exchange Perth with a focus on growth sectors including digital/creative industries.
- We will use the existing Angels Share initiative to promote and support new digital and creative businesses in Perth and Kinross and the wider area.
- We will investigate crowdfunding for businesses and social enterprises seeking access to finance for innovative ideas, products and services.
- We will encourage the use of open data to develop apps that will promote sectors of the economy such as tourism.
- We will develop new digital skills in the population by engaging with coders and programmers and developing hackathon type events.
- We will work with schools, Perth College UHI and employers to promote training and apprenticeships in digital skills.
- We will develop a better understanding of the retail economy in Perth using smart phones and other devices and public WiFi to generate data to inform town centre planning and management.

Key Open Datasets

- Businesses in Perth and Kinross by sector including social enterprises
- Business survival rates
- Business unit vacancy rates
- Vacant commercial land and properties and derelict land in Perth and Kinross
- Numbers of people helped into work through Council programmes
- Employment support and benefit claimants
- Average wages in Perth and Kinross
- Footfall in Perth City Centre

Part 3: Implementation

Delivering the smart city

Local leadership plays a pivotal role in delivering the smart city. It provides the vision and brings together expertise, assets and other resources of the private sector, public authorities, the third sector and local residents in the delivery of creative solutions to the challenges the city faces. Working across a host of institutions, businesses and communities in Perth and Kinross political and managerial leadership is needed to communicate, define priorities, negotiate, resolve conflicts, build consensus, and secure the type of development Perth needs for the future.

This Strategy is the start of developing a vision of what a smart city looks like for Perth and the surrounding region, today and in the future. It will be developed in an iterative and collaborative manner inclusive of all stakeholder groups and informed by user engagement, using social media and other technologies to enable public participation in the process. As part of this we will develop our smart city governance structures and develop an integrated city operating model, focused around citizen and business needs. Our procurement also needs to align with smart city principles by focusing on outcomes, open data, incentives for innovation and collaboration, and avoidance of lock-in to particular technologies or software.

Following consultation on this Strategy we will develop an action plan or roadmap which will set out those actions that reflect smart city priorities. In this way we develop a phased plan to develop the smart city of the future.

To assist with this we will utilise British Standards Institute (BSi) and CSI (the Cities Standards Institute) guidance and standards to support smart cities. Their Smart City Framework is encouraging city leaderships to take a holistic approach to the delivery of their ambitions in the exploitation of smart technologies. It considers the most effective route to achieve this is through the procurement of products and services by city authorities. The focus of the Smart City Framework is on the issues and challenges involved in joining up initiatives into a whole-city approach supported by strong leadership and governance, a partnership culture, innovation, and encouraging an active role from citizens and stakeholders.

The SCF is made up of four components:

- guiding principles: a statement of values which city leaders can use to steer business decision-making as they seek to implement a smart city strategy;
- key cross-city governance and delivery processes: a set of practical guidance notes on how to address city-wide challenges of joining-up across city silos;
- benefit realization strategy: guidance on how to ensure that the intended benefits of a smart city strategy are clearly articulated, measured, managed, delivered and evaluated in practice;
- critical success factors: a checklist of issues which cities should regularly monitor to ensure that they are on track in the successful delivery of their smart city programmes, and that they are managing the major strategic risks effectively.

Commitments:

- We will follow the guidance set out in the Smart City Framework produced by BSi and the Future Cities catapult and seek to ensure that this Strategy and its implementation meets the principles and elements of a smart city identified there.
- We will develop the leadership and governance structures of the smart city initiative so that they provide for greater partnership and citizen engagement.
- We will develop the smart city roadmap and smart city deliverables that wil reflect smart city priorities

Key Open Datasets

- Stakeholder involvement in smart city activities (this is also required for the ERDF 8th City Projects)
- Citizen involvement in smart city activities
- Number of city spaces and systems that are made more accessible and useable by digital technology
- Number of datasets that re opened for innovation via the Open Data Platform

Next Steps

This is the first Smart City Strategy for Perth and Kinross. It sets out the vision and priorities across a number of themes and in a number of projects for developing the city and region as a smarter and more liveable place.

The next steps are that this Strategy will be shared across services and with stakeholders and partners allowing for further input and development. This consultation will be carried out according to guidance contained in the Councils Consultation Toolkit to ensure that a wide spectrum of views are canvassed. A website will allow people to suggest further smart city activities and projects.

When this is completed the action plan will be attached the Strategy which will be approved by the Council.