



FINAL REPORT

Outline Investment Roadmap

Smart Cities Readiness Assessment Date: May 2015

In partnership with:



Scottish Cities Alliance Operational Plan



*Scottish Cities Alliance Operational Plan http://scottishcities.wordpress.com/operational-plan-2/ http://www.scdi.org.uk/policy/projects



Smart Cities Readiness Assessment Project Remit

Outline Investment Roadmap "That the Scottish Cities Alliance can advance collaboratively and that will inform a funding application for the **European Structural Funds 2014-**2020 Programme in the first half of 2015..."

*Smart Cities Maturity Model and Self-Assessment Tool Guidance Note, Urban Tide & Scottish Government 2014

Funding opportunities

- ERDF: €15M Funding (requires match funding)
- Wider EU Funding, for example:
 - Horizon 2020 (€80Bn from 2014 2020 with focus in particular on the sectors of low carbon and efficient built environment, sustainable urban mobility and integrated infrastructures (energy, ICT and transport))
 - Interreg V (€9Bn from 2014 2020 for smaller scale local projects which are part of a wider programme)
 - Life+ (next call for proposals in May 2015 and particularly relevant to climate/ low carbon, municipal waste and mobility)
 - ELENA (large energy efficiency and renewables project grants with technical assistance up to c€5M per project)
- Economic and Social Research Council (ESRC)
- Innovate UK (previously Technology Strategy Board)
- Specific funding opportunities are highlighted where relevant; these have been identified with assistance from Scottish Cities Alliance and Scotland Europa
- Private sector opportunities

Urban Tide Commission

Smart Cities Maturity Model & Guidance Note





City Engagement & Self-Assessment



Analysis & Outline Investment Roadmap

Definition of a Smart City

"The Smart City can be defined as the integration of data and digital technologies into a strategic approach to sustainability, citizen well-being and economic development".

Quality of Life | Economic Growth | Sustainability





What is a Smart City?

"The prospect is of cities and their regions using data and digital technologies to manage urban congestion, maximise energy efficiency through smart grid technology, enhance public security and resilience, allocate scarce resources based on real-time evidence and turn operational data into insight, information and knowledge".

*Smart Cities Maturity Model and Self-Assessment Tool Guidance Note, Urban Tide & Scottish Government 2014

Examples include:

- Intelligent street lights with dimming control and sensor capability that can detect motion and gather information
- Bins with sensor capability that notify a control centre when they are full
- Parking sensors detecting availability of spaces in real-time to prevent the build-up of traffic as motorists look for spaces
- Technology in the home to support independent living, for example, sensing a lack of movement or alerting if the kettle isn't switched on by a certain time in the morning
- Businesses developing products and services based on the publication of open data, for example, transport apps, energy apps
- Citizens providing data to enhance the efficient running of the city, for example: cycle routes taken, home/ business energy meter readings, fault reporting, about how they use services
- Citizens 'adopting' street furniture and notifying the local authority when repairs are required, for example, street lamps that need replaced, 'adopt a hydrant' in New York, playground equipment that is damaged and unsafe

Benefits of a Smart Cities Approach

Benefits

"Cities that are adopting a Smart City strategy are making city services more effective and cities more attractive to investors, residents, visitors and the business community..."

*Smart Cities Maturity Model and Self-Assessment Tool Guidance Note, Urban Tide & Scottish Government 2014

Benefits of a Smart Cities Approach



*Solutions for Cities: An analysis of the Feasibility Studies from the Future Cities Demonstrator Programme, ARUP Report 2013

http://publications.arup.com/Publications/S/Solutions_for_Cities.aspx

Methodology: Smart Cities Maturity Model

Dimension	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.
Citizen & Business Engagement	Successful smart cities make best use of data and digital technologies to invest in enhanced openness and transparency. Citizen & business 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.

Methodology: Smart Cities Maturity Model



Methodology

- 1. City Self–Assessments were collated to identify:
 - Common priorities & opportunities across domains (transport, health etc)
 - Existing capabilities & opportunities across dimensions of maturity (data, technology etc)
- 2. Ambition levels & investments were reviewed across cities to identify:
 - Where further investments are needed to reach ambition levels
 - Where there are potential benefits from collaborative approach
- 3. Collaborative Outline Investment Roadmap tested with City Representatives at Workshop on 16th December 2014
- 4. Final Report prepared incorporating feedback from colleagues

Methodology: Benefits of Collaborative Approaches

Benefits

Coll Ap	aborative proaches	Leverage Expertise	Learn & Transfer Knowledge	Cost Efficiency	Standardisation & Inter- operability	Improved Service Delivery	
	Shared Business Case						
	Shared / Co-ordinated Piloting						
	Shared Procurement						
	Shared Service						

Overview: Scotland's Smart Cities Maturity



Overview: Investments

Current/ Committed

"Investments that have been made or programmes established which are already in place or being implemented at this time (procured and with budget secured)."

Planned

"Investments which have either secured or can be assumed to have secured local funding over the next three years (or longer planning period if that is available) but where delivery and procurement have not yet started."

Ambition

"Opportunities for investment and potential programmes and actions to secure [the identified smart cities] ambition."

*Smart Cities Maturity Model and Self-Assessment Tool Guidance Note, Urban Tide & Scottish Government 2014

Shared Vision & Management of Outcomes



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Smart City Maturity Model Dimension

M2

Develop an investment proposition for, and invest in, data platforms that give cities the technical capability to capture, integrate and analyse data (can be used by multiple partners and should consider building on what already exists i.e. the Glasgow City Technology Platform & other systems).

M3

Technology

Data

- Develop a programme to: map, make best use of, and invest in enhanced connected assets across the built environment (air quality, energy use in buildings, transport data re: journey times, parking, lighting, waste, etc).
- Support a national approach to investment in open, flexible, integrated and scalable ICT architectures across the public sector.

M5

Citizen & Business Engagement

 Invest in data analytics from social media, and particular crowd sourced data, to engage citizens in improving service delivery - working with partners across private sector and academia.

Cross-Domain



City Operations

 Develop an investment proposition to create/ enhance real time city operations across Scotland's cities (by reviewing opportunities to build on and develop existing capabilities).



Citizen's Account

 Develop shared approach to ensure that every citizen has access to a secure environment where they can register for and access services online and where every city has the capability to manage a Citizen's Account that helps organisations keep accurate, up-to-date records of their customers and customer contact.



Data Publication & Innovation Ecosystem

 Support publication of open data specifically in relation to Education, Transport, Visitor Information & Waste, and its exploitation through national hackathons that seek to improve service delivery in these areas.



Capacity Building

• Consider development of shared and multi-disciplinary teams to manage collaborative programme and build smart cities capacity.

Domain-specific

D4

 Implement smart parking applications that use data and connected assets to manage and control spaces - including coach parking for events and visitor attractions.



Street Lighting

• Implement street lighting programmes that use data and connected assets for the delivery of benefits such as energy efficiency and improved operational control.



Waste

Parking

 Implement smart waste programmes that use data and connected assets for the delivery of benefits including cost savings and achievement of environmental targets and improved service delivery.



Data Platform "28 out of 29 cities taking part in the TSB Future Cities Demonstrator Competition outlined the vision to have a Data Platform..."

*Solutions for Cities: An analysis of the Feasibility Studies from the Future Cities Demonstrator Programme, ARUP Report 2013 http://publications.arup.com/Publications/S/Solutions for Cities.aspx Data

M2

"Successful smart cities make effective use of their 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" [Smart Cities Maturity Model 2014]

 Desired Outcome Cities have the technical capability to capture, integrate and analyse data across multa a flexible and scalable solution. This will lead to improved decision making, cost reduction efficiency. Cities Overview All cities outlined an ambition to improve their smart cities maturity within the dimensition to Level 3 or Level 4. Improvements to capability through extended data capture, improver integration across city-wide organisations and, in particular, the development of share were identified. 	 Smart Cities Maturity Impact >Data (Level 4) data assets used to provide actionable information extended data capture & analytics leads to improved decision making and service design >Technology (Level 4) cross-organisational ICT architectures are in place. These are being scaled and adapted. 	
Outline of Potential Investment and Next Steps Development of this capability should build on existing investments investments. >Review potential for wider exploitation of the technolo analytics that may be extendable to wider application (for example, s >Preparation of a system-wide business case to support the develop integration and analytics across Scotland's cities.	and identify synergo ogy that currently e systems listed in 'E oment of shared teo	gies with committed and planned xists for data capture, integration and xisting Capability' below) chnical capability for data capture,
 Existing Capability >Dundee: Data Platform that supports the NEC with potential for integration and inter-operability >Glasgow: City Technology Platform provides a cross-organisation ICT architecture based upon cloud-computing which provides scalability and adaptability for opening (and in the future, sharing) data >Transport Scotland & a number of Local Authorities: advanced Urban Traffic Management & Control (UTMC) Data Platform Potential Future Investments >Aberdeen: Master Data Management beyond records management >Dundee: upgrading K2 system within Health & Social Care >Inverness: noted interest in data sharing & analytics platform (especially relating to Transport but with the opportunity to extend across other domains) >Perth & Stirling: initial interest in city-wide data sharing platform 		Added Value of Collaboration >Shared Business Case >Shared Service - leverage expertise - learn & transfer knowledge - cost efficiency - ensure standardisation & inter-operability - improved service delivery
Gaps and Barriers to be addressedOther Funding Opposition>Identification of additional synergies & opportunities in this area>Innovate UK Integra>Cultural barriers to optimising data sharing>Innovate UK Solvin>Appetite for data sharing platforms still at early stages in some cities>Horizon 2020 ICT>Capacity building required to fully exploit analytical capacitySustainability and S>Business case and budget needs to be developed on a system-wide basis>DataLab Innovation		ortunities and Wider Links ated Future of Cities SBRI Competition g Urban Challenges with Data 0 2015 Collective Awareness Platforms for cial Innovation Centre, Urban Big Data Centre

Internet of Things "By 2020 we will be hopelessly outnumbered - some 50 billion networked objects will prowl the reaches of cyberspace, with a few billion humans merely mingling among them..."

*Anthony M. Townsend, Smart Cities (2013) anthonymobile.com



"Successful smart cities invest in open, flexible, integrated and scalable ICT architectures that enables accelerated service innovation such as provision of automated and real-time dynamic response capabilities" [Smart Cities Maturity Model 2014]

Desired Outcome Cities are investing in the co-ordinated deployment of connected assets (Internet of Thir 'system-of-systems' that provides opportunities for management across the city in real-to open, flexible, integrated and scalable ICT architecture are taking place across organisa Cities Overview All cities outlined an ambition to improve their smart cities maturity within the dimension time - to Level 3 or Level 4. Dundee in particular chose Telecommunications as a doma identified 'Connected Assets' as a key dimension. All cities already have significant conto together with planned investments and ambitions in this area but the investments to real deployment of connected assets (Level 4) are not clear. The infrastructure to support IC broadband, 4G, city wifi networks) was highlighted as a key area for investment across a connectivity improvements in these areas will support the further deployment of connected	Smart Cities Maturity Impact >Data (Level 4) - data assets used to provide actionable information - extended data capture & analytics leads to improved decision making and service design >Technology (Level 4) - city-wide deployment of connected assets >Technology (Level 3) - investment in integrating architectures between organisations is taking place.			
Outline of Investment and Next Steps - Connected Assets Development of this capability should build on existing investments and identify synergies with committed and planned investments. It is critical to sweat the existing connected assets in place for multiple purposes. >Feasibility studies to be undertaken within each of Scotland's cities to map the current network, compile an asset register and identify future opportunities for shared use. >Agree a programme to enhance capacity of connected assets on a city-wide basis; across domains and accessible by multiple partners. Explore opportunities for shared procurement of sensors (air quality, energy use, journey time, parking, lighting, waste etc). Outline of Investment and Next Steps - ICT Architecture >Support a national approach (eg High-Level Operating Framework, Policy & Guidance) to investment in open, flexible, integrated and sealable ICT architecture				
 Existing Capability Scotland Wide Area Network (SWAN) and planned value added services Many existing systems of connected assets currently exist, eg: SCOOT Urban Traffic Control System (Inverness, Perth), Stratos Traffic Solutions System (Perth), Bus Information and Signalling (BIAS) Potential Future Investments There are significant planned and ambition investments within broadband, 4G and wifi infrastructure that would support city-wide rollout of connected assets, including: Aberdeen: Strategic Infrastructure Plan, Inverness: broadband infrastructure, 4G and extending use of SWAN, Perth: city wifi, wifi hotspots, wifi in public buildings, Stirling: 4G availability from street lighting Stirling: ambition for more data collection technologies available across Stirling 		Added Value of Collaboration >Shared Business Case >Shared/ Co-ordinated Piloting >Shared Procurement - leverage expertise - learn & transfer knowledge - cost efficiency - ensure standardisation & inter-operability		
Gaps and Barriers to be addressed>Different ICT arrangements within each city and some cities currently undertaking contracting out (Edinburgh) or investigating this further (Stirling)>Existing connected assets not mapped across domains within cities>Lack of digital strategy in some cities>Lack of investments identified to move towards shared ICT architecture25	Other Funding Opportuni >Horizon 2020 Smart City L >European Innovation Partu Communities - Integrated In Data)	ties and Wider Links Lighthouse Demonstrators hership (EIP) on Smart Cities and hfrastructures & Processes (including Open		



Engagement "Smart cities seek to engage with citizens and businesses as owners of and participants in the creation and delivery of city services, not passive recipients..."

*British Standards Institution (BSI) PAS 181 Smart City Framework 2014 http://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-181-smart-citiesframework/

Citizen & Business Engagement

M5

"Successful smart cities make best use of data and digital technologies to invest in enhanced openness and transparency. Citizen & business 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" [Smart Cities Maturity Model 2014]

Desired Outcome Smart Cities Maturity Impact That cities are ensuring the views of citizens, businesses and visitors are systematically captured through > Citizen & Business Engagement (Level) multiple channels. Social media, mobile apps and crowd-sourced data are increasingly used to enable public 4) participation, gather opinion and inform service design. For example, the Glasgow TSB Future Cities - city uses multiple channels to engage Demonstrator Active Travel App will enable crowd-sourced data to inform cycling infrastructure within the city. with citizens tailored to their needs **Cities Overview** - views and ideas of citizens and All cities outlined an ambition to improve their smart cities maturity within the dimension of citizen & business businesses systematically captured engagement over time - to Level 3, Level 4 and Level 5 (Dundee, Perth). However, there were very few areas of through multiple channels to improve investment identified which specifically focused on citizen & business engagement. In particular, it is services recommended that there is a more targeted approach to the use of social media channels, mobile apps and >Data (Level 4) crowd-sourced data to enhance the value of engagement that already takes place through more traditional - extending data capture leads to means (face-to-face, telephone, webforms etc) and with the specific outcome of improving service delivery. This improved decision-making and service would ensure that digital and non-digital channels are integrated and opens up opportunities for co-design & codesign creation of services. It could also lead to the cessation of some more expensive, traditional non-digital data collections. **Outline of Potential Investment and Next Steps** >Work with academic partners and private sector providers to invest in the following: >Data analytics from social media activity across a range of city organisations (including public, private and voluntary sector). >Development of a targeted city-wide approach to social media, specifically in relation to improving service delivery. >Identification of opportunities to obtain crowd-sourced data to provide ideas and insight into service delivery. >Testing integration of data from digital channels with data from non-digital channels to inform service design. **Existing Capability** Added Value of Collaboration >Aberdeen: regular use of social media highlighted specifically in Waste domain Shared Business Case >Dundee: Digital Dundee Observatory and Digital on the Move (aimed at social inclusion) >Shared/ Co-ordinated Piloting >Edinburgh: Budget Challenge, crowd-sourced ideas generation (Dialogue App) >Shared Procurement >OPEN Glasgow & Connected Communities Domain (Glasgow) leverage expertise >Inverness: use of social media channels learn & transfer knowledge Potential Future Investments cost efficiency >Dundee: more targeted approach to the use of social media including guidance & training ensure standardisation & inter-operability Other Funding Opportunities and Wider Links Gaps and Barriers to be addressed >Horizon 2020 ICT 10 2015 Collective Awareness Platforms >Different social media arrangements and approaches currently in place across the for Sustainability and Social Innovation organisations within cities, and across Scotland >Cultural shift to reliance on social media data and crowd-sourced data may be required >Citizen & business engagement often seen as one-way >Integration of data from digital and non-digital sources 27





Command & Control "Enabling insight into how the city operates to enable more efficient city operations and inform longer term policy decision making..."

*Department for Business,Innovation & Skills (BIS) Research Paper No 135 International Case Studies on Smart Cities https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249397/bis-13-1216-globalinnovators-international-smart-cities.pdf



City Operations

Desired Outcome

Every city has the capability for cross-organisational intelligent command-control-response of city operations. This supports the better management of city resources, communication across the city and design of city services together with improved decision-making through predictive and preventative action.

Cities Overview

There has been substantial investment in the state-of-the-art integrated 24/7 Glasgow Operations Centre control room providing operational management and control across the different services of traffic, community safety, public space CCTV, and emergency & resilience functions across the city. This has the capacity for significant expanded use and further innovation. Additional capability and capacity may also be available via other operations centres that exist within Scotland - including Transport Scotland National Traffic Control Centre and the Scottish Water National Operations Control Centre.

Outline of Investment and Next Steps

Development of this capability should build on existing investments and identify synergies with committed and planned investments. >Review potential for wider exploitation of the technology that exists for intelligent management and control of city services across but not limited to the following: Glasgow Operations Centre, Transport Scotland Operations Centre and Scottish Water Operations Centre.

>Preparation of a system-wide business case to support the development of capability for the management & control of city services.

 Existing Capability >Glasgow Operations Centre >Transport Scotland Operations Centre >Scottish Water National Operations Control Centre Potential Future Investments >Glasgow: potential opportunities grouped around the themes of: Command and Control; Security of Assets and Event Management; Extended use of Operation Centre to other city partners. 	Added Value of Collaboration >Shared Business Case >Shared Service - leverage expertise - learn & transfer knowledge - cost efficiency - ensure standardisation & inter-operability - improved service delivery
Gaps and Barriers to be addressed >Identification of additional synergies & opportunities in this area >Cultural barriers exist to data sharing across services or organisations within a city, and across cities >Consensus and commitment of internal and external partners/ stakeholders to integration needs to be secured >Development of leadership and governance models for shared accountability >Development of shared service agreements	Other Funding Opportunities and Wider Links



Smart Cities Maturity Impact

system-wide outcomes

>Technology (Level 3)

>Data (Level 4)

information

>Governance & Service Delivery (Level 3)

evolve to share accountability for delivering

-data assets used to provide actionable

- investment in integrating architectures

between organisations is taking place

-Leadership and governance models

Citizen's Account "The Citizen's Account provides a secure environment for citizens to register for and have access to, services, which also helps organisations keep accurate, up-todate records of their customers..."



Citizen's Account

Desired Outcome

Every citizen has access to a secure environment where they can register for and access services online (myaccount) and every city has the capability to manage a Citizen's Account that helps organisations keep accurate, up-to-date records of their customers and customer contact. Personal shared data is secure and lower transaction costs are achieved through online self-service. *Cities Overview*

Edinburgh specifically highlighted Citizen Account as a domain and both Dundee (link to Telehealthcare) and Glasgow (Connected Citizen & Connected Data domains) have noted further ambitions in this area. Edinburgh specifically highlighted the extension of their Citizen's Account to additional services beyond the City of Edinburgh Council. They also wish to explore the development of a similar Business Account (also mentioned by Glasgow within the Connected Data domain).

Smart Cities Maturity Impact

>Data (Level 3)

- data management & optimisation strategy agreed between partners
- >Governance & Service Delivery (Level 3)
- leadership and governance models evolve to share accountability for delivering system-wide outcomes
- >Citizen & Business Engagement (Level 4)
 citizens benefit from integrated services across organisations using the best digital technology for them

Outline of Investment and Next Steps

Development of this capability should build on existing investments and identify synergies with committed and planned investments. >Wider application of the Citizen's Account to specifically demonstrate integration with public services beyond the local authority. >Preparation of a system-wide business case to support the wider application of the Citizen's Account.

>Further consideration to be given to the development of a similar Business Account.

Existing Capability Added Value of Collaboration >mygovscot myaccount identity authentication (integrated and scalable ICT component) >Shared Business Case already a national initiative that has been leveraged at city level >Shared/ Co-ordinated Piloting >Edinburgh Citizen's Account (as part of ICT Transformation Programme and Channel >Shared Service Shift) - Council Tax, Non-Domestic Rates, Council Tax Reduction and/or Housing Benefit, and Landlords services leverage expertise >Dundee Citizen Account linked to National Entitlement Card (NEC) learn & transfer knowledge >Glasgow eCitizen (as above for Edinburgh plus Registration to Vote) cost efficiency ensure standardisation & inter-operability **Potential Future Investments** >Further use of a Citizen's Account and the National Entitlement Card (NEC) improved service delivery >Dundee ambition to develop Citizen's Account as per their TSB Future Cities Demonstrator Gaps and Barriers to be addressed Other Funding Opportunities and Wider Links >Scottish Government Working Group on Business Authentication >Identification of additional synergies & opportunities in this area >Data owner uncertainty about security of sharing personal data >Legislation on sharing of personal data and understanding of it >Organisational buy-in to service design from the customer perspective required >Some systems not designed from service orientated architecture principles >Support for iterative and agile development required



Data Publication and Innovation Ecosystem Open data is "data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share alike..."

*Open Knowledge Foundation https://okfn.org

Data Publication & Innovation Ecosystem

is ers

Desired Outcome

That every city has an extensive range of open data published with the strategic intent to leverage innovation. Activity to develop an ecosystem takes place that empowers stakeholders (citizens, entrepreneurs, social enterprises, public service providers, businesses etc) to create new sorts of services and value. *Cities Overview*

A number of cities expressed an existing commitment to open data and ambitions to improve capability in this area. Several cities identified areas of current challenge (Education, Transport, Visitor Information, Waste, Freedom of Information Requests) where providing information in a smarter way would help meet an existing need or reduce current resource levels - for example through new services including apps, dashboards, visualisations, improved websites with information joined up across multiple services etc.

Smart Cities Maturity Impact >Data (Level 4)

 established open data community is building new services valued by users
 >Governance & Service Delivery (Level 3)

-greater input to problem solving and service design from providers/ suppliers & users

Outline of Investment and Next Steps

>Support publication of open data in general and specifically within Education, Transport, Visitor Information and Waste.
>Deliver four national challenge-led Hackathons to collaborate intensively around software projects within Education,
Transport, Visitor Information and Waste - ensuring that these build on work already being undertaken to improve information provision (eg: TACTRAN improved travel information interface).

>Engage with students, universities, startups, SME community to attract developers, designers, ethnographers and other interested users to participate in the national challenge-led Hackathons.

>Facilitate that the winners work with local authorities to fully develop solutions (treat as pre-procurement similar to Edinburgh Apps).
>Explore the national Open Data Strategy can support open publication of Freedom of Information (FOI) Requests.

Existing Capability >Code for Aberdeen, Dundee Observatory, OPEN Glasgow, Edinburgh Apps Potential Future Investments >Aberdeen, Glasgow, Inverness, Perth & Stirling: Travel & Transport Information >Aberdeen: Waste (for example smartphone apps for reporting; use of technology to communicate to households about recycling in their area) >Dundee: hackathon promotion and incubation services >Glasgow: plans to develop Visitor attractions & amenities app >Inverness: future delivery of Visitor Information >Perth: Education highlighted as area for improved information provision	Added Value of Collaboration >Shared/ Co-ordinated Piloting >Shared Service - leverage expertise - learn & transfer knowledge - cost efficiency - ensure standardisation & inter-operability - improved service delivery
Gaps and Barriers to be addressed >Securing commitment of stakeholders to the principle of open data >Need to ensure data is up-to-date and accurate >Different data suppliers use different technologies >Ensure link to ongoing support through, for example, Business Gateway or physical innovation/ incubation spaces 34	Other Funding Opportunities and Wider Links >European Innovation Partnership (EIP) on Smart Cities and Communities - Integrated Infrastructures & Processes (including Open Data)

Capacity Building "We have mapped out the skills we need to deliver the smart city programme, and have established clear plans for acquiring and maintaining them..."

*British Standards Institution (BSI) PAS 181 Smart City Framework 2014 http://www.bsigroup.com/en-GB/smart-cities/Smart-Cities-Standards-and-Publication/PAS-181-smart-citiesframework/

Capacity Building

	_		
Desired Outcome			Smart Cities Maturity Impact
That every city has the skills required at leadership, management and operational levels to deliver the smart city programme.			>Strategic Intent (Level 4)
Overview			- vision, strategy and roadmap
PAS 181 Smart City Framework published by the British Standards Institution (BSI) particular	ly refers to the following as	established at city-wide level
critical success factors in building and supporting a smart city:			>Governance & Service
>the right skills mix in the leadership team to drive ICT-enabled business transf	ormation a	t a city-wide level including	Delivery (Level 3)
strategy development skills, stakeholder engagement skills, marketing skills, comm	nercial skill	s and technology management	- leadership and governance
skills			accountability for delivering
> mapping out the skills needed to deliver the smart city programme with clear p	lans for ac	quiring and maintaining them	system-wide outcomes
>effective mechanisms in place to maximise value from all the skills available a	cross the n	partners involved in delivery of	
the smart city roadmap			
Cities Overview			
Cities raised concerns about the resources required to support smart city developm	nent and th	ne incompatibility of existing	
skills. It is critical that adequate capacity is built to ensure success - specifically in	relation to	the investments outlined and	
the recommendations made here but more significantly to support the longer term	smart city	ambitions across all Scottish	
cities.			
 Clear plans to be established for acquiring and maintaining skills Consideration given to skills sharing throughout partner organisa resource pool Deployment of a formal competency framework, such as Skills Fr support for identifying and building the right skill sets. 	ations an rameworl	d across cities, including k for the Information Age (oossibility of shared SFIA), to be investigated as
Existing Capability		Added Value of Collaboratio	n
>Existing resources across all Scotland's cities including throughout partner organi	isations	>Shared Business Case	
Potential Future Investments			3
>Range of talent and skills available across public, private and voluntary sector		>Shared Service	
Gaps and Barriers to be addressed	Other F	Funding Opportunities and Wid	ler Links
>Leadership, management and operational resource buy-in >Horizon 2020			
>Time taken to build capacity >European Commission Marie Curie Actions FP7 Call			ions FP7 Call
Costs involved to build conspirity			
	>Scottis	sh Cities Alliance National Develo	opment Manager & wider Scottish

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Parking "With around 29 million cars owned by a population of over 60 million people, it's no wonder that the UK is one of the busiest places in the world to drive and park..."

D4



Desired Outcome Cities implement smart parking applications that use data and connected assets for the delibenefits to the management & control of spaces and improved service delivery to users. Cities Overview Transport and the movement of good and services was highlighted as a key area of focus work of the seven cities. Inverness, Perth and Stirling in particular all raised the potential of smart projects as an application of data, technology and citizen & business engagement. There are committed and planned investments in this area and an ambition to do more.	ery of hin five some Some	s Maturity Impact el 4) s used to provide actionable information y (Level 2) ed use of sensor networks Business Engagement (Level 4) nultiple channels to engage with citizens heir needs
Outline of Investment and Next Steps >It is recommended that a number of smart parking projects are supported digital technology application. These could include: >data capture and use of smart technology in car parks >data capture and use of smart technology for on-street parking >integration of data with other traffic management systems >management of coach parking and transport to visitor attractions >Projects in this area should build on existing investments and identify sy	as demonstrators of the second s	of data, connected assets and
 Existing Capability >Glasgow - open data feed listing the occupancy and status of council car parks in Glasgow >Edinburgh - contactless meter pilot to notify when meter time running out Potential Future Investments >Inverness - specific issues with coach parking and transport to visitor attractions; smart technologies could assist in matching visiting coaches with spaces >Perth - VMS Displays, payment on foot, automatic number plate recognition (ANPR) and integration of data with other traffic management systems for more effective use of parking resources, improved space utilisation and public information >Stirling - parking management and availability 	Added Value of Collaboration >Shared/ Co-ordinated Piloting >Shared Procurement - leverage expertise - learn & transfer knowledge - cost efficiency - ensure standardisation & inter-operability	
Gaps and Barriers to be addressed >Resources >Commitment is there but stronger delivery partnerships need to be developed >Conflicting views from stakeholders around best solution	Other Funding Oppo European Innovation F Communities - Integra Open Data)	rtunities and Wider Links Partnership (EIP) on Smart Cities and ted Infrastructures & Processes (including



Street Lighting "Understanding the operational details of networked LEDs and comparing those benefits and costs to traditional lighting lays the foundation for building a business case to upgrade street lights..."

Desired Outcome Cities implement intelligent street lighting demonstrators that use data and connected assets for the delivery of benefits including energy efficiency, reduced cost of asset management and maintenance, improved operational	Smart Cities Maturity Impact >Data (Level 4)
control and increased city data through sensors.	actionable information
Cities Overview	- extended data capture & analytics
Glasgow have undertaken an Intelligent Street Lighting Demonstrator in 3 locations as part of the TSB Future Cities	and service design.
Demonstrator Programme and are actively looking at how they can use street lights as wifi provision within a Transformational Regeneration Area (TRA) through the ECCI (Edinburgh Centre for Carbon Innovation) Smart	>Technology (Level 2) - some shared use of sensor
Accelerator Programme. Aberdeen, Dundee, Inverness and Stirling all specifically referenced project investments relating to intelligent street lighting.	networks

Outline of Investment and Next Steps

It is recommended that a number of intelligent street lighting projects are supported as demonstrators of data, connected assets and digital technology application - building on expertise from the Glasgow TSB Intelligent Street Lighting Demonstrator.
 Projects in this area should build on existing investments and identify synergies with committed and planned investments.
 Apply leverage towards/ link with EU European Innovation Partnership Humble Lamppost project.
 Review outcome of Glasgow TSB Intelligent Street Lighting Demonstrator following demonstrator period to August 2015.

 Existing Capability >Glasgow TSB Intelligent Street Lighting Demonstrator within 3 location Glasgow Potential Future Investments >Aberdeen: linked to energy efficiency, real-time journey monitoring, transmittering and air quality monitoring >Dundee: linked to V&A Waterfront Development >Inverness: LED street lighting pilot (investigate opportunity to make size stirling: linked to energy use, need for central management system (display="block"> 	Added Value of Collaboration >Shared/ Co-ordinated Piloting >Shared Procurement raffic - leverage expertise - learn & transfer knowledge - cost efficiency - ensure standardisation & inter-operability	
Gaps and Barriers to be addressed >Resources, finance and planning >Stronger delivery partnerships need to be developed to work better with the private sector	Other Funding Opportunities and Wider Links European Innovation Partnership (EIP) 'The Humble Lamppost' Commitment (1Million intelligent street lights by 2020) European Innovation Partnership (EIP) on Smart Cities and Communities - Integrated Infrastructures & Processes (including Open Data) 41	



Waste

"Waste is a by-product of economic activity and the smart management of waste will have economic implications which will influence productivity, government expenditure and the environment..."

*Department for Business,Innovation & Skills (BIS) Research Paper No 136 Smart Cities Market: Opportunities for the UK https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249423/bis-13-1217-smart-citymarket-opportunties-uk.pdf

Desired Outcome	Smart Cities Maturity Impact			
Cities implement smart waste demonstrators that use data and connected ass	>Data (Level 4)			
of benefits including cost savings, achievement of environmental targets and it	- data assets used to provide actionable information			
life for citizens.	- extended data capture & analytics leads to improved			
Cities Overview	decision making and service design.			
Only Aberdeen included waste as a specific domain within the Smart Cities Re	>Technology (Level 2)			
Assessment but we are aware that there is a significant amount of infrastructur	- some shared use of sensor networks			
investment taking place across Scotland's cities - for example, smart bins pilo	>Citizen & Business Engagement (Level 4)			
Edinburgh with swipe card access for recording volume of business waste and	- city uses multiple channels to engage with citizens			
accordingly; bin also communicates when 80% full.	tailored to their needs			
Outline of Investment and Next Steps >It is recommended that a number of smart waste projects are supported as demonstrators of data, connected assets and digital technology application. These could include: >bin notification capability (ie sending of signal when full) >integration with in-cab GPS systems to alert and re-route drivers in real-time >on-board weighing of bins >integration with existing customer relationship management (CRM) systems >Projects in this area should build on existing investments and identify synergies with committed and planned investments.				
 Existing Capability All cities undertake waste collection (some are organised on a regional basis) and are reviewing the potential of data and technology application Potential Future Investments Aberdeen are undertaking waste infrastructure investment over the next 3 years and plan for more over the subsequent 3-6 year period including bin notifications and integration with in-cab GPS systems Dundee investigating bin sensor networks Opportunity for further integration with CRM systems 		Collaboration ated Piloting hent se knowledge lisation & inter-operability		
Gaps and Barriers to be addressed	Other Funding Of	pportunities and Wider Links		
>Resources, finance and planning	>Circular Economy	y ERDF application - Zero Waste Scotland		
>System integration challenges with back office of CRM systems	>LIFE+ (Municipal	Waste) (May/ June 2015)		

Recommendations - which could lead to further Outline Investments (£)



Recommendations

 There are 3 specific policy areas where we think significant benefits can be derived from a strategic and collaborative approach:

D1	Transport/ Mobility
D2	Digital Health
D3	Energy

- Further work with the policy leads and stakeholders at a national/ partnership level is required to identify how to add most value. We are recommending that this is undertaken early in 2015 to assess these areas in terms of their smart maturity at a national rather than city level.
- There is also one service area where we think significant benefits can be derived from a strategic and collaborative approach on a national level and we are recommending that this is aligned with existing work that the Scottish Cities Alliance are leading in this area:



Smart Ticketing/Smartcard

 The proposed collaborative investment plan will require strong commitment and will benefit from further strategy development and new governance approaches. We are recommending that smart cities maturity in the following areas is developed further through implementation of this outline investment roadmap:



Strategic Intent

Governance & Service Delivery Models



Desired Outcome

That each of these domains have an overarching smart vision, strategy and roadmap established at national level and that smart investments identified have a clear impact on national and city's strategic priorities.

Cities Overview

These are all significant multi-partner domains that have the potential for significant transformational impact on a system-wide basis and were selected by a number of cities [Transport/ Smart Mobility (5 cities), Digital Health (2 cities) and Energy (2 cities)]. They all have strong existing capability and an ambition to improve smart cities maturity - ranging from Level 3 to 5. A lot of smart activity and investment is already taking place and this was highlighted in the self-assessment returns. Delivery within these sectors is multi-partner and activity is often not led by the city local authorities.

Recommendation

>Arrange a summit to use the Smart Cities Maturity Model with national & local partners in each domain.

>Identify synergies and opportunities that exist across transport/ smart mobility, digital health and energy domains.

>Identify specific areas where the Scottish Cities Alliance or local authorities can add most value.
>Work closely with Scotland Europa as there is a strong focus on these areas within European Funding calls but there is a need for collaboration, aggregation and scale to attract significant European Funding.

Desired Outcome

That the implementation of Smart Ticketing/ Smartcard is taken forward on a cross-domain basis within cities and on a national basis where appropriate. This could include transport, health, education, leisure and many other areas of service delivery within a city.

Cities Overview

Smart Ticketing/ Smartcard investments were highlighted in a number of city returns including Dundee (link with extended use of the National Entitlement Card (NEC), ShareMore mobility product across all modes of transport and the SmartSat transport integration project), Edinburgh (link with Citizen's Account), Inverness (link between bus and ferry services) and Perth (educational attendance at school & college with link to public transport). The Scottish Cities Alliance and Transport Scotland are already undertaking work in this area.

Recommendation

>Discuss potential investments in the context of the work that the Scottish Cities Alliance is already undertaking in this area.

>Identify synergies and opportunities that exist across different domains within a city and on a national basis as appropriate.

>Link to the proposed investments within Citizen's Account (C2).

>Leverage the existing capability of the National Entitlement Card (NEC) as appropriate.



Μ4

Strategic Intent

Governance & Service Delivery

"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" [Smart Cities Maturity Model 2014]

"Successful smart cities adapt traditional organisational models of delivery to realise the opportunities of data & digital technologies. They invest in systemwide partnership models focussed on shared outcomes" [Smart Cities Maturity Model 2014]

Desired Outcome

To improve maturity in strategic intent and governance & service delivery models through the implementation of this outline investment roadmap. This is a real opportunity to pilot/ test different models and ways of working.

Cities Overview

All cities outlined an ambition to improve their smart cities maturity within the dimensions of strategic intent and governance & service delivery models over time - mostly to Level 4. Strong strategic intent and multipartner governance models will be required in order to maximise the effectiveness of the outline investments identified and fully enable service reform. The smart approach is not pain-free and requires strong leadership and buy-in across multiple partners to succeed. Good examples where collaborative approaches in the digital sector have been successful at a national level include the superfast broadband infrastructure and Scotland Wide Area Network (SWAN).

Recommendation

>To put in place appropriate leadership, governance & service delivery models for the successful implementation of this outline investment roadmap.

Outline Investment Roadmap (£) Stateholder Engagement Publication perations Citizen's echnology Capacity Building Street 'ghting Parking Waste Data Shared \checkmark \checkmark \checkmark \checkmark \checkmark \checkmark **Business Case** Shared / V \checkmark \checkmark \checkmark **Co-ordinated** Piloting Shared \checkmark \checkmark \checkmark \checkmark \checkmark Procurement Shared \checkmark Service

Annex of Additional Information



Level	Outline		
Level 1 Ad-hoc	 No overall roadmap for digital transformation exists yet. Investment in discrete areas only, with view to establishing evidence & business case. 		
Level 2	Strategy and investment largely at departmental level.		
Opportunistic	 Emerging sharing of strategic intent and business case with partners. 		
2	 Some initial shared service transformation between partners. 		
Level 3	A shared vision, strategy and roadmap for the 'smart' city in place with multiple		
Purposeful &	partners across multiple domains.		
Repeatable 3	 Business case established & shared investments in place to secure scalable improvements to agreed outcomes. 		
Level 4	 Vision, strategy and roadmap established at city-wide level. 		
Operationalised	 Improved service outcomes evidenced and underpinning future service improvements at scale. 		
Level 5 Optimised	 Strategy is optimised and evolves based on clear evidence of impact on city competiveness 		
5	 Smart investments have clear impact on city's strategic priorities. 		

Smart Cities Maturity Model: Data



Level	Outline
Level 1 Ad-hoc	 Data re-use and integration is limited by the range of disparate systems in use for different operations. Issues with data integrity, quality, privacy and security. Data is used primarily for the delivery of a particular service.
Level 2 Opportunistic	 Barriers to optimising data assets being discussed between partners and solutions emerging. Some advanced data sharing and analytics applications in place. Some data sets are opened to the public.
Level 3 Purposeful & Repeatable	 Data management & optimisation strategy agreed between partners. Investing in advanced data management, capture, analytics and big data applications. Extensive range of open data published with strategic intent to leverage innovation. Citizens sharing data in key areas.
Level 4 Operationalised	 Data assets used to provide actionable information. Extended data capture & analytics leads to improved decision making and service design. Established open data community is building new services valued by users. Citizen willingness to share data is widespread.
Level 5 Optimised	 Data analytics used for dynamic & automated predictive and preventative improvements to service delivery and real-time response capabilities for non-predictable events. Open data community generating new market opportunities and building alternatives to public service provision.



Level	Outline
Level 1 Ad-hoc	 ICT architectures are predominantly designed to support each line of business application. Limited investment in sensor networks for particular service applications.
Level 2 Opportunistic	 Some shared or integrated architectures exist but deployed on a limited set of services. Barriers are understood and being addressed between partners. Some shared use of sensor networks.
Level 3 Purposeful & Repeatable	 Investment in integrating architectures between organisations is taking place. Joint investment plans in city-wide deployment of connected assets.
Level 4 Operationalised	 Cross-organisational ICT architectures are in place. These are being scaled and adapted. The architecture enables accelerated service innovation. City-wide deployment of connected assets.
Level 5 Optimised	 Organisations are continuously reviewing, adapting and investing in ICT architecture to drive service transformation. A networked built environment across the city.

Smart Cities Maturity Model: Governance & Service Delivery Models

Level	Outline		
Level 1 Ad-hoc	 Leadership, governance and budgeting focuses on service transformation primarily within the boundaries of traditional organisational models. Traditional client-provider-supplier-user relationships exist and are often managed separately. 		
Level 2 Opportunistic	 Leadership and governance models test new ways of engaging with wider partners (including the private sector) to address cross department /organisation service transformation. Shared budget accountability for some discrete initiatives. 		
Level 3 Purposeful & Repeatable	 Leadership and governance models evolve to share accountability for delivering system-wide outcomes. Greater input to problem solving and service design from providers/ suppliers & users. Organisational budgets and structures adapt to ensure effective and transparent delivery of system-wide approach. 		
Level 4 Operationalised	 Transparent multi-partner governance model firmly embedded and delivering improved decision-making and outcomes at city-wide level. Service users are strong influencers. Traditional supplier / contractor relationships evolve to include gain sharing, co-development & performance contracting. 		
Level 5 Optimised	 Leadership and governance model stimulates an innovation system that promotes new combinations of service delivery and greater effectiveness at impacting on city-wide strategic priorities. 		

Smart Cities Maturity Model: Citizen & Business Engagement

Level	Outline				
Level 1 Ad-hoc	 Stakeholder participation in reform is focused on particular services and is limited by the lack of clear and accessible information on the performance of city services. Opportunities to enhance participation using web-based and social network channels is recognised and discrete initiatives are underway. 				
Level 2 Opportunistic	 Departmental-level commitment to investing in digital channels to enhance citizen engagement. The approach predominantly focuses on using digital means to provide improved information and transparency to stimulate engagement. Approaches to address digital exclusion in specific service areas underway. 				
Level 3 Purposeful & Repeatable	 System-wide/ multi partner strategies for enhanced citizen engagement in place that make effective use of digital technologies and address digital inclusion. The engagement tools and approaches adopted enhance the voice of stakeholders and citizens across a range of city services. 				
Level 4 Operationalised	 City uses multiple channels to engage with citizens tailored to their needs. Views and ideas of citizens and stakeholders systematically captured through multiple channels to improve services. Citizens benefit from integrated services across organisations using the best digital technology for them. 				
Level 5 Optimised	 City has embedded inclusive & personalised engagement models that stimulate innovation and collaborative approaches across the public and private sectors. Digital literacy across the population is high and support or alternative provision is in place for those that need it. 				

Potential Examples of Measurements of Success

	Suggested Input Measures		Suggested Output Measures
	Volume of data captured		Efficiency savings
	Number of datasets shared	•	Improved response times
•	 Number of datasets integrated Number of datasets published as open data Number of datasets analysed Number of data standards set Number of sensors installed Number of variables measured by sensors Level of data interoperability 	•	Increased number of automated real-time responses
		•	Increased citizen input to service design
•			Number of integrated services Enhanced innovation measured by:
•			 number of new products/ services delivered (including based on open data)
•			 number of start-ups achieved based on smart cities innovation system
		•	Level of engagement achieved

Data

Summary

 Develop an investment proposition for, and invest in, data platforms that give cities the technical capability to capture, integrate and analyse data (can be used by multiple partners and should consider building on what already exists i.e. the Glasgow City Technology Platform & other systems).

Investment Required

 >Professional Services
 >Enterprise Architects
 >Developers & Testers
 >Data Scientists
 >Technology Products
 >Licensing or Software-as-a-Service (SaaS) Payments

Measurements of Success

>Volume of data captured
>Number of datasets shared
>Number of datasets integrated
>Number of datasets published
>Number of datasets analysed
>Level of data standardisation
>Service delivery improvements

Benefits

- >Avoids multiple systems and multiple investments
- >Supports data sharing and data analytics across organisational and geographical boundaries
- >Supports data interoperability and the potential of big data integration
- >Encourages innovative use of data analytics to support targeted service delivery

- >Aberdeen: Common Transport Database System and Master Data Management
- >Dundee: National Entitlement Card (NEC)
- >Glasgow: Targeted Service Delivery enabled by innovative use of Data Analytics

Technology

Summary

- Develop a programme to: map, make best use of, and invest in enhanced connected assets across the built environment (air quality, energy use in buildings, transport data re journey times, parking, lighting, waste, etc).
- Support a national approach to investment in open, flexible, integrated and scalable ICT architectures across the public sector.

Investment Required

- >Professional Services
- >Technology Products
 - >Sensors
 - >Centralised management
 systems (CMS)
- >Network infrastructure
- >Further discussion & debate about appropriate national future approach to ICT architecture

Measurements of Success

- >Number of sensors installed
 >Integration capability of
- sensors installed
- >Number of variables measured
- >Volume of data captured
- >Service delivery improvements

Benefits

 Improves use of connected assets as a medium to provide command & control in addition to real-time data
 Ensures standardisation of deployment on a national basis

- >Aberdeen: Strategic Infrastructure Plan, SWAN Connectivity services & Accelerate Aberdeen
- >Dundee: City-wide Digital Strategy & City Wifi
- >Glasgow: Expansion and further innovation of the Glasgow Operations Centre, LED Lighting Programme & Humble Lamp-post Project
- >Inverness: 4G infrastructure, extended use of SWAN & Next Generation Broadband Network
- >Perth: Wireless enhancement in schools and smart technology in car parks
- Stirling: Transport data collection & centralised management system for street lighting

Citizen & Business Engagement

Summary

 Invest in data analytics from social media, and particular crowd sourced data, to engage citizens in improving service delivery - working with partners across private sector and academia.

Investment Required

 Professional Services
 Engagement Specialists
 Data Scientists
 Technology Products
 Social Media analytic tools
 Crowd-sourced data tools
 Licensing or Software-as-a-Service (SaaS) Payments

Measurements of Success

- >Volume of data captured
- >Number of datasets analysed
- >Level of engagement achieved (representation across different stakeholder groups and over time)
- >Service delivery improvements

Benefits

- >Makes best use of data available through social media channels
- >Opens up opportunities for co-design and co-creation of services
- >Could identify opportunities to stop collecting data in more traditional and resource inefficient ways

- >Dundee: Digital Strategy (including Dundee Observatory and Digital on the Move)
- >Edinburgh: work already taking place within ICT Transformation Programme
- >Glasgow: Targeted Service Delivery enabled by innovative use of Data Analytics

City Operations

Summary

 Develop an investment proposition to create/ enhance real time city operations across Scotland's cities (by reviewing opportunities to build on and develop existing capabilities).

Investment Required

- >Professional Services
 >System Operators
 >Data Scientists
 >Technology Products
 >Communication systems
 >Analytic tools
 >Network Infrastructure
- >Accommodation
- >Licensing or Software-as-a-Service (SaaS) Payments

Measurements of Success

 >Efficiency savings achieved
 >Volume of data captured, shared and integrated
 >Level of data interoperability
 >Service delivery improvements

Benefits

- >Avoids multiple systems and multiple investments
- >Supports data interoperability and the potential of big data integration
- >Centralised operational management facility provides consolidated view of the city
- >Encourages innovative use of data analytics to support targeted service delivery

- >Aberdeen: potential to link with Waste Collection Management System
- >Dundee: potential to link with Technology Enabled Care, ShareMore, SmartSAT
- >Glasgow: Expansion and further innovation of the Glasgow Operations Centre (£TBC)
- Stirling: potential to link with Central management system
 for street lighting (£TBC)

Citizen's Account

Summary

 Develop shared approach to ensure that every citizen has access to a secure environment where they can register for and access services online and where every city has the capability to manage a Citizen's Account that helps organisations keep accurate, up-to-date records of their customers and customer contact.

Investment Required

- >Professional Services >Developers & Testers
 - >Data Scientists
- >Technology Products
- >Integration with other public service ICT systems
- >Integration with existing back
 office processes
- >Licensing or Software-as-a-Service (SaaS) Payments

Measurements of Success

- >Number of services integrated
 >Number of users registered
- > Level of engagement achieved (representation across different stakeholder groups and over time)
- >Service delivery improvements

Benefits

- >mygovscotland myaccount identity authentication already a national initiative that has been leveraged at city level
- >Supports channel shift to an increased number of transactions moving online
- >Improved information about customer contact with multiple organisations for analysis and service improvement
- >Integration with national digital initiatives
- >Personalisation and lower transaction costs through online self-service

- >Edinburgh: ICT Transformation Programme & Channel Shift
- >Dundee: National Entitlement Card (NEC) Smart & Integrated Ticketing

Summary

 Support publication of open data specifically in relation to Education, Transport, Visitor Information & Waste, and its exploitation through national hackathons that seek to improve service delivery in these areas.

Investment Required

>Professional Services
 >Engagement Specialists
 >Data Scientists
 >Event Organisers
 >Post-Event Support
 Providers

Measurements of Success

- >Volume of data published
- >Number of attendees
- >Level of post-event involvement
- >Number of data products delivered
- >Service delivery improvements

Benefits

- >Supports data sharing and data analytics across organisational and geographical boundaries
- >Creates and supports a national innovation ecosystem on stimulating innovation that can drive public sector reform & provide opportunities for economic growth
- >Demonstrates a commitment to open data
- >Supports development of common data standards
- >Provides ease of access to appropriate data on a Scotlandwide basis by stakeholders
- >Ideas can be taken forward and supported collaboratively on a national basis

- >Aberdeen: potential to link with Waste Collection Services, Handheld Devices, In-cab devices
- >Inverness: wider use and development of information for visitors
- >Other: further ambition and activity mentioned in narrative in this area but not highlighted as specific potential
- 62 planned investments further review required

Capacity Building

Summary

• Consider development of shared and multi-disciplinary teams to manage collaborative programme and build smart cities capacity.

Investment Required

Strategies and investment required to attract and develop skills including the following: >Smart Cities Leadership >Programme/ Project Managers >Data Scientists >Enterprise Architects >Developer Resource >Test Resource >Product Managers >Designers >Engagement Specialists >Procurement Specialists >Legal Advisers >Communication Specialists

Measurements of Success

Skills capacity developedLevel of recruitmentLevel of retention

Benefits

>Adaptable and skilled workforce
 >Smart Cities Maturity Development
 >Skills transfer opportunities

Potential Investments

>Level of detail specifically identifying capacity building investments not included within potential planned investments - further work required

Parking

Summary

 Implement smart parking applications that use data and connected assets to manage and control spaces - including coach parking for events and visitor attractions.

Investment Required

>Professional Services

- >System Operators
- >Data Scientists
- >Technology Products >Sensors
 - >Communication systems
- >Network Infrastructure
- >Licensing or Software-as-a-Service (SaaS) payments

Measurements of Success

- >Volume of data captured
- >Integrated use of sensor technology
- >Number of datasets analysed
- >Service delivery improvements

Benefits

- >Improves citizen or visitor experience
- >Improves utilisation of assets
- >Generates data that can feed into service improvement
- >Improves sustainability of transport network

- >Dundee: potential to link with ShareMore, SmartSAT
- >Inverness: Bus investment
- >Perth: Smart technology in car parks, TACTRAN Connect integrated platform
- >Stirling: Parking management & maintenance, TACTRAN Connect

Street Lighting

Summary

• Implement street lighting programmes that use data and connected assets for the delivery of benefits such as energy efficiency and improved operational control.

Investment Required

>Professional Services

- >System Operators
- >Data Scientists
- >Technology Products >Sensors
- >Communication systems
- >Network Infrastructure
- >Licensing or Software-as-a-Service (SaaS) payments

Measurements of Success

- >Volume of data captured
- >Integrated use of sensor technology
- >Efficiency savings achieved
- >Number of datasets analysed
- >Service delivery improvements

Benefits

- >Efficiency savings (energy use & asset management)
- >Demand responsive service delivery
- >Opportunity to integrate with other connected assets, for example, environmental sensors, parking meters

- >Aberdeen: Street Lighting Lanterns Replacement
- >Glasgow: LED Lighting Proposal, European Innovation Partnership Humble Lamppost Project
- >Stirling: Central Management System for street lighting

Waste

Summary

 Implement smart waste programmes that use data and connected assets for the delivery of benefits including cost savings and achievement of environmental targets and improved service delivery.

Investment Required

- >Professional Services
 - >System Operators
 - >Data Scientists
- >Technology Products
 - >Sensors
 - >Communication systems
- >Network Infrastructure
- >Licensing or Software-as-a-Service (SaaS) payments

Measurements of Success

- >Volume of data captured
- >Integrated use of sensor technology
- >Efficiency savings achieved
- >Level of engagement achieved (representation across different stakeholder groups and over time)
- >Service delivery improvements

Benefits

- >Joint procurement opportunity (Aberdeen already working with Aberdeenshire & Moray Council; Edinburgh also organise waste on a regional partnership basis)
- >Joint development of capability especially data & digital technology application
- >Opportunity for data integration (operational data and crowd-sourced data)

- >Aberdeen: Waste Collection Services, Underground Bins Collection System, Handheld Devices, Collection Management System, In-cab Devices
- >Glasgow: Targeted Service Delivery enabled by innovative use of Data Analytics

END OF REPORT

