Evidence Check: Smart Cities

Government statement

UK actions - information provided by the Future Technologies Team, Digital Economy Unit, DCMS
Export - provided by UKTI

1. **Description:** Smart Cities covers the use of data-driven digital innovations to improve services and sustainability in towns and cities, including in planning, transport, energy use, and health, making appropriate and safe use of citizen data and big data. Smart Cities activity, both nationally and internationally, can include a broad set of sectors including digital technology, transport, energy, health, security, design and financial services. In terms of the market and related public policy, Smart Cities is a developing area.

2. **Public policy overview:** In Government, the Department for Culture, Media and Sport, the Department for Communities and Local Government, and the Department for Business, Innovation and Skills have responsibilities in relation to the main relevant sectors. However other departments also have interests, notably Department for Transport, the Department of Energy and Climate Change, and the Department of Health.

3. Smart Cities policy is cross-cutting and overlaps with other key Government priorities including devolution, digital innovation, digital transformation of local public services, open data and data sharing, city performance and local growth, future infrastructure, and export. Digital technology and data are the connecting factors, bringing city and citizen service delivery domains together, and bringing the corresponding policy areas together at city management and national levels. Many of the benefits of Smart Cities are sought through integration of data and delivery across domains.

4. The UK has strengths in many of the key industry sectors which see Smart Cities as a major opportunity, including data analytics, the internet of things, advanced electronics, Building Information Modelling, construction and intelligent mobility.

5. The Government has not set out a single model for UK cities to follow. That could conflict with the aims of devolution policy with regard to supporting UK places in addressing local priorities.

6. Government has supported the sector through linked initiatives, including:
- action by innovation bodies, in particular the Future Cities Catapult and Innovate UK to drive innovation and share successful examples and business models
- promoting engagement and understanding in cities (including through the Cities Standards Programme)
- supporting UK cities and companies in realising international opportunities: export, inward investment and other partnerships.

7. This note summarises actions to date on UK development and on export.

UK Smart Cities actions and organisations

Diagnosis:
- **Initial evidence base**
- **Smart Cities Forum**
- **Foresight Future of Cities projec**

Actions and implementation:
- **Future Cities Catapult**
- **City Standards Institute**
- **Future Cities Demonstrator**
- **Internet of Things City Demonstrator**

Evaluation is addressed separately for initiatives, which are at different stages.

Diagnosis

8. **Initial evidence base:** In 2013, the Government published this policy background paper setting out initial positions. The paper covers the challenges facing cities, the size of the opportunity afforded by the focus being given, worldwide, to addressing those challenges by transforming city infrastructures and city systems, and the key actions needed to seize those opportunities.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246019/bis-13-1209-smart-cities-background-paper-digital.pdf

9. At the same time the Government published two reports by Arup. *Smart City Market: Opportunities for the UK: a market assessment of smart solutions in five verticals: water, waste, energy, transport and assisted living*.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249423/bis-13-1217-smart-city-market-opportunties-uk.pdf

10. And secondly, *Global Innovators: International case studies on Smart Cities*, a study highlighting common themes in cities adopting smart approaches to city management including leadership models; procurement; mechanisms for managing risk and introducing innovation; placing the smart city vision in a department that already works horizontally across city silos; representing the needs and capabilities of a variety of city stakeholders and ensuring that certain citizen groups are not marginalised by the move to smart city approaches.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249397/bis-13-1216-global-innovators-international-smart-cities.pdf

11. In 2014, the Future Cities Catapult published UK Capabilities for Urban Innovation.This report sets out the UK's strengths in the global market for urban solutions. The report defines the challenges and opportunities that are driving global demand for integrated urban solutions and the adoption of a 'city systems approach'. It documents the wide range of UK capabilities relevant to development of the world's future cities, including spatial, physical, digital, commercial and social capabilities. It also highlights innovative

products and services developed by different actors in the UK ecosystem, which includes businesses, universities, national and city governments, and civic organisations.
http://publications.arup.com/Publications/F/Future_Cities_UK_Capabilities_For_Urban_Innovation.aspx

12. The evidence base continues to develop, with many UK and international organisations (including the FC Catapult) continuing to publish research and analysis relating to Smart Cities.

13. **Smart Cities Forum:** The Smart Cities Forum is a Ministerially-chaired stakeholder group to advance Smart Cities development in the UK, and export by UK companies and cities. The Forum first met in December 2013. The Forum was initially co-chaired by Greg Clark MP (as Minister for Cities) and David Willetts MP (as Minister for Universities and Science), and more subsequently by Ed Vaizey MP (as Digital Minister). Members include cities, Government departments, research and innovation organisations and industry.

14. Terms of Reference

- to help all parties to develop a shared perspective of challenges and needs, to understand the barriers to progress, and the priorities for effective Government intervention, in order to strengthen UK capability and practice;
- to ensure that the wide range of Government activity is better co-ordinated to meet these needs;
- to identify where further research and demonstration or standards might enable innovation and exploitation;
- to develop a global perspective on good practice and market opportunities and to work with UKTI to ensure UK firms are well placed to exploit their knowledge/expertise.

15. **Foresight Future of Cities Project:** A major multi-year Government Office for Science project looking at scenarios for UK cities up to 2065, to inform city and national policy on risks and opportunities. https://www.gov.uk/government/collections/future-of-cities

Implementation

16. **Future Cities Catapult:** In 2013 the Government established the Future Cities Catapult as a global centre for urban innovation, to help cities engage with Smart Cities technologies, and help UK businesses to turn urban innovations into commercial reality. https://futurecities.catapult.org.uk/

17. The Catapult works with city authorities and developers in collaboration to better understand their needs, and potential solutions, and to establish relationships with UK and global businesses and academic research institutions, accessing the latest research and ideas emerging in industry. The Catapult is technology 'agnostic' and will work with a city authority to help get the right solution for its needs.

18. The Catapult has teams of experts (economists, sociologists, engineers, and strategists) who research and apply global best practices to help cities better

understand and address urbanisation trends, technological innovation, environment and demographic changes. It provides access to legal and financial experts, works to finance some of the most ground-breaking deals, and seeks to combine technology with city services and infrastructure in new and innovative ways.

19. The Catapult is currently working with 20 UK cities and local authorities. It has 25 active projects with businesses, including SMEs, and 15 projects supporting exports on four continents. These include:
- innovating and demonstrating the urban Internet of Things, in collaboration with the Digital Catapult and with the Royal Parks;
- developing technologies to help local authorities better understand and serve cities, citizens, infrastructure and land usage, e.g. urban modelling, Growth Mapper, and Blockchain for Local Authority uses;
- developing and applying new methods for the measurement of the environmental, social, economic impacts of ICT solutions in the urban environment.

20. Evaluation: The Catapult is assessed against 28 Key Performance Indicators by Innovate UK. Learnings from Catapult projects are also captured and fed into the standards programme described below.

21. **Technology Strategy Board / Innovate UK - Future Cities Demonstrators:** Research suggests that the complexity of delivering economic and environmental sustainability, and good quality of life, in cities in the future will require new technologies, new business models, new financing mechanisms, and citizen engagement. Therefore there can be a role for Government in supporting targeted demonstrator projects where these are unlikely to emerge without this action.

22. In 2012, the Technology Strategy Board (now Innovate UK) invested £34.5m in two phases to discover the value that could be delivered to a city through integrating city services and systems through using innovative combinations of off-the-shelf tools. In the first phase, 30 cities were funded £50k each to carry out a feasibility study. In the second phase, 29 cities developed bids for funding based on their feasibility study to demonstrate in practice how integration of city systems could add value. Glasgow was awarded £24m to implement its proposal, and Bristol, London and Peterborough were each awarded £3m to implement parts of their plans.

23. The demonstrator projects have been completed and learning outcomes are being collated and shared. InnovateUK is running workshops (November 2015 - March 2016) in each of the Demonstrator cities at which leaders from the projects will share and discuss their work and transferable lessons from it. The themes to be discussed will vary between events but each is covering areas of critical importance to many cities, including leadership and organisation for smart / future cities; use of data to enhance prosperity and sustainability; innovation through people and community engagement; urban logistics; smart energy; smart business models.

24. Subsequent to receiving funding in the programme, in November 2015, Peterborough beat other shortlisted cities including Dubai and Buenos Aires to win the City Award at the Global Smart City Expo, underlining what the city has achieved.

25. Evaluation: A study by Leeds Metropolitan University has highlighted the effectiveness of the £50,000 feasibility studies and the competition, including beyond the competition winners. £107 million additional private and public investment was successfully brought into Belfast, Bristol, London, Peterborough and Milton Keynes to make parts of their studies a reality. It is reported that three-quarters of the local authorities had taken forward some aspects of their bids by the end of 2013, using their feasibility studies as business cases to secure alternative funding from EU sources and the private sector. New partnerships between authorities and with local businesses and universities have continued.

26. A more formal analysis of lessons learned will be carried out in partnership with the Future Cities Catapult.

27. **Internet of Things Cities Demonstrator Competition:** In 2015 the Government and Innovate UK offered up to £10 million for an Internet of Things Cities Demonstrator: a single collaborative research and development project to demonstrate the capability of applications at scale across a city region.
https://interact.innovateuk.org/-/internet-of-things-cities-demonstrator

28. The competition is part of IoTUK a wider £40 million government investment in Internet of Things announced in March 2015, to make the UK an international leader in these pioneering technologies. IoTUK is a partnership between the Department of Culture, Media and Sport, the Department of Health, Innovate UK, and the Future Cities and Digital Catapults, helping the UK's businesses and public sector to make advances in creating their IoT capability, specifically in areas such as security and trust, data interoperability, investment justification and design development. http://iotuk.org.uk

29. In December 2015, the Government announced that the CityVerve project led by Greater Manchester Local Enterprise Partnership, had been chosen by the independent assessors as the winner of the Cities Demonstrator competition. CityVerve will demonstrate applications of Internet of Things technologies and services in four key areas: healthcare; transport; energy and environment; and culture and community. The city demonstrator will develop and share business models for other cities to follow.

30. Evaluation: The programme and criteria and means for evaluation are in development. The demonstrator is required to deliver specific benefits for citizens, the city region and the environment, and economic benefits for businesses and local authorities, both during and after the period of the demonstrator. It will also deliver a plan for scale during, and scalability after, business models for other cities to use and adapt.

31. Innovate UK, DCMS and the Future Cities and Digital Catapults are working to support the runner-up bids in accessing alternative funding, in order to deliver more projects and to maximise the overall value of the programme to UK cities and the economy.

32. **City Standards Institute:** The Institute was created to bring together cities, industry leaders and innovators to work together in identifying the challenges facing cities, providing solutions to common problems and defining the future of smart city standards. Initially funded by the Information Economy Unit in BIS (now transferred as the Digital Economy Unit, to DCMS) and delivered by the British Standards Institute, this is now a partnership between BSI and the Future Cities Catapult, and has 33 members, including 12 UK cities and 5 London boroughs. The institute is composed of a Board, a Cities working group and a SME working group, which assess city needs and priorities in terms of standardisation.

33. The programme's publications deliver strategic and practical approaches to help cities engage with new opportunities. The Institute is currently considering additional means to help cities take up these tools, and to evaluate their use. The programme has delivered the tools listed below, and is seeking feedback from cities and industry on their use.

34. PD 8100 Smart Cities overview: This guidance has been developed to help city leaders identify opportunities to improve services, but is accessible for citizens and businesses too. It covers the role of technology, data and standards and provides a balanced picture of the potential benefits of smart city strategies.

35. PAS 181 Smart Cities framework: This tool gives city leaders a framework to develop, agree and deliver smart city strategies. It draws on existing examples of successful practice and provides a set of consistent and repeatable models.

36. PAS 180 Smart Cities terminology: This guidance provides industry-agreed understanding of smart city terms and definitions. The aim is to improve communication and understanding by providing a common language for citizens, developers, designers, manufacturers and local government customers and managers, and local businesses.

37. PD 8101 Guidance for planning the smarter city: This guidance gives models of good practice, so that new developments can support smart city aspirations at lower cost.

38. PAS 182 Guide to using city data: Developed around concepts from the public sector data concept model, provides a basis for interoperability, and outlines details of the smart city concept model, so that data sets can be discovered and combined to gain a better picture of the needs and behaviours of citizens and businesses.

Smart Cities Export

Diagnosis - the export opportunity

39. By 2050 the number of people living in urban environments will have grown to around 7 billion. There is growing need for better city-based services in transport, energy, infrastructure, health and education. To support this there is a corresponding need for security, privacy, governance and standards, data management and analytics, financing and major project management. A report by the Future Cities Catapult identified over 32,000 companies in the UK providing innovative, technology based solutions to the national Smart Cities market. With additional UK expertise in architecture and urban design already contributing £16bn and 400,000 jobs to the UK economy, the UK has the potential to deliver Smart Cities' solutions on a global scale.

Actions / Plans

40. The UK has significant supply side capability. However, many of the UK's innovative Smart Cities solutions are from UK SMEs with limited resources, funding and reach. Therefore the UK industry needs to develop if it is to match the pace of international market growth. The UKTI Smart Cities team was established in 2014 to address this market failure to bring together cross-sector UKTI teams, UK companies and wider UK stakeholders, to quantify the international opportunities and support UK companies.

41. Key sectors

- Transport - Intelligent Transport /Mobility
- Energy - Smart Grids/Smart Networks
- Health - Assisted Living/Remote Care
- Security - Cyber
- Infrastructure – Construction/Water/Waste/Environment

Implementation

42. The delivery strategy comprises a two-pronged approach to the identification of events and activities that focus on 'big ticket' events (such as the Smart City Expo World Congress, Barcelona) and more bespoke, sector specific activities that target specific cities, High Value Opportunities and other business opportunities. This work will be in collaboration with the relevant sector teams and other government departments as part of the whole-of-government approach to exports.

43. UKTI is helping UK cities with international cities interested in the British experience in Smart Cities to help British companies access commercial opportunities within these foreign municipalities. This includes collaboration on FCO Prosperity Fund projects eg. Manchester Smart City working on a project in Wuhan; and promotion of smart city collaborations through existing city twinning platforms e.g. Bristol and Guangzhou. UKTI also works with local "in market" systems integrators who win and then subcontract major projects to help British SMEs to bid for otherwise inaccessible opportunities.

44. UKTI is also forming and implementing a Smart Cities inward investment strategy. This will position the UK as a preferred destination for investment in smart infrastructure by featuring UK cities, as well as R&D projects. We are aiming to attract new investors as well as encouraging existing investors to expand their UK footprint by establishing smart city teams.