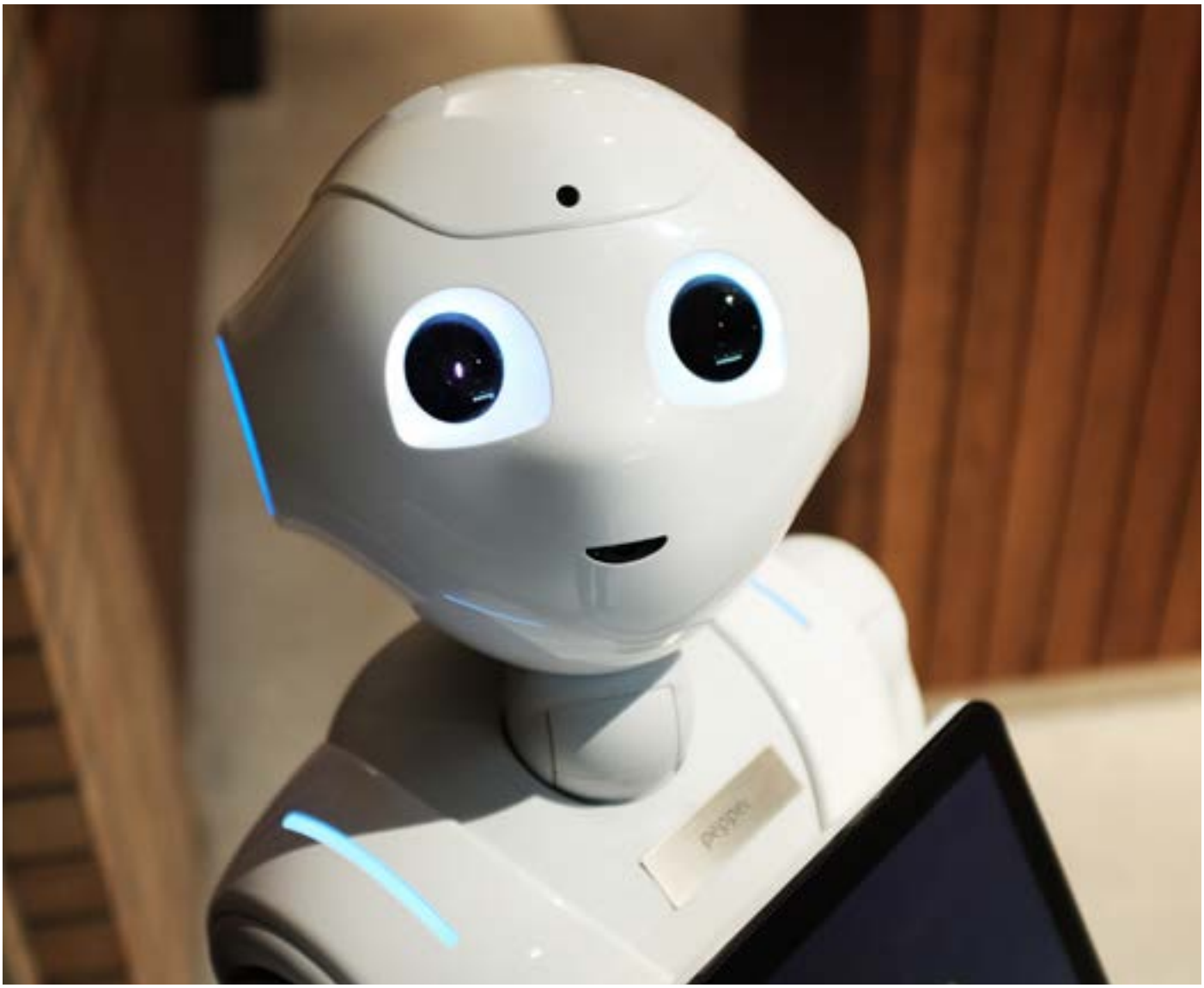
Q1

Autumn 2018 edition

CITY INNOVATION BRIEF

CATAPULT Future Cities



FOREWORD

Over 90% of the world's data was created in the last two years. Much of it was generated by the billions of connected devices in our pockets and bags, homes and workplaces, and streets and skies that make up our modern cities. There's huge potential for city leaders and businesses alike to harness this valuable resource, put it to work, and power solutions to many of the challenges cities face now and in the future.

Why is data so important? It enables AI-driven products and services. Companies like Amazon, Google, and Uber show us the impact data can have on society and urban environments. And there's massive economic benefits up for grabs. A recent report by McKinsey estimates AI will add £9.8 trillion to the global economy by 2030. Almost half of that will come from new products and services. In this issue you'll see how cities are already taking a cue and experimenting with data and AI to help meet their diverse challenges and encourage economic growth. But more needs to be done.

City^{X}, the Future Cities Catapult Expo at the end of September, worked to do more. The three-day event explored three pressing city issues: adaptability, breathability, and mobility. Exhibitors and speakers demonstrated the important role data and AI in these three critical areas will play in the future of advanced urban services.

The UK is in a strong position to lead on data in cities: we have one of the largest and most developed AI and machine learning markets in Europe, with over 200 SMEs in the field. Machine learning underpins many smart

city applications from pollution reduction to data management. Transportation will see the biggest impact – one that's already visible in our streets with increases in taxis and packs of bright shareable bicycles.

This is still an emerging sector. But there are definite benefits for early adopters. China has already outpaced the world with a deliberate strategy of becoming a supply chain leader in AI. I believe the UK can and should take a similar approach for applications of AI in cities. The supportive infrastructure we need to do this is in place: the first UK tests of the 5G data network are now complete. And I welcome the recent announcement of the West Midlands as the UK's first '5G urban connected community'.

Collaboration across sectors and industries will be essential to accelerating the development, deployment, and adoption of AI-powered solutions in cities. The UK is perfectly positioned to take the lead.

Nicola Yates OBE – Chief Executive Officer, Future Cities Catapult

CITY INNOVATION BRIEF

CATAPULT Future Cities

URBAN FORESIGHT

City Innovation Brief **is produced by Future Cities Catapult in collaboration with Urban Foresight.**

WHAT'S **INSIDE?**

The fourth edition of the *City Innovation Brief* starts with a review of announcements, policies and technologies affecting advanced urban services during the second quarter of 2018.

Some highlights include:

- Further devolution of transport policy to Transport for the North and Transport for the West Midlands.
- Increases in the use of digital technology to support health and social care services.
- Pioneering smart city innovations, including drones, smart cities and satellite applications.
- Acceleration in the research and testing of connected autonomous vehicles and roll-out of electric buses.
- New legislation including the Scottish Climate Change Bill and Telecommunications Infrastructure Act 2018.

The largest funding announcement in our activity tracker is £50 million for the creation of a network of AI and digital pathology imaging centres. This is part of a growing trend for funding announcements for smart technologies which help deliver public services such as waste and energy management.

Overall in this quarter there has been a significant decrease in European funding announced for UK cities, with H2020 funding falling from €224.5 million in Q1 to €8 million in Q2.

Our featured article in this issue deep dives into trends and applications of artificial intelligence (AI) and its role in cities. This includes the use of AI in tackling mobility and air pollution challenges, how chatbots and machine learning are helping city management and security, and how social care and housing is being transformed by robots and automation.

URBAIN
NETWORK

A new AI network bringing industry, cities and researchers together to develop and adopt AI

Future Cities Catapult has launched URBAIN, a new network between industry, cities and researchers focused on accelerating the development and adoption of AI and Analytics in our cities.

The goal of the URBAIN network is to create new market opportunities for businesses and cities hoping to apply AI and Analytics to cities by fostering and unifying:

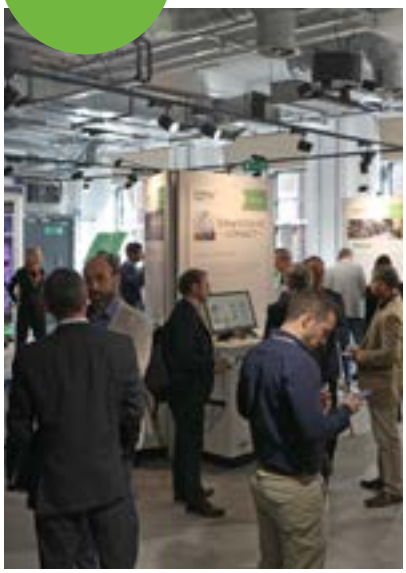
- Confidence in customers who are ready to invest time or resources in new products
- An ecosystem of UK business offering tried and tested products that deliver real impact to customers, ready to pilot new ones with city authorities, or seeking signposting to funding opportunities

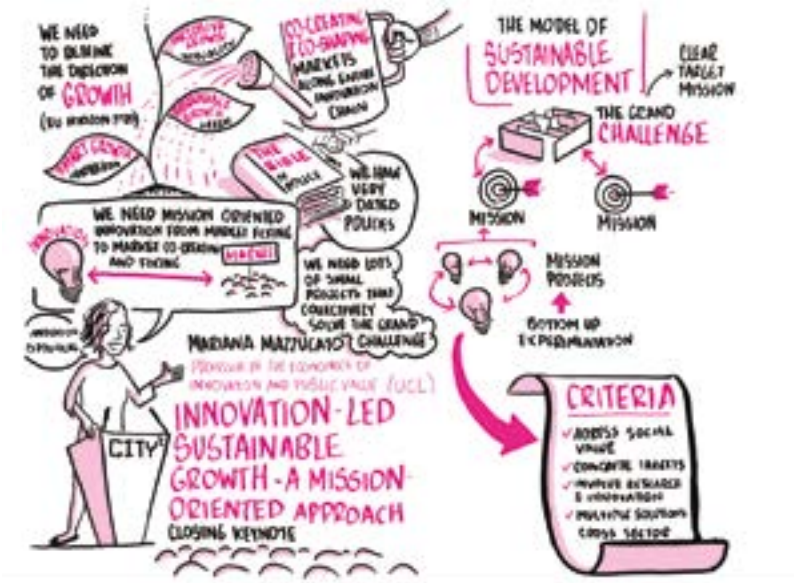
How you can contribute to this network

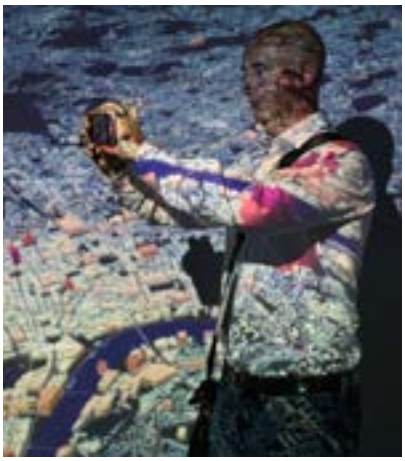
Aside from hosting physical meet-ups at the Urban Innovation Centre in London, we are encouraging members to grow this community online through using the social media handle #urbainUK to share case studies, blogs, and experiences with one another. Here's some ideas on what you can do next.

- Sign up to the mailing list for this network
- Share this article with other people who might like to join this network
- Use #urbainUK to share case studies, blogs, and funding opportunities on Twitter and LinkedIn
- Explore with your organisation how AI might change the way it delivers services
- Join us at an URBAIN or other events later this year

CITY^X UPDATE







City^X – the inaugural future cities expo at the Urban Innovation Centre

Our inaugural Future Cities Expo in September 2018 was a showcase of the innovative companies working on products and services that are helping to improve urban living. The event shone a light on three key areas for future cities — adaptability, breathability and mobility. Over the four days of City^X, we had more than 260 companies in the building – 38 of which exhibited, and many others that took part in panel sessions and presentations.

Conversation flowed, both at the event, during panels on topics from active travel to improving air quality, and online, across social media. In total, 573 people were involved in exhibiting, speaking and attending. Most importantly, the feedback from businesses who took part has been exceptionally positive, with firms reporting they had more "great quality conversations, with the right people" than usual for this type of event.

Photo by Nello Matos @nello_matos

Digest

Key developments in Advanced Urban Services and urban innovation in the UK this quarter.

Meanwhile the West Midlands Combined Authority (WMCA) has taken over the operation of the West Midlands Metro franchise.

The fourth in our series of quarterly briefings profiles key developments in advanced urban services and urban innovation in the UK for the second quarter of 2018.

POLITICAL

City deals and regional devolution continue to be on the policy agenda this quarter. A deal was agreed for three North of Tyne councils and extra powers for the Belfast city came a step closer after Theresa May's commitment to progressing City Deals in Northern Ireland.

Jo Johnson, the Rail Minister, announced new powers for Transport for the North (TfN), labelling TfN as the "crucial next step in giving the north of England leaders greater influence than ever over transport investment". In May, the DfT and Network Rail launched the Digital Railway Strategy making a commitment that all new trains and signalling are digital or digital-ready from 2019, to reduce overcrowding and cut delays.

Responses to TfN's Strategic Transport Plan have been emerging this quarter. The plan has been broadly welcomed, including endorsements from Northern airports, but Doncaster Metropolitan Borough Council expressed disappointment at not being named a rail hub.

Meanwhile the West Midlands Combined Authority (WMCA) has taken over the operation of the West Midlands Metro franchise.

Newcastle City Council has unveiled plans to transform Newcastle into a smart city, which could be worth up to £200 million for the city's economy by 2020 according to analysis by Urban Foresight for Newcastle City Futures. Newcastle has also been named as one of the eight smart European cities to watch in 2018.

Smarter London Together, a roadmap for making London a leading smart city was launched by the GLA to help solve some of the city's challenges including poor air quality through digital design and urban design.

In Basingstoke, the council is engaging with citizens to identify local challenges which smart technology could be solve. The Scottish Government's CivTech Challenge is also supporting 10 public sector organisations to procure solutions for some of the toughest problems they face.

ECONOMIC

April saw the launch of the latest UK Innovation Survey which found the proportion of 'innovation active' businesses in the UK fell from 53% in 2012-2014 to 50% 2014-2016.

Meanwhile, a report from the Scottish Government states that over 60% of Scottish employees had to change how they work following the introduction of new technologies in the workplace.

Outside of London, the three urban areas with the highest average workplace wages are Reading, Crawley and Milton Keynes according to Centre for Cities, with Southend being the lowest, below Huddersfield and Birkenhead.

Investment in road infrastructure continued, including the completion of a £400 million upgrade to the A1 and announcement of a £63.5 million bypass around Melton Mowbray.

The British Chambers of Commerce (BCC) Quarterly Economic Survey shows that UK economic growth was subdued in the first quarter of 2018, despite a strong export performance. The BCC also published research which found that over a third of businesses don't believe that the UK's road and rail networks are meeting their needs. With the number of miles driven increasing by 17.4 billion miles between 2010 and 2016 the LGA is calling on the Government to respond to increased demand on local roads with additional funding.

Investment in road infrastructure continued, including the completion of a £400 million upgrade to the A1 and announcement of a £63.5 million bypass around Melton Mowbray. Railways are also benefitting from new funding, with the Welsh Government committing to spend nearly £100m on the new Transport for Wales depot as part of £194m investment in stations across Wales. In London, 94 new state-of-the-art trains to serve the Piccadilly line have been commissioned in a contract worth £1.5bn.

London is also home to a £1.1bn vision for the East Bank at Queen Elizabeth Olympic Park announced by the Mayor in June. Similar economic development investment is happening around the country, such as the development of Princes Dock in the £5.5bn Liverpool Waters scheme and the £50million of funding from the Glasgow City Region City Deal to further the development of the Clyde Waterfront.

Looking at local council finances, a new report by the IFS on the 100% business rate retention pilots has found that councils operating the scheme could gain £870m in extra funding in 2018-19, or 3.6% of their operational budget. Oxford City Council has agreed the terms of its Revaluation Discretionary Relief Scheme for 2018 to support local businesses facing financial pressures.

Leeds City Region Enterprise Partnership is making £1m in funding available to attract digital businesses to relocate to the Leeds City Region.

Aberdeen City Council approved a new 10-year culture strategy and the Mayor of Greater Manchester has set up a major review to identify how the city-region's music industries can be nurtured, encouraged and refreshed as well as appointing Greater Manchester's first ever Night-Time Economy Adviser. Nationally, funding of up to £16 million is available for 4 demonstrator projects with immersive audience experiences, whilst analysis found over 1,000 immersive specialist UK companies, employing 4,500 people with turnover of £660million, or 9% of the global market.

A new report from PwC has found that the construction and manufacturing sectors could save £8.6bn through the introduction of drones, potentially adding £42bn to the UK's GDP by 2030. Similarly, the government is reviewing how best to support businesses in embracing new technology to accelerate productivity and wage growth. ▸

In Brighton and Hove a demonstrative housing scheme that will allow people living with dementia to continue living independently has opened.

SOCIAL

In May, the Welsh Government confirmed a £50m a year fund to support joined-up working between health, social care, housing and third sector organisations to deliver care closer to people's homes. In Brighton and Hove a demonstrative housing scheme that will allow people living with dementia to continue living independently has opened, whilst Wigan Borough Council is trialling digitally enabled spectacles helping visually impaired residents to read and write. Twelve other councils have been chosen by NHS Digital and the Local Government Association to explore how technology innovations can shape the future of social care.

Hampshire County Council has approved planning for a development to build fit-for-purpose accommodation for people with disabilities. The West Midlands Combined Authority has been granted £9.6m in funding for a 3 year project to reduce rough sleeping, offering safe, secure accommodation, alongside intensive health and well-being support. The Mayor of Greater Manchester has set out plans for a proposed £8m Housing First project that will create 500 homes for people with complex needs and who are homeless. June saw the announcement that charities and community groups will get £20 million of new government funding to help isolated people and those suffering from loneliness.

The Scottish Government has announced a £3.5m decarbonisation fund for local authority and housing association home energy efficiency and low carbon heating projects. Aberdeen City Council is exploring a new way of meeting demand for housing, by purchasing completed units from landowners and developers as part of their goal for 2,000 new council homes in 2018/19. Liverpool City Council's new ethical housing company, Foundations, has announced the first wave of properties to be built after identifying land for 120 homes. London Community Land Trust, the first urban community land trust, will deliver flagship community-led housing on two sites on TfL land as part of the Mayor of London's work to boost small builders in the capital

The LGA has responded to a study finding that 4.1% of children aged 10 and 11 in Year 6 are classed as severely obese by calling for action to prevent a future health crisis. Examples of action include Barnsley Council's food plan to create a 'sugar-free town' and Kingston Council partnering with GoodGym to launch a new project to encourage citizens to be more active. The Mayor of London has also unveiled new proposals to ban the advertising of junk food on the TfL network.

The National Police Chiefs Council (NPCC) has set out to address the lack of governance, standards, and common practices in forces' use of social media. This is as part of a strategy to embed three main uses for social media: a means to contact the police; a way of addressing local needs; and a tool for engaging children and

More than 95% of Scotland's homes and businesses are now able to connect to fibre broadband thanks to the Digital Scotland Superfast Broadband (DSSB) project.

young people. In London, the Police and Crime Committee has launched an investigation into the Mayor's Knife Crime Strategy, as well as reviewing the effectiveness of social media and advertising campaigns and knife detection wands provided to schools across the capital.

NHS England is introducing new local partnerships to give health and social care staff better access to patient data to improve decision making. Alongside this, NHS Digital has granted £1.1m of funding for 'demonstrator areas' to develop or adopt digital tools for transferring data from clinical settings to adult social care.

TECHNOLOGICAL

Investment in connectivity and smart city applications continued during this quarter. Vodafone has conducted the first test of the UK's 5G spectrum, Manchester is introducing smart lighting technology and Cambridgeshire County Council is to invest up to £11m to fund the rollout of superfast broadband access to 99% of buildings.

More than 95% of Scotland's homes and businesses are now able to connect to fibre broadband thanks to the Digital Scotland Superfast Broadband (DSSB) project. However, when it comes to mobile connectivity the British Chamber of Commerce has found that only 53% of UK businesses believe that the UK's mobile network is more reliable than it was 5 years ago.

Nexus, the public body which owns and runs the Metro is partnering with Google to enable passengers to pay for

Opening up OS MasterMap data can add £130m a year to the UK economy.

smart card tickets on their phones. This follows figures from Transport for London that show half of all pay-as-you-go Tube and rail journeys are made using contactless cards or mobile phones. Similarly, in West Yorkshire £30m worth of bus and train journeys have been made on the MCard smart card in the past year, and ArrivaClick, a new on-demand app-based public transport service, will be launched in Liverpool this summer.

In April, Transport for West Midlands (TfWM) launched a Mobility-as-a-Service platform that allows people to combine all their travel needs via their smartphone across all of the city-region's transport modes. A new mobile travel app and smart wayfinding screen network has been launched by Smart Cambridge to help residents, commuters and visitors plan their journeys.

Bradford Council brought together key drone technology stakeholders to identify drone applications in the city after winning a bid in the NESTA Flying High Challenge. Meanwhile, the government is to spend up to £70m implementing satellite tracking technology to monitor the whereabouts of people prosecuted for immigration offences.

Cities and government continue to develop ways of using data to provide better and more efficient services with the government estimating that opening up OS MasterMap data can add £130m a year to the UK economy. North Lanarkshire Council has successfully used its Master Data Management system to enhance citizen's engagement experience with a new Citizen Portal. Homes England

New measures to protect the nation's critical infrastructure and digital services from cyber-attacks and computer network failure were announced in May.

has agreed a "digital partnership" with systems integrator Accenture and public-service transformation specialist FutureGov to improve their data management and enable its workforce to operate more effectively with industry partners.

TfL is beginning a three-month trial to identify how best to automatically count passengers on buses and has partnered with Siemens to deploy a Real Time Optimiser (RTO) system to make the capital's traffic light control system smarter.

Basingstoke and Deane Borough Council has launched the Virtual Reality Lab to showcase VR/AR technologies and to combine the interactive capabilities of Virtual Reality with the connectivity features of 5G. The launch event is part of TechTown project which brought together eleven European medium-sized cities.

LEGAL

The quarter started with the Telecommunications Infrastructure Act 2018 coming into force to legislate 100% business rates relief for communications network operators who install new fibre on their networks in order to incentivise investment.

This Act was one of a suite of legislation and consultations, including the Data Protection Act 2018 coming into force and a consultation on the Modernising Consumer Markets Green Paper, which reviews how firms' data can be made more accessible to consumers. Updates to the Renewable Transport Fuel Obligation has set new biofuel targets to double the amount of renewable fuels used in the UK transport sector by 2033.

New measures to protect the nation's critical infrastructure and digital services from cyber-attacks and computer network failure were announced in May. Measures to protect internet users are part of the commitment to new online safety laws to make social media safer made in the Government's response to the Internet Safety Strategy consultation.

Drones will not be allowed to fly above 400ft and within 1km of airports following an amendment to the Air Navigation Order 2016. A change to Highway Code regulations is set to make way for new technologies allowing drivers to use remote control parking on British roads.

Infringements and licensing issues relating to taxis and private hire vehicles continued to surface this quarter, with Transport for London's Compliance Officers given new powers by the Metropolitan Police to crack down on illegal activity and Liverpool City Council issuing a number of penalties for infringements relating to taxi and private hire drivers. Brighton & Hove City Council's licensing panel has decided against renewing Uber's licence in the city.

The Scottish Climate Change Bill introduced a target to reduce greenhouse gas (GHG) emissions by

90% by 2050, with an ambition to go further still by setting a commitment to reach net-zero GHG emissions as soon as possible. The Scottish Government has also announced that it will double the amount of funding available through the Community Links Fund for active travel infrastructure in 2018/19, and Transport Scotland has made £2m available for the Smarter Choices, Smarter Places (SCSP) Open Fund.

The Scottish Government also announced the Transport (Scotland) Bill, including plans for new Low Emission Zones and measures to standardise smart ticketing technology compatibility and interoperability. The Road Vehicles Regulations 2018 have been approved by UK Parliament, stating that OEMs who manufacture vehicles designed to cheat emissions tests in the UK will face fines of up to £50k per tampered vehicle.

Other environmental legislation this quarter includes the doubling of the maximum spot fine for littering and graffiti from £80 to £150 from April 2018, and the launch of a consultation on the Environmental Principles and Governance Bill and new laws to deliver a Green Brexit. European Member States have

The Mayor of London has released £1m of funding for a range of measures to tackle air pollution and protect pupils, as well as £2m of grant funding for green space improvements.

approved new legislation on the circular economy with targets for recycling rates set to 55% by 2025; 60% by 2030; and, 65% by 2035.

ENVIRONMENTAL

In Scotland, an Expert Panel on Environmental Charges and Other Measures has been established by Scottish Government to provide advice on tackling single-use plastic waste. The Scottish Government has also opted to extend the Home Energy Efficiency Scheme beyond a group of three initial trial local authorities. The Energy Efficient Mortgages Pilot Scheme has been launched in the UK making favourable financing options available for energy efficient buildings and energy saving renovations.

Cities around the UK have also announced a range of environmental initiatives. The Mayor of London has released £1m of funding for a range of measures to tackle air pollution and protect pupils, as well as £2m of grant funding for green space improvements. Oxford City Council has convened green space providers and healthcare professionals to discuss how the natural environment can help keep people healthy and to

Meanwhile, Bristol City Council is offering subsidies of more than £3,000 for taxi drivers who purchase electric and ultra-low electric vehicles to help improve air quality in the city.

encourage green prescribing.

A new initiative was launched in April to help small and medium sized enterprises in the Aberdeen City Region to identify and capitalise on circular economy opportunities. Kingston Council has launched a new initiative to encourage residents living in purpose-built flats to reduce their food waste and Cardiff Council has agreed to a number of measures to increase the city's recycling and composting rate from 58% to 70% by 2025. July saw the launch of the Mayor's Energy Efficiency Fund to deliver new low carbon technology or upgrade existing low carbon infrastructure.

Dundee City Council analysis found that the annual and daily air quality objectives for PM10 emissions were met in full for the first time at all monitoring sites throughout the city. Meanwhile, Bristol City Council is offering subsidies of more than £3,000 for taxi drivers who purchase electric and ultra-low electric vehicles to help improve air quality in the city. The London ULEZ will expand to include the North and South circular roads from 25 October 2021, and Birmingham City Council is bringing forward plans for a Birmingham Clean Air Zone.

Birmingham has also been announced as the host of the world's first International Zero Emission Vehicle Summit in September 2018 as support for electric and ultra-low emission vehicles continued this quarter. London is set to have Europe's largest double-decker electric bus fleet with 68 new zero-emission vehicles, while Leeds has purchased eight new ultra-low buses as the first part of a £71m plan to have 284 new ultra-low emission buses by the end of 2020. Cardiff has also welcomed its first electric bus as part of an 8-week trial.

Transport Scotland is increasing its Low Carbon Transport Loan budget from £8m to £20m and quadrupling its Switched on Fleets budget from £1.2m to £4.8m in 2018/19, as well as launching a new Switched on Towns and Cities Challenge Fund. The Mayor of London has also launched a new taskforce dedicated to enhancing electric vehicle infrastructure across the capital.

Private sector investment in electric vehicles is growing with BP purchasing the UK's largest EV charging company, Chargemaster and Pivot Power partnering with National Grid to deliver a £1.6bn programme to develop battery storage and rapid EV chargers at 45 sites around the UK. UPS has announced that it will pilot a fleet of 35 electric delivery vehicles for last-mile deliveries in London.

Urban service providers are also adopting low-emission vehicles with the City of London of trialling the UK's first fully electric refuse truck and Dundee unveiling a pair of electric vacuum cleaners as part of the Smart Cities (Smart Waste) Project.

ACTIVITY TRACKER

Around **£2.35BN** was made available in funding for advanced urban services this quarter

Around £2.35BN was made available in funding for advanced urban services this quarter, with the largest amount coming from an announcement by Lloyds Banking Group for a £2BN Clean Growth Finance pot. This is close to a three-fold increase in funding available compared to the previous quarter. Excluding the anomolous Lloyds contribution, however, this quarter saw a fall of more than half the value of funding made available for advanced urban services in 2018 Q1.

Other large funding pots included £40M for smart local energy systems from Innovate UK. There was also a drop in the number of European H2020 and ERDF funding calls made available compared to previous quarters.

UK GOVERNMENT FUNDING
TOTAL: £300.85M

Smart local energy systems: demonstrators
- Innovate UK & UKRI
- £40M
- UK organisations can apply for a share of up to £1.5 million to design smart local energy systems.
- UK-based organisation
- 8 May – 25 July 2018

Low carbon vehicles of the future
- Advanced Propulsion Centre (APC) / Innovate UK
- £30M
- APC 10 is seeking proposals for UK based R&D projects that significantly reduce carbon dioxide emissions and improve air quality. The projects must focus on technologies directly linked with the long-term development of zero-emission capability including mobility services in cities.
- UK-based business/business activity
- 30 Apr – 27 June 2018

Meridian 3: autonomous highway, rural and parking test facilities
- CCAV / Meridian Mobility / Innovate UK
- £25M
- CAV testing infrastructure for autonomous parking and autonomous driving on rural roads and highways.
- UK-based organisation
- 4 June – 29 Aug 2018

Connected and autonomous vehicles 4: piloting passenger services
- CCAV/ Innovate UK
- £25M
- Pilot studies are expected to develop and then test connected and autonomous vehicles (CAVs) in a real-world public or semi-controlled environment, with at least a 6 month public trial.
- UK-based business of any size
- 25 June – 19 Sept 2018

Commercialising quantum devices: innovation R&D
- Innovate UK
- £20M
- Innovate UK will invest £20 million in innovation projects to develop prototype quantum technology devices that address one or more important industrial challenges including: situational awareness; infrastructure productivity; seeing the invisible; and, trusted peer-to-peer communication.
- UK based business, academic, charity, public sector organisation or research and technology organisation
- 18 Apr – 13 June 2018

Open programme funding competition round 1
- Innovate UK
- £20M
- This competition is open to the best cutting-edge or disruptive ideas or concepts with a view to commercialisation. These can come from any area of technology, including technologies important for driving innovation in advanced urban services.
- UK-based business of any size or a research and technology organisation (RTO)
- 10 May – 11 July 2018

Hydrogen Supply Competition
- Innovate UK
- £20M
- The £20 million Hydrogen Supply programme aims to accelerate the development of a low carbon bulk hydrogen supply solutions for industry, power, buildings and transport at a technology readiness level (TRL) between 4 to 7.
- See eligibility criteria
- 11 May – 21 November 2018

Cultural Development Fund
- DCMS/ Arts Council
- £18.5M
- This fund aims to allow cities and towns to invest in creative, cultural and heritage initiatives that lead to culture-led economic growth and productivity. This fund is from the Department for Digital, Culture, Media and Sport (DCMS) with a budget of £20 million available.
- Towns & cities outside London Partnerships for an area
- 3 July – 1 Aug 2018

Audience of the future: demonstrators
- Innovate UK & UKRI
- £16M
- UK businesses can apply for a share of up to £16 million to transform the creative industries by testing large, immersive experiences with mass audiences.
- UK-registered businesses
- 21 May – 1 Aug 2018

Innovation loans: April 2018 open competition
- Innovate UK
- £10M
- Loans are for highly innovative late stage projects with the best game changing and/or disruptive ideas or concepts. There should be a clear route to commercialisation and economic impact. Whilst projects for advanced urban services are eligible, this is not exclusive and projects in other sectors are also able to apply.
- UK-based SMEs carrying out projects in the UK
- 9 April – 13 June 2018

Meridian 2: connected vehicles data exchange
- CCAV / Meridian Mobility / Innovate UK
- £5M
- This is to develop one or more platforms for the exchange of connected vehicle data. The aim is to create the world's most effective CAV testing ecosystem.
- UK-based organisation
- 4 June – 29 Aug 2018

Smart local energy systems: concepts and designs
- Innovate UK & UKRI
- £1.5M
- Innovate UK has up to £41.5 million to invest in both the design and practical demonstration of new business models that intelligently link supply, storage and demand in heating, power and transport.
- UK-based organisation
- 8 May – 25 July 2018

GovTech Catalyst challenge
- Government Digital Service

Fund | Provider | Value | Purpose | Target | Date

- £1.25M
- The GovTech Catalyst (GTC) supports public sector organisations to find innovative solutions to operational service and policy delivery challenges. GovTech Catalyst competitions help the public sector identify and work with cutting edge technology firms.
- Public sector organisation
- 21 May – 11 June 2018

Audience of the future: design foundations
- Innovate UK & UKRI
- £1M
- UK businesses can apply for a share of £1 million for early-stage, human-centred design projects that will determine future R&D activity in immersive experiences. This is from the Industrial Strategy Challenge Fund.
- Organisation working in the UK or intending to exploit the results in or from the UK.
- 21 May – 4 July 2018

Audience of the future: design foundations
- Innovate UK & UKRI
- £1M
- UK businesses can apply for a share of £1 million for early-stage, human-centred design projects that will determine future R&D activity in immersive experiences. This is from the Industrial Strategy Challenge Fund.
- UK-registered businesses
- 21 May – 4 July 2018

SBRI: higher education open data, digital tools for prospective students
- SBRI
- £425K
- Organisations can apply to develop digital tools using graduate outcomes data to help prospective higher education students make decisions.
- Organisations of any size
- 25 June – 8 Aug 2018

SBRI: smart waste tracking data collection, storage and reporting services
- Innovate UK/ SBRI/ Defra
- £400K
- Defra's challenge is to use digital technology to record and track individual movements of waste through the economy. We aim to know more about the types and amounts of waste generated, what is done to it, and where it ends up.
- Organisation
- 11 June – 18 July 2018

SBRI: identify, catalogue and analyse terrorist still imagery online
- RICU
- £250K
- Organisations can apply to develop solutions for automatic identification, cataloguing and analysis of online still imagery. This is phase 1 of a 2-phase competition.
- Organisations of any size
- 14 May – 20 June

Neighbourhood Planning Support
- DCMS, Locality and Groundwork
- Not stated
- To give communities the tools to shape their local areas through neighbourhood plans and development orders.
- Community groups
- 3 April 2018 onwards

UK Research and Innovation strength in places fund
- Innovate UK/ UKRI
- Not stated
- To be successful, applications must build on their existing research and innovation capability and present a valid plan of new research and innovation activities. These should have a demonstrable impact on local economic growth.
- See eligibility criteria
- 28 May – 25 July 2018

UK REGIONAL FUNDING
TOTAL: £23.83M

Sustainable Urban Development (SME Support, Climate Change and Environment)
- ERDF
- £12M
- Sustainable Urban Development call to run to enhance the competitiveness of small and medium sized enterprises, promote climate change adaptation, risk prevention and management and preserving and protecting the environment and promoting resource efficiency in Leeds City Region.
- Organisations operating in the Leeds City Region area
- 8 June – 27 July 2018

Decarbonisation fund
- Scottish Government
- £3.5M
- An invitation to social landlords to submit expressions of interest to deliver energy efficiency and heat decarbonisation programmes within their existing stock.
- Scottish local authority or housing association
- 10 May – 8 June 2018

Smarter Choices, Smarter Places (SCSP) Open Fund
- Transport Scotland / Paths for All
- £2M
- The Smarter Choices, Smarter Places (SCSP) Open Fund aims to encourage people to change their behaviours to walk or cycle as part of their everyday short journeys. The fund will also encourage people to use sustainable travel choices for longer journeys.
- See eligibility criteria
- 30 May – ongoing

Digital Development Loan
- Scottish Government
- £2M
- A £2 million Digital Development Loan has been launched for Scottish companies which want to improve their digital capabilities and processes.
- Scottish SMEs
- 20 June 2018 – ongoing

Digital Social Care Demonstrators
- NHS England
- £1.1M

Fund | Provider | Value | Purpose | Target | Date

- To support the adoption of digital products and services that will demonstrate effective use of health information within adult social care.
- Local Authorities and Voluntary Sector Adult Social Care Providers in partnership with NHS organisations
- 12 June – 2 July 2018

E-bike Grant Fund
- Transport Scotland / EST
- £800k
- For local authorities, public sector agencies, community organisations, colleges and universities to encourage large scale e-bike adoption. It is expected grants will fund e-bike pools, secure cycle parking and safety equipment.
- Public/ community organisation
- 22 June 2018 – ongoing

eBike Grant Fund
- Scottish Government/ EST
- £800K
- The Transport Scotland eBike Grant Fund – Round 1, will make available £700,000 of grant funding for local authorities, public sector agencies, colleges and universities to take the lead on the large-scale adoption of ebikes. A further £100,000 will be available through the E-bike Grant Fund to let members of the public test ride e-bikes at Home Energy Scotland advice centres, active travel hubs and community centres.
- See eligibility criteria
- 22 June 2018 – ongoing

Low Carbon Transport Loan Fund
- Transport Scotland / EST
- £500K
- Interest-free loans of up to £3,000 to help individuals and businesses purchase e-bikes and e-cargo bikes.
- Individuals and businesses
- 22 June – ongoing

'Action on Plastic' Zero Waste Towns
- Zero Waste Scotland
- £500K
- Any community in Scotland wanting to take action on plastic can register their interest, and we are particularly interested in coastal communities as they are often most directly affected by marine plastic pollution.
- Scottish community groups
- 18 June 2018 – ongoing

SBIR challenge: Last mile urban freight
- SBIR / Enterprise Ireland
- €230K
- This challenge is for companies interested in working with Belfast & Dublin and other partners to find new ways to enhance the efficiency of commercial goods deliveries in both urban centres.
- Businesses operating in Belfast & Dublin
- 18 April – 18 June 2018

Climate Challenge Fund
- Keep Scotland Beautiful
- Not stated
- Funding for projects including energy efficiency improvements to community owned buildings, home energy efficiency advice, lower carbon travel options, community growing initiatives and schemes to tackle waste.
- Community-led organisations
- 5 June – 3 Aug 2018

EUROPEAN FUNDING
TOTAL: €8M

Modelling in support to the transition to a Low-Carbon Energy System in Europe
- EU Commission (H2020)
- €5M
- To develop new knowledge on energy system modelling to set up an open space for researchers at national and European levels to collaboratively innovate and progress in using modelling tools to understand and predict the requirements of the transition towards a low-carbon energy system.
- At least 3 legal entities from different Member or Associated States
- 15 May – 6 Sept 2018

SynchroniCity
- SynchroniCity/ EU Commission (H2020)
- €3M
- The purpose of this is to create a global market for human-centered IoT-enabled urban services which are interoperable, replicable and reusable across cities and across domains.
- Businesses or cities
- 1 June – 30 Sept 2018

Services supporting critical infrastructure
- ESA
- Not stated
- The European Space Agency's services to support resilient & sustainable critical infrastructure opportunity offers support and funding to companies looking to carry out an in-depth analysis on the technical feasibility and economic viability of services to reduce the vulnerability of critical infrastructures and for making such infrastructure "greener".
- Companies operating in eligible Member States
- 20 Apr – 1 June 2018

Makerspace for 5G & satellite
- ESA
- Not stated
- The objective of the activity is to deliver rapidly small proof of concepts, which are using emerging 5G concepts and technologies for satellite communications. The deliverables of this activity will be hardware prototypes and software demonstrators, which will validate the use of technologies in a satellite context.
- Companies operating in eligible Member States
- 28 June – 11 Oct 2018

PRIVATE SECTOR
TOTAL: £2BN

Clean Growth Finance
- Lloyds Banking Group
- £2BN
- New £2bn scheme offers discounted finance to Commercial Banking clients investing in a lower carbon future

Fund | Provider | Value | Purpose | Target | Date

PUBLIC SECTOR TENDERS ADVERTISED

In this quarter, the largest number of UK public sector tenders in the advanced urban services sector was in digital transformation (Table 1), spread across shared and integrated platforms, data management and digitalisation of services. The number of tenders advertised increased once again between 2018 Q1 and 2018 Q2 (Figures 2 and 3).

The largest value tenders were in digital transformation, totalling over £1.5BN. These included £600M contract from the Cabinet Office for G-Cloud 10 and £150M for Digital Development Services and Solutions for the Northern Ireland Environment Agency.

The circular economy category was boosted significantly by the dedicated £992 million "Energy for Londoners" fund, which is intended to support the Mayor's aim for the capital to be carbon neutral by 2050.

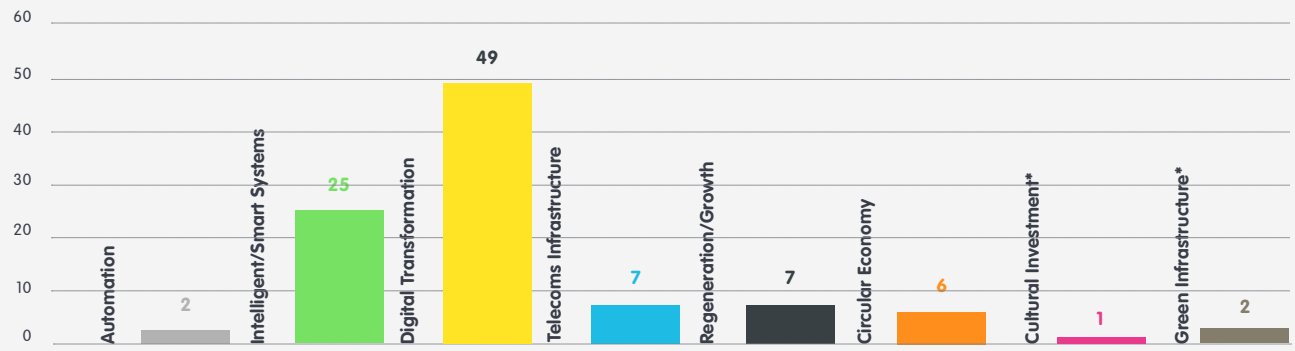
Table 1: Number and value of published tenders by theme

Category	Number of tenders where the value (budget) is stated	Total value (budget), where stated**
Automation	4	£17.6 M
Intelligent / Smart Systems	27	£113.9 M
Digital Transformation	59	£1317 M
Telecoms Infrastructure	3	£7.6 M
Regeneration & Growth	8	£1.1 M
Circular Economy	8	£997.8 M
Cultural Investment	1	£0 M
Green Infrastructure	2	£0.8 M
Total	**112**	**£2455.8 M**

**Rounded to the closest 100,000

FIGURE 1: BREAKDOWN OF TENDERS BY THEME.

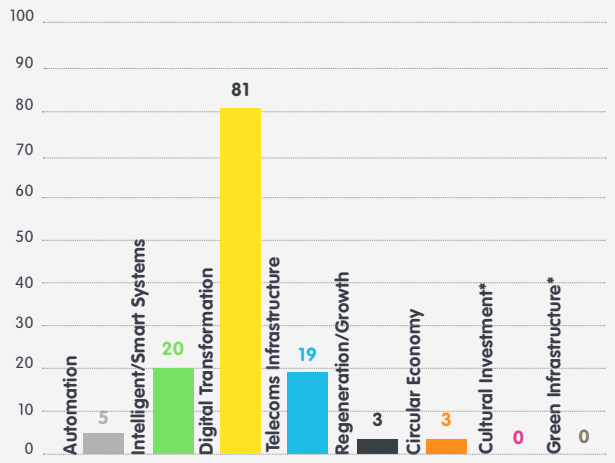
Total advertised: 131



PUBLIC SECTOR TENDERS ADVERTISED

FIGURE 2: NUMBER OF TENDERS ADVERTISED Q1 2018

Total advertised: 131



Percentage of total (rounded to whole number)

Automation	4%
Intelligent/Smart Systems	15%
Digital Transformation	62%
Telecoms Infrastructure	15%
Regeneration/Growth	2%
Circular Economy	2%
Cultural Investment*	0%
Green Infrastructure*	0%

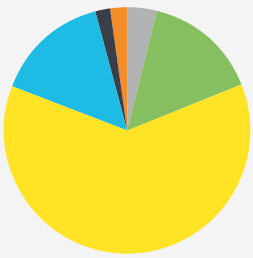
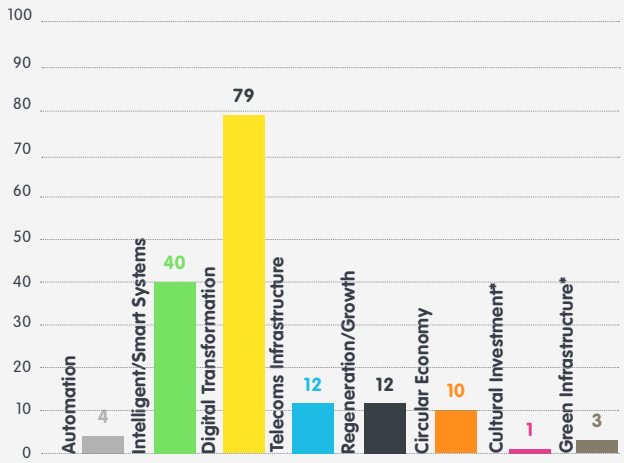


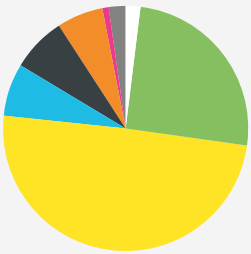
FIGURE 3: NUMBER OF TENDERS ADVERTISED Q2 2018

Total advertised: 161



Percentage of total (rounded to whole number)

Automation	2%
Intelligent/Smart Systems	25%
Digital Transformation	49%
Telecoms Infrastructure	7%
Regeneration/Growth	7%
Circular Economy	6%
Cultural Investment*	1%
Green Infrastructure*	2%

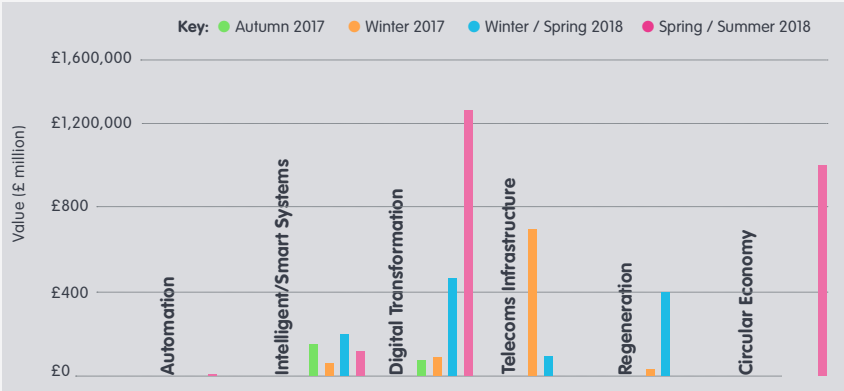


*Cultural Investment and Green Infrastructure are new themes not featured in previous editions.

FIGURE 4: CHANGE IN TENDER VALUES OVER THE LAST 12 MONTHS

Tenders across all advanced urban services amounted to a total of £4,709.4m in the 2017 – 2018 year to July. There were 484 individual calls, making the average value of a tender £9.7 million.

Over the last 12 months the total value of tenders grew from £0.25BN in Q3 2017 to £2.45BN in Q2 2018 (Figure 4)



NOTABLE APPOINTMENTS

April – May 2018

General Council Member Arts Council England
Ciara Eastell

Chief Executive, Derby City Council
Carole Mills

Strategic Director of Economic Growth, Waltham Forest Council
Stewart Murray

Interim Chief Digital Officer, Homes England
Dominic Campbell

Chair of the Competition and Markets Authority (CMA)
Andrew Tyrie

Board Members of the Cultural Cities Enquiry
Jayne-Anne Gadhia CBE (Enquiry Independent Chair), Sir Nicholas Serota, Cllr Huw Thomas, Cllr Alan Waters, Cllr Darren Rodwell, Charles Landry, Bridget Rosewell OBE, Tom Bloxham MBE, Shirley Atkinson, Dame Seona Reid, Nisha

Tandon OBE, Isaac Julien CBE, Kate Nicholls, Shain Shapiro PhD, Alison Nimmo CBE

Secretary of State for Housing, Communities and Local Government, HM Government
James Brokenshire

General Council Member Arts Council England
Ciara Eastell

Chief Executive, Derby City Council
Carole MillsApril 18

Strategic Director of Economic Growth, Waltham Forest Council
Stewart Murray

Interim Chief Digital Officer, Homes England
Dominic Campbell

Chair of the Competition and Markets Authority (CMA)
Andrew Tyrie

Chair, Independent review into the GP partnership model
Dr Nigel Watson

Governors, Board of the British Film Institute
Idris Elba, Robin Smith, Andrew Saunders, Phil Stokes

Parliamentary Under Secretary of State, Department for the Environment, Food and Rural Affairs
David Rutley MP

Parliamentary Under Secretary of State, Ministry of Housing, Communities and Local Government
Nigel Adams MP

Members of the Expert Panel on Environmental Charges and Other Measures
Dame Sue Bruce (Chair), Professor Dame Theresa Marteau, Professor Liam Delaney, Mike Barry, Roger Kilburn, Professor Margaret Bates, Professor Aileen McHarg, Terry A'Hearn, Iain Gulland and Professor Kate Sang

London Assembly chairs
Tony Arbour AM (Chairman), Jennette Arnold OBE AM (Deputy Chair)

Mayor of Southend-on-Sea
Cllr Derek Jarvis

Birmingham City Council Cabinet
Cllr Ian Ward (Leader), Cllr Brigid Jones (Deputy Leader), Cllr Jayne Francis (Education, Skills and Culture), Cllr Kate Booth (Children's Wellbeing), Cllr Waseem Zaffar (Transport and Environment), Cllr Majid Mahmood (Clean Streets, Waste and Recycling), Cllr Paulette Hamilton (Health and Social Care), Cllr Sharon Thompson (Homes and Neighbourhoods), Cllr Brett O'Reilly (Finance and Resources), Cllr Tristan Chatfield (Social Inclusion, Community Safety and Equalities)

President, Socitm
Nicola Graham

Chief Digital Officer, Salford
Jon Corne

Chairman of the Board
Dennis Hayter

Chief Officer, Greater London Authority
Mary Harpley

Director of Culture, City of Manchester
Dave Moutrey

NOTABLE APPOINTMENTS

June 2018 – present

Chair, Centre for Data Ethics and Innovation
Roger Taylor

Chair, Creative Industries Council
Tim Davie

Chair, Accelerated Access Collaborative
Lord Ara Darzi

Members of the Low Pay Commission
Kate Bell, Simon Sapper, Martin McTague, Kay Carberry, Professor Sarah Brown, Clare Chapman

Night-Time Economy Adviser, Greater Manchester Combined Authority
Sacha Lord

Director for Customer, Digital & Transformation, Surrey County Council
Michael Coughlin

Adviser, Office for Artificial Intelligence
Dr Demis Hassabis

Chair and Spokesperson, AI Council & AI Business Champion
Tabitha Goldstaub

Skills Champion for AI, national
Dame Wendy Hall

Trustee, National Gallery
Tonya Nelson, Molly Stevens

Chair, British Library
Dame Carol Black

Trustees, V&A
Caroline Silver, Mark Sebba

Chief Operating Officer, Government Digital Service
Sally Meecham

Chair, National Infrastructure Commission for Wales
Mr John Lloyd Jones OBE, FRAgS, Hon FLI

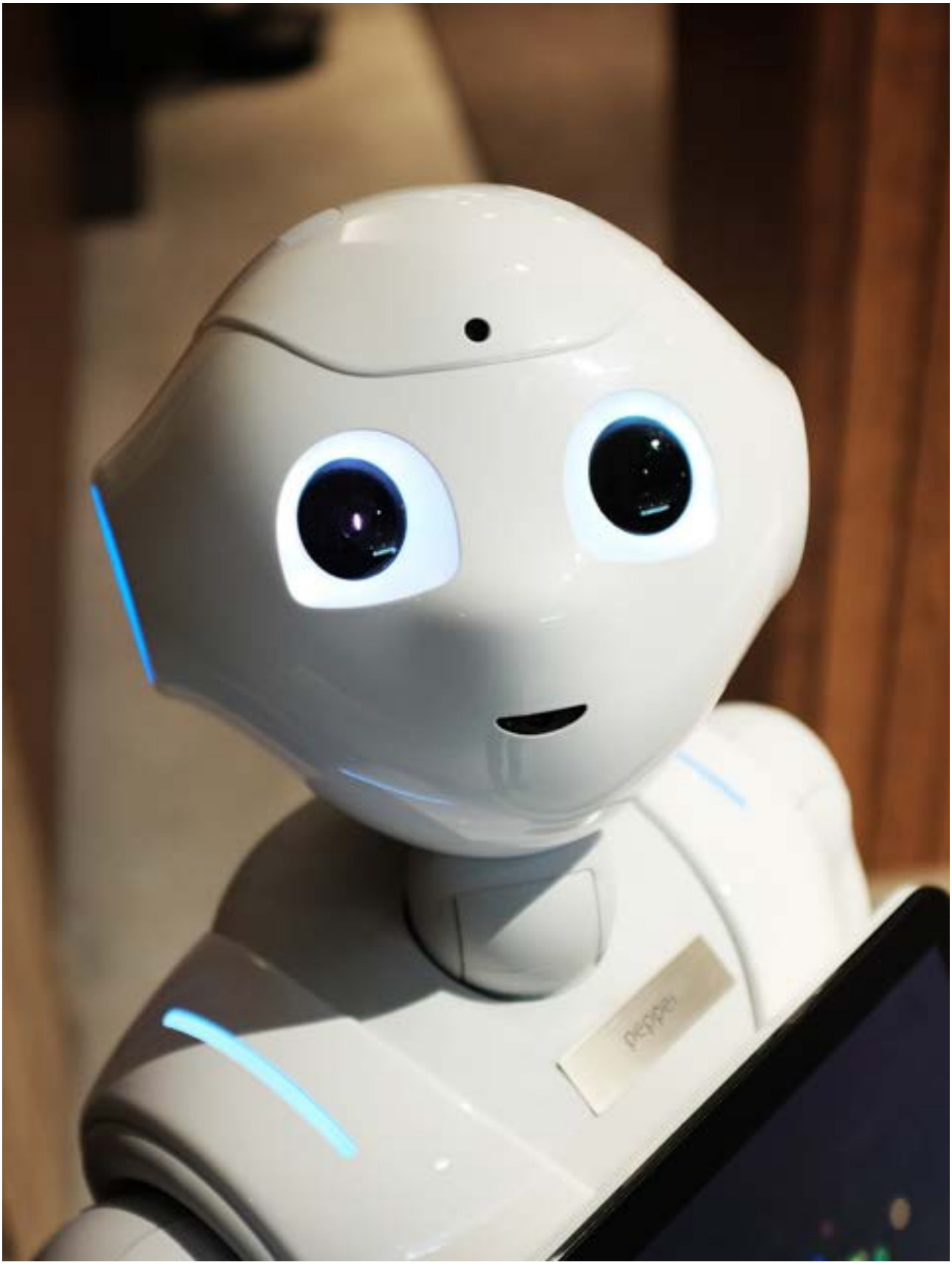
Chair, West Yorkshire Combined Authority Transport Committee
Cllr Kim Groves

Interim COO, Government Digital Service
Sally Meecham

Executive Director of City Development, Dundee City Council
Robin Presswood

Chair, 2022 Commonwealth Games Organising Committee
John Crabtree OBE

Chairman, England's Economic Heartland's Strategic Transport Forum
Dave Hodgson, Mayor of Bedford Borough


pepper

AI AND CITIES

The last edition of the *City Innovation Brief* explored how Artificial Intelligence (AI) can open up new opportunities for engaging citizens in planning. In this issue we explore the wider uses of AI in cities.

AI technology is a growing opportunity for cities but applications are only beginning to emerge. This is why the Future Cities Catapult has launched URBAIN, a new network between industry, cities and researchers focused on accelerating the development and adoption of AI and Analytics in cities.

Building on the 1956 definition established by the 'father of AI', John McCarthy, AI today is broadly described as technology which is able to perform tasks such as planning, understanding language, recognising objects and sounds, learning, and problem solving.

Key to AI developing these skills is machine learning which experienced rapid growth in capability and commercial applications in 2017. The UK has the strongest AI and machine learning market in Europe, with over 200 SMEs in the field compared to just 81 in Germany, 50 in the Nordic countries and 50 in France. Applications of blockchain secured peer-to-peer services in cities could include electric car charge point sharing and peer-to-peer energy trading.

Natural Language Processing (NLP) improves human-AI interaction by analysing and understanding human languages, variations in speech, emotions and meanings in different context. NLP will be crucial to the growth in the use of customer engagement chatbots and virtual assistants.

Improved computer vision and the growth in facial and object recognition is enabling technologies such as autonomous vehicles and AI medical diagnosis.

The UK government is taking steps to increase the use of AI in national public services with the Secretary of State for Health launching a review into how thousands of NHS staff could be trained to use AI and robotics. The review will investigate opportunities for the NHS to take advantage of new technologies as well as implications for future skills needs.

The Government also announced the appointment of AI expert Dr Demis Hassabis as an adviser to the Office for Artificial Intelligence, the Government's new policy unit for promoting growth and uptake of AI across the UK economy, and Tabitha Goldstaub as the chair and spokesperson of the AI Council, a new industry body which will work with Government to deliver those objectives.which . ▸

To extract data from correspondence, the DfT Lab created a machine learning tool, outlining the parameters of a problem, and leaving AI to learn how to solve it.

CASE STUDY

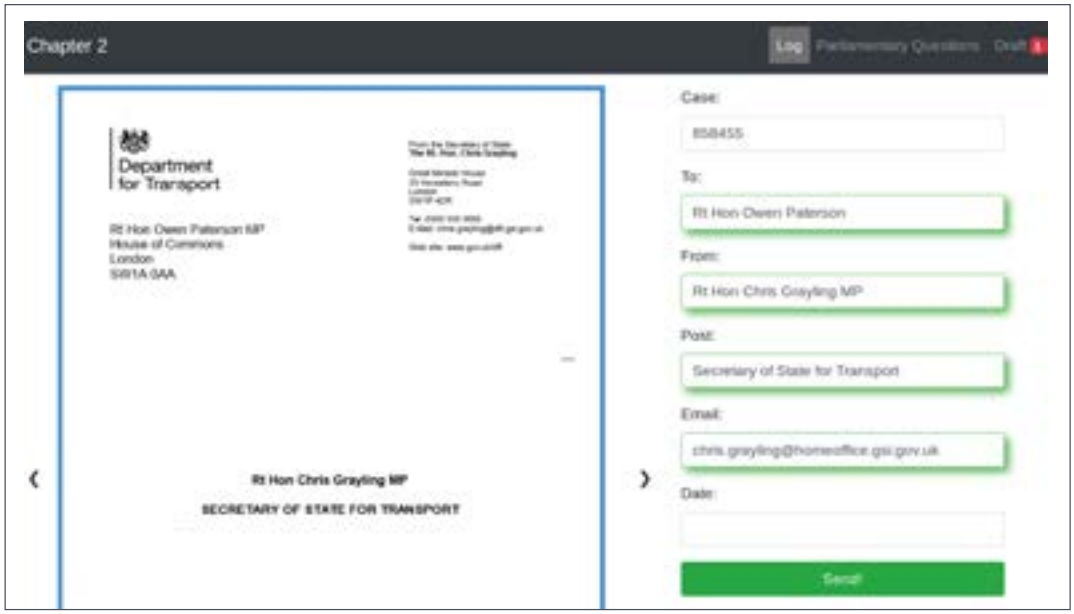
DfT Lab for AI Correspondence

The Department for Transport want to use AI to cut down on the 12,000 hours of staff time it takes to deal with 70,000 different pieces of correspondence a year.

Challenges in processing and dealing with requests include needing to pass correspondence on to multiple teams or deciding where to categorise correspondence relating to unusual topics.

To extract data from correspondence, the DfT Lab created a machine learning tool, outlining the parameters of a problem, and leaving AI to learn how to solve it. Correspondence was scanned using the Google Cloud Vision API, enabling the Stanford Named Entity Recogniser software to capture who sent correspondence and who it is sent to.

To assign correspondence to the right team, DfT Lab created and trained a neural network by inputting 5,000 pieces of correspondents in the same format. After making tweaks to the neural network switches, the AI was able to correctly sort and allocate correspondence with 90% accuracy.



AI can direct drivers to available parking spaces, whilst real-time data on traffic congestion and poor air quality hotspots can be used to automatically redirect traffic away from these area

AI Opportunities for Cities and Citizens

AI can be used to develop solutions to a range of urban challenges, by automating functions, improving responsiveness and personalization, and enhancing decision-making

For cities, AI may offer the most potential where is can be used in combination with the internet of things (IoT). Sensor networks offer the potential for more accurate and responsive management of infrastructure, resources and challenges in a city, but to realise the gains it will be necessary to manage very significant new flows of data effectively. AI has the potential to do that, and in fact it may come to be essential in managing and making good use of large-scale IoT.

Mobility and Air Pollution

AI can be used to reduce congestion, journey times and air pollution as well as informing city decision making. AI can direct drivers to available parking spaces, whilst real-time data on traffic congestion and poor air quality hotspots can be used to automatically redirect traffic away from these areas. Similarly, real-time environmental data can be used to help vehicles avoid hazardous conditions, such as flooding or poor visibility.

One of the most high-profile uses of AI is for connected autonomous vehicles (CAVs), incorporating visual recognition and analytics, robotics, machine learning and intelligent decision making.

SAE International standards score CAVs on their level of autonomy, with levels ranging from no driving automation (level 0) to full driving automation (level 5). The Centre for Connected and Autonomous Vehicles (CCAV) plans to invest £25 million in four pilot schemes for new CAV businesses developing self-driving vehicles which operate at SAE level 4. Vehicles operating at level 4 can act independently if things go wrong or there is a system failure and without any human intervention in most situations.

Midlands Future Mobility is investing £25 million to test CAV technology including smart vehicle monitoring, data analytics and 5G ready wireless infrastructure. Similarly, research to improve CAV perception and how they 'see' is being undertaken by a consortium led by Jaguar Land Rover with trials of connected and automated vehicles on public roads in urban areas.

Specific AI technologies to make the future of mobility more sustainable, smarter and safer are being trialled in the UK Autodrive Programme. This includes Intersection Priority

Boeing is working on an automated air traffic management platform for drones using blockchain and cognitive computing.

Management (IPM) technology to assign priority when two or more connected vehicles come to a junction and Green Light Optimal Speed Advisory (GLOSA) which sends traffic light information to CAVs to calculate the optimal speed for approaching the lights

UK Autodrive will also trial a fleet of up to 40 low-speed self-driving 'pod' vehicles in pedestrianised areas of Milton Keynes during Summer 2018 to further develop AI capabilities for navigating public spaces. The latter stages of the trial will enable members of the public to order and use the pods as part of a test of a new urban mobility service. In fact, over 85% of people would be willing to use an autonomous vehicle in the future according to research from MERGE Greenwich.

Emerging technologies will take autonomous vehicles, on the ground and in the air, to the next level. MIT is developing depth-sensing imaging systems so that autonomous vehicles can identify objects through fog that humans cannot see. Boeing is working on an automated air traffic management platform for drones using blockchain and cognitive computing.

CASE STUDY

Microsoft BOT Framework

Newcastle City Council is investing in capabilities to develop intelligent conversation apps.

The Waste Bot has received positive feedback from customers, particularly on the speed of the service. It has also reduced calls to the Council from about 60 per month to three and saved the equivalent of about £25,000 per year in staff time.

In March 2017, Newcastle's City Council was awarded £15,000 from the national Digital Shift Channel fund. This was used to develop in-house capabilities in Microsoft's BOT Framework. The digital service allows hosts to create artificial intelligent conversation apps for use in desktop and device chat apps, such as Skype, Slack, Messenger and Outlook.

Newcastle City Council used this to develop the Waste Bot service, which was launched in Spring 2018. Using the service, households can manage their permits for unloading bulky waste at the city's recycling centres. Van drivers are limited to six drop offs per household a year and previously they had to apply in writing to be allocated a time slot. This analogue system took up to 14 days to process a request. Now drivers can text the Waste Bot to apply for a permit, which reduces the processing time to seconds.

The Waste Bot has received positive feedback from customers, particularly on the speed of the service. It has also reduced calls to the Council from about 60 per month to three and saved the equivalent of about £25,000 per year in staff time.

Newcastle City Council is hoping to apply the BOT Framework to other services. The latest project is a 'virtual advisor' chatbot for social care but this time working as a website bot.

City Management and Security

Businesses and service providers are benefitting from AI technology. For example, United Utilities is using artificial intelligence to cut their own electricity costs by 10% a year, passing the benefits on to customers. United Utilities is using Open Energi's platform Dynamic Demand 2.0, which continuously monitors and manages electricity demand and generation. Key to the process is machine learning to determine what an optimal strategy looks like and adjusting processes second-by-second in reaction to changing data indicators and signals.

In the USA, MIT researchers are working on new way to automatically build road maps from aerial images. AI recognition technology can view satellite images to identify roads and paths. City authorities and service providers can use this process to produce maps of streets which are so new they aren't shown on online maps or GPS navigation software.

Local authorities and city governments can use conversational AI to deliver more personalized and responsive chatbot services to their citizens. International examples include WienBot which provides answers to questions from citizens and visitors in Vienna and continuously learns from the interactions to pre-empt questions based on the most frequently used terms.

Learning from questions and learning

Police forces around the country are also piloting Cellebrite, an AI software capable of interpreting images, matching faces and analysing patterns of communication to speed up examination of mobile phones.

to use natural language has been an area of technological growth which is vital to the success of chatbots according to Gartner. This is set to see chatbots become widespread within the next two to three years with 20% of all citizens in developed nations expected to interact with AI assistants by 2032. As well as providing more responsive services, chatbots can also enable local authorities to be more efficient and identify abnormal patterns which can signify fraud or user error.

AI can be used to improve citizen safety. For example, the Shotspotter is used in over 90 cities worldwide, using sophisticated AI technology consisting of sensors to detect gun violence. It alerts the police department and other authorities within 45 seconds of the gunshot fired.

Police in Durham plan to introduce an AI system to help officers decide whether or not a suspect should be kept in custody after a trial. Police forces around the country are also piloting Cellebrite, an AI software capable of interpreting images, matching faces and analysing patterns of communication to speed up examination of mobile phones.

AI can be used to improve the way emergency services manage calls. The UK emergency services can learn from international examples, such as the Cincinnati Fire Department using data analytics to advise the dispatcher on the appropriate response to a medical emergency call based on factors, such as the type of call, location, weather, and similar past experiences.

As smart city technology becomes more ubiquitous, cloud-based cognitive AI platforms used to host smart city data and software will be important for preventing cyber-attacks.

CASE STUDY

Metropolitan Police efficiency gains with AI

Adopting artificial intelligence technologies could save The Met £30m per year and support an additional 545 police officers.

A report by released by the Chairman of the London Assembly police and crime committee states that introducing AI could help solve many of the new and emerging pressures faced by the Metropolitan Police Service (MPS).

The report states that using AI in policing will bring benefits in four areas. Firstly, AI can lead to an increase in the number of crimes solved using machine learning and advanced analysis of data to identify trends and patterns. In the same way, AI can be used to predict where and when crime may take place, helping police take preventative action.

Secondly, not only would more in-depth data analysis by AI increase the

Robots can be used to improve the emotional development of autistic children and machine learning of people's behaviour using data from wearable technologies and connected home devices can identify health problems and inform care providers.

arrest rate, it can solve crimes and secure convictions faster, reducing the risk of further crime taking place.

Thirdly, AI frees up resources for front line policing by taking over more menial tasks and back-office functions that currently put pressure on police time.

Finally, AI can reduce the police officer time spent conducting investigations – by reviewing and analysing large volumes of information – allowing them to spend their time solving other crimes by providing them with access to real-time AI outputs.

Housing and social care

AI and robots are being used to automate elements of social care. These technologies include assisting robots like Pepper a nd Pearl in Southend who respond to emotions and learn personality traits or, Robear who can lift patients or help them in and out of chairs adapting the force of their grip and lifting to the situation. Robots can be used to improve the emotional development of autistic children and machine learning of people's behaviour using data from wearable technologies and connected home devices can identify health problems and inform care providers.

Hackney council, in partnership with tech company Xantura have developed and deployed an AI programme which analyses data to highlight and prioritise families with multiple needs to help target support more quickly, or even

Machine learning is a growing trend in reducing construction risks and site monitoring by enhancing real-time collaboration and building information modelling in the cloud. AI is helping to improve 3D printed buildings, augmented reality construction sites and survey drones.

pre-emptively. A chatbot developed by healthtech company Cera uses deep learning and machine reading to advise users and care workers on specific care needs, and over time will be able to predict health deteriorations.

February 2018 saw the end of the two-year CHIRON project funded by Innovate UK, focused on designing and deploying care robotics for the future with a focus on dignity, independence and choice. The project saw the use of JUVA, an intelligent modular robotic system installed around the home to assist with domestic and self-care tasks allowing care workers to spend more time on human interaction with more patients.

Housing management can be supported by AI, whether using data to improve profiling of individual tenants and their needs, to automated fault-finding and informing decisions around property maintenance planning.

Increasingly, AI is also playing a major role in building design and construction activities. AI-can manage construction assets, help in performance diagnostics, and support planning stages of construction with analysis of GIS data.

Existing uses of AI in construction include project schedule optimisers running millions of project delivery scenarios to continuously refine project planning, image recognition and classification to identify unsafe behaviour for training purposes, and analysis of data from sensors for preventative maintenance.

Machine learning is a growing trend in reducing construction risks and site monitoring by enhancing real-time collaboration and building information modelling in the cloud. AI is helping to improve 3D printed buildings, augmented reality construction sites and survey drones. Cobots can work 24 hours a day on tasks such as bricklaying with different teams of humans working shifts to provide inspection, finishing touches, and fresh materials.

Looking to the future, Balfour Beatty predict that the UK construction site of 2050 will be "human-free" with teams of robots working on complex structures monitored by drones flying overhead and reacting to live data analysis collected to predict and solve problems before they happen.

CASE STUDY

Q-bot

An innovative partnership to use robots to insulate social housing.

In February 2018, social housing provider Your Homes Newcastle (YHN) announced a new partnership with Q-bot to bring innovative robotics and AI technologies to the housing management market. This is the first partnership of its kind for Q-bot, which is a London-based robotics and AI firm. ▸

Q-bot results in minimal disruption to residents, which is one of the key reasons why YHN deemed it to be the most cost-effective solution.

Q-bots can inspect underfloor cavities in homes with suspended wooden floors and, where needed, install insulation. This insulation has the potential to improve a home's energy efficiency by up to 40%.

Traditional installation practices would require the removal of tenants, carpets, underlay, and floorboards to fit insulation between joints. Q-bot results in minimal disruption to residents, which is one of the key reasons why YHN deemed it to be the most cost-effective solution.

YHN manage 18,000 homes that could benefit from the Q-bot's installation and have a target to retrofit 1,500 of them with under-floor insulation in the next three years.

WHAT CAN **FUTURE CITIES CATAPULT** DO TO HELP?

From Belfast to Belo Horizonte, Future Cities Catapult has helped public authorities, prime suppliers and other buyers of advanced urban services with expert, agnostic, pre-market advice and practical support to engage the innovation ecosystem and tackle thorny urban challenges. We do this through a combination of:

- Research and analysis into current trends and state of the art in advanced urban services
- Insight-driven problem definition, prioritisation and articulation
- Challenge-led innovation 'open calls' that harness the creativity of the market
- Implementable roadmaps to embed innovative approaches into organisations and realise change
- Robust impact evaluation of projects and interventions that unlock further investment.

Contact

Sam Markey, Head of Executive Office:
smarkey@futurecities.catapult.org.uk

CITY INNOVATION BRIEF

CATAPULT Future Cities

URBAN FORESIGHT

This report was produced by Future Cities Catapult in collaboration with Urban Foresight.