

Digital Cities



Up to speed: The digital accelerator programme revolutionising the public sector. Page 2

Streaming by the river: How city-wide wi-fi will boost flexible working in Perth. Page 3

Glasgow set to be tech's 'living lab'

BY WILLIAM PEAKIN

Technologies that support futuristic applications, such as surgeons performing operations remotely, could be developed in a 'living lab' as part of the University of Glasgow's £1bn expansion of its historic campus.

The university is bidding to lead Britain's second 5G technology demonstrator. Earlier this year, the UK Government awarded £16m to researchers at King's College London and the Universities of Surrey and Bristol, to develop the first test network.

5G is expected to deliver reliable, ultra-fast mobile connectivity with the ability to process huge amounts of data and support

complex applications, such as communication between autonomous vehicles, 3D virtual reality on phones, robotics, and remote surgery. The Government estimates that the technology could add £173bn to the UK economy by 2030.

"These applications require ultra-low latency to work," said Muhammad Imran, professor of communications systems in the university's School of Engineering, "reducing as far as possible the time it takes for a packet of data to travel between devices."

"But they will also raise our aspirations about the technology's possibilities, such as in the 'Internet of Skills'. For example, a surgeon operating remotely would receive haptic tactile feedback – the sensation of

vibration, pressure, touch and texture – in real-time."

Imran's team is working on the pre-requisites of a 5G network, such as energy and spectrum efficiency, and the ability to intelligently manage peaks and troughs in demand caused by the anticipated billions of connected devices, applications and smart objects sharing information ubiquitously. "Universities, industry and government are investing heavily in this new technology as an essential backbone for the digital services of the future," he said.

Professor Chris Pearce, lead for the university's overarching Smart Campus project said: "Glasgow University is keen to contribute to this development through

a programme of partnership research, based around the development of the smart campus. The aim is to create a living lab to test these requirements, and the potential of these new applications."

The university is working with CGI, the world's fifth largest independent information technology and business process services firm. Its geospatial specialists create life-like 3D maps and simulations of physical environments, detailed down to 2cm, which can provide dynamic real-time views of urban landscapes, both outside and inside buildings.

"5G depends on line-of-sight connection, and signal performance is affected by environmental factors, surface materials, traffic, and demand for data," said Suzan-

nah Brecknock, geospatial innovation lead in CGI's Digital Insight team. "Therefore, 3D city modelling and accurate, real-time understanding of a continually changing physical environment is essential to plan and manage a 5G network."

"To create a 5G planning tool, we will need to capture accurate survey data of the entire estate, and transform this into a 3D model. Sensor data and live CCTV feeds can be viewed directly in the platform, which can enable researchers understand what's happening in an area of poor performance."

"Each building and physical asset, including trees and street furniture, will be linked to a centralised, open-source database which will contain accurate informa-

tion about whether a building is listed, a tree is protected, surface materials, and the locations of utility access points and power sources. Innovation around the collection of this data is an area of special interest for CGI, as we know our local authority clients will need to plan for 5G in the future."

"Local authorities understand all-too-well the challenges faced when trying to access property or asset information in a single place, as some of this data may not be readily available, or may be held by other parties. CGI has over 500 geospatial data specialists, and teams who specialise in 'robotic process automation' and

Continued on Page 2

Nation's success in digital has to be international

BY WILLIAM PEAKIN

Supporting young people to prepare for their future must be done in the context of the disruption that digital is bringing to public services and businesses, according to Colin Cook, digital director at the Scottish Government.

"It is a self-evident truth that if Scotland is going to be successful, it will be in a world that has changed, that is digital, and that the solutions that have enabled us to be successful in the past are not going to be the same as those in the future," he said.

Cook was speaking at the Edinburgh event of the Digital Cities series hosted by *FutureScot* in association with *The Sunday Times Scotland*.

"The core plans of the Government – growing the economy in an inclusive way, reforming our public services, tackling inequalities, preparing children for their future in life and work – all have to be talked about within the concept of digital."

"The disruption digital brings to services that support them and the opportunities that this disruption creates. This is both in terms of the immediate transformation it brings to government services and to different industries, but also increasingly the way in which society operates and the kind of work that we can expect to have as we look forward."

Cook said Scotland had built strong foundations on which to excel; providing access to fibre broadband for 95% of premises, with a target of 100% by 2021, the highest level of basic digital skills of the four nations of the United Kingdom, transforming public services, stimulating economic growth, and fostering partnerships between the wider public sector, digital businesses and the enterprise agencies.

"This not a cause for complacency, but we have the basis on which we can push forward and be successful," he said. "Scotland has some unique strengths in areas such as data, health and social care, and sensors. And I think it is the job of government to identify those strengths, invest

in them and make sure we have the skills and infrastructure to support them."

As well supporting Scotland's digital technologies sector, said Cook, the Government's job was also to support wider industry to become "digitally mature and internationally competitive", to create digital public services "around the needs of their users and to make the public sector more efficient", and to create the conditions in which non-personal data is shared and used by people, businesses and organisations "as a source of innovation and efficiency".

There is still work to be done, he said, on key areas of infrastructure, skills, inclusion and safety. This will focus on providing high quality connectivity across the whole of Scotland, on the country's education and training systems expanding its pool of digital skills and capabilities, tackling the current gender gap in digital skills and careers, enabling everybody to share in the social, economic and democratic opportunities of digital, and on ensuring Scotland is a cyber-resilient and secure nation.

The opportunities, said Cook, lay in creating government organisations, such as those coming with the new powers afforded to Scotland, based on digital business models, and in being the most connected nation possible.

"Scotland's success in digital must be in an international market. So, not just encouraging businesses to solve some of our great public sector challenges, but also supporting them to develop as internationally successful businesses."

"And there is a real opportunity in partnerships with industry, not the old model of outsourcing, but in new and vibrant ways of partnering and co-producing solutions."

"Digital is at the heart of the Government's thinking. Our digital strategy doesn't have all the answers and it does pose some questions."

"Ministers and people like me that support them are out constantly talking with organisations, the third sector, and with businesses, about what is needed. It is a genuine attempt to co-produce the answers in a digital world."

Benchmarks: From Obama's White House to the Granite City



The former President with company co-founder Sandra Richter

Aberdeen is to install 'smart benches' in three city locations as part of a plan to provide citizens with mobile and laptop charging points, and monitor the environment, writes William Peakin.

The solar-powered benches, made by a spin-out from the Massachusetts Institute of Technology (MIT), can charge electronic devices and collect data on footfall and air quality. They hit the headlines in 2014 when President Obama was photographed speaking to company co-founder Sandra Richter at a White House 'Maker Faire'.

The initiative to install the benches came from CityLab, a student innovation programme founded by Aberdeen City Council, Aberdeen University and Robert Gordon University. CityLab allows students to consider civic challenges and, during a 12-week user-centred design course, come up with tangible solutions.

The idea for the smart bench sprung from students' concerns around the safety of young people late at night, if they become separated from friends and their phones are out of charge. Other projects to emerge from CityLab include Tuk-In, an electric 'tuk-tuk' vehicle that will distribute surplus food in areas of deprivation, and Next Step Energy, which plans to install rubber pads in city pavements that will harvest kinetic energy from pedestrians to power street lighting.

"CityLab is about using the city as a classroom where young people can help make Aberdeen a better city," said Councillor Ross Grant. "The programme allows the students to focus on city challenges and create tangible and innovative solutions through user-centred design principles and the expert knowledge of key stakeholders from public, private or third party organi-

sations. The aim is that each winning project could be carried forward by the city council, or by an interested city partner. The standard has been excellent and we are delighted to see the winning projects being rolled out across the city."

Ed Krafcik, partnership director at Soofa, said: "We're very excited about the Aberdeen launch as we are slowly ramping up our expansion into Europe. Their smart approach, working in close collaboration with telcos, developers, technology suppliers and others will create lasting value, benefiting everyone."

Since its launch in 2014, the Soofa bench has been installed in around 75 cities throughout the world. News of its pending arrival in Aberdeen emerged at the *FutureScot/Sunday Times Scotland Digital Cities* event in the city last month.

Community crowdfunder seeking Scottish growth

A crowdfunding site which boosts campaigns with contributions from business, foundations and local authorities, is launching a drive to grow in Scotland, writes William Peakin. Spacehive.com, whose platform has raised £7m over the past five years, is dedicated to supporting people shape their local communities.

"It's an old idea," said Amelie Deschenes, senior partnerships executive at Spacehive. "It used to be called public subscription. The pedestal on which the Statue of Liberty stands was funded by an appeal to readers of the *New York World* newspaper by publisher Joseph Pulitzer. It wasn't quite enough so he went to his black book and brought in some big funders."

"But we've brought it into the 21st century, and democratised it. The model is simple; people and organisations with

ideas for improving their local area come to our platform to gather support from the community through crowdfunding campaigns.

"Then our partners – councils, businesses, grant bodies, property developers – make them happen with a contribution. This collaborative approach has resulted in hundreds of projects delivered across the UK, thousands of people involved in making them happen, and millions in investment."

Projects have included an artist who wanted to create a slide in Bristol's high street; he raised £5,000 to buy the length of plastic, straw bales and soapy water. But, noted Deschenes, on the day the installation raised £120,000 for the local economy from footfall generated by the event.

Another, in Liverpool, saw a residents' group raise £40,000 for a feasibility

study to turn a disused flyover into an elevated park, along the lines of New York's High Line. The council had been planning to demolish the flyover, at a cost of between £3m and £4m. Significantly it was one of the final organisations to pledge to the Spacehive-based campaign.

One of the platform's first campaigns was in Scotland; the 'Porty Lightbox', a disused phonebox in Portobello, has been turned into an art installation with LED displays and designs supplied by local schoolchildren. Recently, residents of a new housing development, at Glenmill near Giffnock, raised more than £5,000 to upgrade an Openreach cabinet so they can have access to fibre broadband, with the company matching their contribution.

But Spacehive, which was established as a social enterprise, wants to significantly increase the size and impact of

its campaigns north of the border. In London, the Mayor has given £1.1m to projects around the city and committed to a further £3.5m for future campaigns. "We want to see more projects at scale," said Deschenes.

"Places and spaces matter to people and shaping them should be collaborative. We create a market place of ideas and funding. We get innovative ideas and we unlock new sources of funding. In turn, we create more resilient communities because they have responsibility for making change happen, and more cohesive, because people are going out into their communities and making connections."

Park and slide: One man's high street craze generated £120,000 for the local economy



Digital Cities

Inspirational speakers, insightful case studies, hands-on workshops and healthy debate combined to make the Digital Cities series of events, hosted by *FutureScot* in association with *The Sunday Times Scotland*, a compelling medium with which to engage in the nation's digital future.

Over two weeks during September, the Digital Cities team set up in Dundee, Edinburgh, Aberdeen, Stirling and Glasgow, providing a platform for policymakers, skills specialists and professionals from a range of digital technologies to present their insights, and a forum for hundreds of delegates to pose questions and propose solutions.

This supplement provides a snapshot of the events' content and output; more features, as well as presentations and information about the organisations involved, can be found by clicking on the Digital Cities block on the homepage at www.futurescot.com.

The series was supported by XMA, Check Point Software Technologies Ltd, Skills Development Scotland, Smart Energy GB, CGI UK, Glasgow University, Registers of Scotland and Spacehive. Our thanks also to the Scottish Government, Scotland's city councils, Chambers of Commerce, Scotland's universities and colleges, the Federation of Small Businesses, SCDI, SCVO, the Scottish Government, The Data Lab, Scotland, CivTech®, Opportunity North East, NESTA and CENSIS.

Think smart

"There is undoubtedly a significant appetite for smarter, more intuitive technology in our everyday lives. Smart meters will enable much of this to happen. For example, in the future consumers will be able to share their energy data with innovators offering them new lifestyle services. This could be especially true for our health and social care sectors where customer energy data is shared sensitively and responsibly to allow a relative, close friend or care service to monitor someone who is elderly or vulnerable in their home via their smart meter data, to make sure they are safe, well and warm.

"Smart meters will help with Scotland's carbon reduction targets and other ambitions such as cutting fuel poverty, where every possible tool is needed to help households get their energy use under control and their homes warm and healthy. Smart meters are going to transform the energy market in lots of exciting ways, both in terms of the consumer benefits that will be felt by every household, but also the national benefits to our energy system."

www.smartenergygb.org

Be safe

"Digital cities will improve how we live and work and save money. It will involve more automation of devices and technology, acting on our behalf. This raises the question of how we can secure these new technologies to keep our digital future safe. Check Point can provide this security through a wide range of products and services and are already working with organisations in Scotland to achieve this goal.

"The move towards digitisation of services is here to stay; we need to make sure that the businesses and services that we consume as part of a digital nation are secure and safe. Attackers, creators of malware and other ill-intentioned individuals and organisations love the idea that we are adopting these new digital versions of services in our cities. It gives the attackers a much larger attack surface from which to disrupt or destroy services and data. We need to make sure that we secure our services and data against such attacks."

www.checkpoint.com

THE SUNDAY TIMES
SCOTLAND

Digital Cities is an independent publication by Canongate Communications distributed in The Sunday Times Scotland. All rights reserved. Neither this publication or part of it may be stored, reproduced or transmitted, electronically, photocopied or recorded without prior permission of the Publisher. Digital Cities is published and exclusively distributed in The Sunday Times Scotland. We verify information to the best of our ability but do not accept responsibility for any loss or reliance on any content published. If you wish to contact us, please include your full name and address with a contact telephone number.

CivTech: Solving public sector challenges and launching new businesses

The Scottish Government has said its accelerator programme will revolutionise how technology-led businesses work with the public sector, writes *William Peakin*. Following a successful pilot, CivTech® will match digital technology innovators – typically start-ups and SMEs – with public sector organisations looking to create digital solutions for a range of 'civic challenges'.

"It aims to drive innovation in public services, empower the public sector to think differently, and provide economic development opportunities for digital companies," one of the project's leaders told the Digital Cities series hosted by *FutureScot* in association with *The Sunday Times Scotland*.

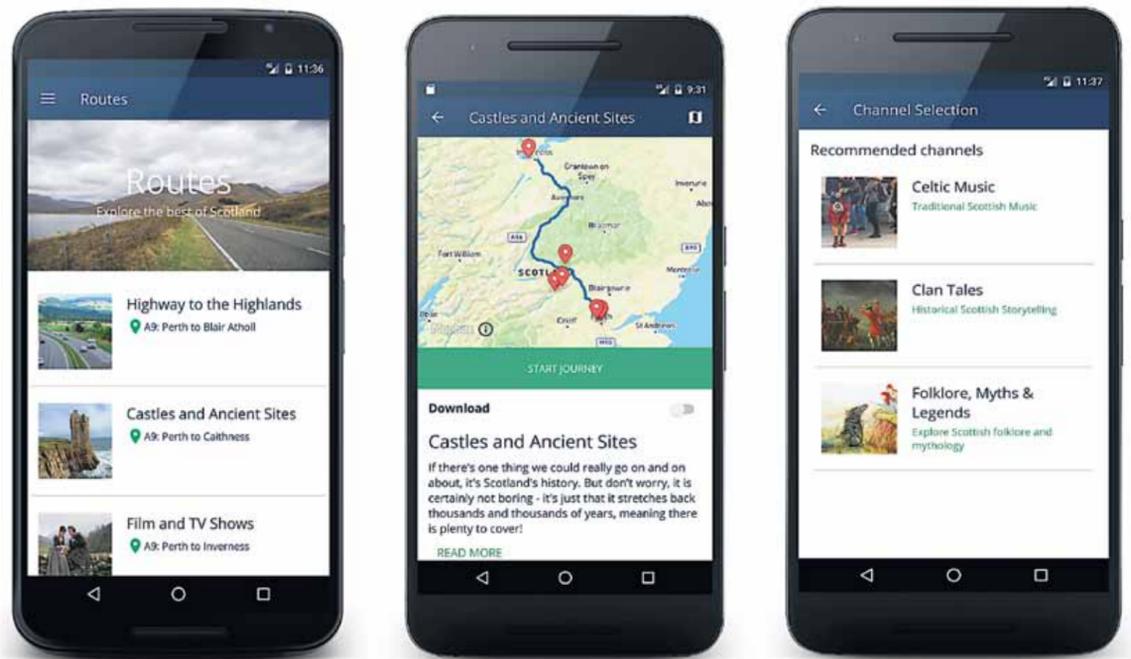
Last year's pilot saw nine firms deliver a range of products in partnership with the likes of the Scottish Environment Protection Agency (SEPA), the NHS and Transport Scotland. This led to a new flood forecasting system, smart road monitoring software which promises "to detect potholes before they happen", and a new fundraising service for homeless people enabling them to raise and access emergency funding.

"It is a truly smart and innovative approach to public sector procurement that has the potential to disrupt and enhance current systems," said Bob Downes, SEPA's chair. "Especially impressive is the pace of the project, the calibre of the work, and its high level exposure it has gained in such a short time".

Learn to Love Digital was one of the CivTech pilot companies. It developed an app called Highlands Discovery which provides a deeper connection with the surrounding landscape for travellers when driving on the A9.

Company co-founder Stephen Heron said: "CivTech is a great way of bringing innovation into the Scottish public sector. The experience has enabled us to make connections with the public sector and other start-ups within the tech industry.

"It has given us an opportunity to access markets that would otherwise have been



The Highlands Discovery app provides a connection with the surrounding landscape for travellers on the A9.

impossible. We were supported every step of the way in developing our product through the accelerator, a challenging, intensive but rewarding process. We now want to leverage this experience to maximise the commercial potential of our product."

As well as being provided with access to training workshops and co-location space, winning bidders can secure contracts worth up to £100,000 – while retaining 100% equity and intellectual property rights, with the potential to sell their newly-developed products to other organi-

"It is a truly smart and innovative approach to public sector procurement"

Bob Downes, SEPA chair

sations around the world. In CivTech 1.0, all six of the winners have secured follow-on contracts worth more than £1.3m with 23 new jobs created.

Finance Secretary Derek Mackay said: "Scotland is highly regarded around the world for innovation. We have some of the brightest entrepreneurial minds based here on our own doorstep, so it makes perfect sense to tap into that talent to help the public sector work faster and smarter.

"If we want to be a world leader in tech we need to create conditions that allow companies to thrive, and that includes

enabling new ways of working, such as streamlining the public sector procurement processes and working in a more agile, fast-paced way."

The recently launched CivTech 2.0 poses a new set of challenges, and invites companies and individuals to propose a solution, including protecting birds of prey, tracking visitors to historic attractions, improving access to statistical information, creating a smarter outpatient booking system, using data to improve access to public services, and mobilising networks to build 'brand Scotland'.

Over the past few months Registers of Scotland has held a number of user experience events



Want to find a good place to live? How map-based data could help

BY HILARY BROWNLIE

There's a myriad of property data out there, from house price information to property title details. Wouldn't it be useful if all that information was available in one place? That's why, at Registers of Scotland (RoS) we're developing ScotLIS. ScotLIS is an innovative, map-based land and information service that will facilitate easy access to a wide range of data relating to land and property in Scotland.

RoS is in the midst of a digital transformation that will ensure we are a modern, digital registration business that can effectively support the conveyancing and property information market in Scotland. A significant benefit of ScotLIS is that it will be a national asset not only for professionals, but also the general public, who for the first time will have access to a map-based property information service underpinned by Registers of Scotland's data.

Working in conjunction with stakeholder groups, including solicitors, mappers, and local councils, RoS has been continuing to develop the service based on user insights. We reached a significant milestone in August when the service entered private beta. For private beta, we've invited a number of existing customers to test the service under controlled conditions, meaning we can gain live feedback while still in this development stage.

Private beta will last for about four

weeks, and during this time we'll be gradually adding additional participants to the service; by the end of the process we'll have over a hundred individual users interacting with ScotLIS. A major benefit of private beta is that our participants will have the opportunity to complete live transactions through ScotLIS, allowing us to better understand customer interactions with the new service at this early stage.

After private beta, we'll soon move into public beta. During public beta, ScotLIS will be open for a much wider professional audience to sign up, with our developers continuing to monitor the service.

Public beta will also see a considerable increase in engagement with the 'citizen' side of ScotLIS. For RoS, this is another key stage in delivering a strong final product that meets the needs of all our customers.

Private beta isn't the only way we're communicating with our customers in the development of ScotLIS. Over the past few months we've held a number of user experience events; these are another important tool for ensuring that ScotLIS is designed with our customers in mind.

For instance, in a similar vein to our Alpha Day in June, in August we hosted a two-day event in Aberdeen. It offered numerous stakeholders from across our customer base to get a first look at ScotLIS. We held both one-to-one and group sessions, so we could maximise engage-

ment and collect detailed responses that only a multi-structured event can bring.

We've received consistently positive feedback throughout private beta and our recent events. Customers are enthusiastic about the improvements that ScotLIS offers compared with existing services, and also how it looks likely to deliver savings in both time and effort across their day-to-day activities.

The format of our user experience events was also positive; attendees found that the relaxed atmosphere encouraged meaningful discussion, while they also valued the opportunity to see a live demonstration of ScotLIS itself at such an early stage.

The rest of 2017 will be an exciting time for the ScotLIS team, as well as everyone else at RoS. Whether you're a solicitor trying to find the exact boundaries of a client's property title, or a family deciding the best place to move, ScotLIS will greatly increase accessibility to a wide range of property information.

We're excited for the potential that ScotLIS holds alongside the rest of our digital transformation. More information on ScotLIS can be found at www.ros.gov.uk – you can also keep up to date with the latest news by visiting and signing up for alerts from our blog – <https://insiders.blog/>

Hilary Brownlie is the ScotLIS service designer at Registers of Scotland.

North-east push to become global digital leader

A new industry sector board focused on building digital capability and capacity in the north-east of Scotland has been created, with aim of establishing a physical hub, providing access to early stage growth funding, and supporting high-potential digital companies to become global success stories, writes *William Peakin*.

Plans for the board were announced over the summer and details outlined at the Digital Cities event in Aberdeen last month, hosted by *FutureScot* in association with *The Sunday Times Scotland*.

The private sector economic development body Opportunity North East (ONE) aims to accelerate the development of the digital economy in Aberdeen and Aberdeenshire through the establishment of ONE Digital, supported by £4m in additional funding over four years.

ONE Digital becomes the fifth sector board within ONE and will focus on

building digital capability and capacity in the region.

Sir Ian Wood, chairman of ONE, said: "We currently have parts of a digital cluster in the region, but there's a huge market here with industries with significant scope for digital solutions. The oil and gas industry, particularly operators, is making major investments over the next few years in automation, artificial intelligence and robotics with the supply chain doing likewise. Food, drink and agriculture are also very active in achieving digital efficiencies, as is tourism.

"The key ingredients of the successful cluster will be a physical hub to help nurture and grow digital tech companies, a strong focus on encouraging entrepreneurship in the sector, some early stage seed funding, community events to foster entrepreneurship, and maximising the potentially significant contribution from the city's two universities"

Continued from Page 1

machine learning, and has developed tools which can streamline the process of generating the data needed for 5G planning.

"The 3D platform also supports the development of virtual and augmented reality applications, which provides opportunities for remote training and field support. Indeed, the educational and skills development potential around 5G technology is another reason we are so excited about the University's Smart Campus project," said Brecknock.

The proposed 5G demonstrator, details of which were outlined at the Digital Cities event in Glasgow last month, hosted by *FutureScot* in association with *The Sunday Times Scotland*, is one part of the university's ambitious expansion plans.

Last December, it gave the go-ahead to spend £430m over the next five years as part of a £1bn, 10-year investment. The first phase includes a new learning and teaching hub on University Avenue, linking to a refurbished Boyd Orr building, due for completion in September 2019.

Earlier this year, Glasgow City Council granted the university planning consent for its plans for the former Western Infirmary site, overlooking the River Kelvin. It will become home to new buildings for engineering and arts, a research hub and innovation zone, the Institute of Health and Wellbeing, and the Adam Smith Business School.

"We believe [this] will be a major economic driver for the city and for Scotland as well as underpin this university's world-leading position," said principal and vice-chancellor Professor Anton Muscatelli when the decision was announced. "This will be one of the biggest educational infrastructure projects in Scotland's history."

Last month, *FutureScot* was taken on a tour of the planned expansion by

Michael Burns, business development manager at the university's research, strategy and innovation office.

Passing through Bute Hall, out onto the South Front overlooking Kelvingrove Art Gallery and Museum, Burns spoke about the university's aim to link its expansion with some of Glasgow's other key assets, including Kelvingrove and Kelvin Hall, the Scottish Events Campus, the Queen Elizabeth Hospital and, across the Clyde, the creative media quarter.

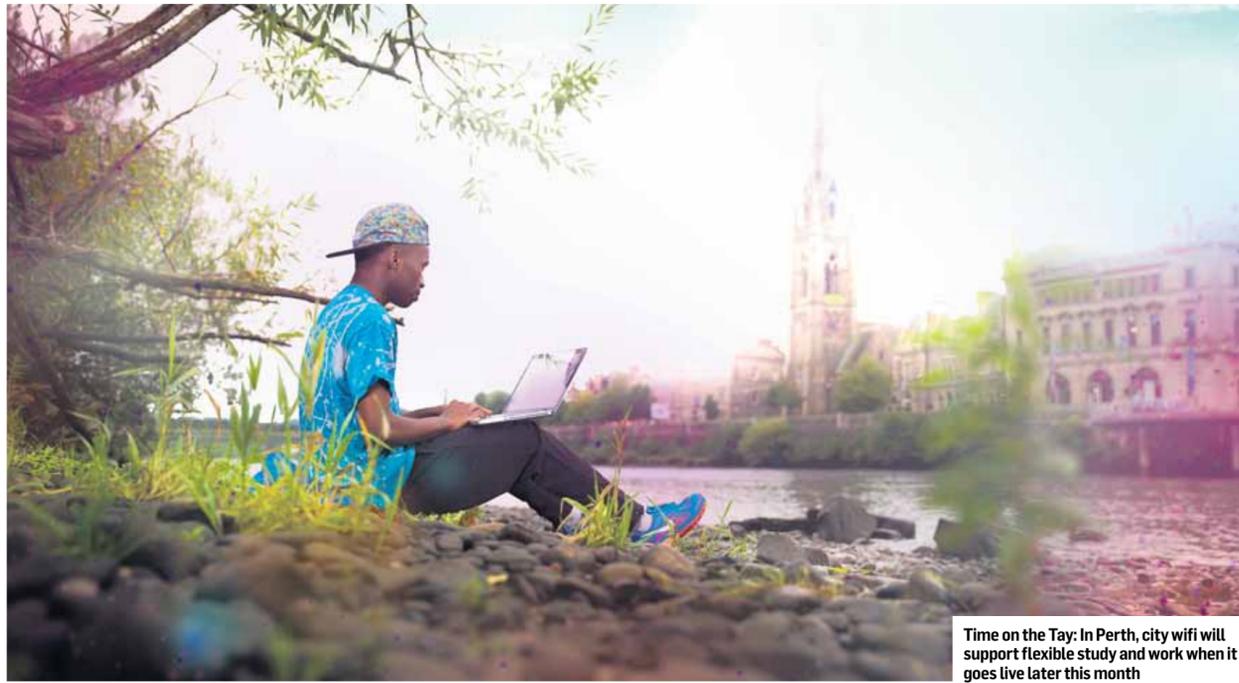
"We're very aware that the effectiveness of what we develop as a physical project will depend on the strength of the digital infrastructure that we can connect to, most notably the 5G campus, a digital district in the heart of the city, that we are beginning to develop with strategic partners," said Burns.

If the 5G demonstrator gets the go-ahead, it will be up and running in time for Glasgow hosting the UEFA European Football Championship in 2020, an ideal showcase for the technology. It is also the year that the European Commission has set as one of its connectivity targets; that 5G should be commercially available in at least one major city in each EU member state.

"The demonstrator has the advantage of being part of the largest capital investment in western Scotland," said Burns. "We think of this project as a strong example of the university sector driving change through collaboration with city and national partners."

Ultimately, the will focus will be on innovation in – and the integration of – data, digital and engineering technologies.

It will, said Burns, "create a world-changing, connected, healthy and vibrant university campus and provide a platform for the research, development and demonstration of city scale solutions with social, technological and economic impact for the city and the city region."



Time on the Tay: In Perth, city wifi will support flexible study and work when it goes live later this month

Digital strategy that should flow into economic rejuvenation

BY WILLIAM PEAKIN

Casting a glance towards the striking new V&A building on Dundee's waterfront, Tom Flanagan drew a parallel between its leading-edge design and the Tay cities' ambition to create a world-class digital infrastructure for the region.

"We believe a smart city approach should become mainstream in terms of how public agencies engage with communities," said Flanagan, interim head of economic development at Perth and Kinross Council. It encompasses smart energy, smart mobility and smart health, among others. "Most of all, it's about smart people; making sure that people across the Tay cities are digitally skilled and can participate," he said.

Flanagan was speaking at the Dundee and Perth event in the Digital Cities series hosted by *FutureScot* in association with *The Sunday Times Scotland*. He was joined by Steven Kyle, Dundee City Council's transformation manager leading its 'Change for the Future' programme. Kyle emphasised the collaborative nature of the region's strategy, with each of their councils, along with Angus, working to de-

velop a single digital platform for citizens. A technology forum provides a medium for specialists to discuss challenges, and ways round, while an improvement forum supports the redesign of council services. Kyle pointed out that the public now have a way to report issues online, across a variety of services such as community safety, the environment, housing and potential fraud. They can also check how the council is performing, based on a series of indicators.

Flanagan said that there is an emphasis on making council data available to small and medium sized enterprises, to encourage the creation of innovative applications and so that more informed decisions can be made about the region's future. It is opening innovation labs to support digital businesses.

Dundee and Perth following Glasgow's lead in opening a 24/7 city operations centre to improve safety and incident response times. Intelligent street lighting and city-wide WiFi are being rolled out, and involvement in the 'playable city' initiative will make visits an experience as well as just being functional. The move to become digital cities is supported by the Tay Cities Deal bid which, if successful, would see more than £1.8bn of investment

and the creation of up to 15,000 jobs for the region. Digital plays a significant part in the bid, which also encompasses the area's potential in tourism, food and drink, creative industries, eco innovation, oil and gas decommissioning, engineering, biomedical and healthcare.

The 2017 Tech Nation Report identified Dundee as a hub of digital excellence, particularly in terms of games and software development, technology services and mobile app development. At 129%, it had the third highest growth in turnover in the UK, while its GVA grew by 42%. Backers of the bid - including media organisation and DC Thompson - believe this expertise can play a crucial role in the wider economic rejuvenation across the Tay Cities area.

Dundee now has the third fastest growing digital turnover in the UK and many companies, particularly software firms, are operating on a global scale. Between 2011 and 2015, the city's turnover growth was 171%, the highest in the UK, followed by London's at 106%.

The presence of Abertay, Dundee and St Andrews Universities, Perth College UHI, and Dundee & Angus College helps with supplying the skills, in terms of software

and hardware engineers, that local companies - such as cloud host Brightsolid and app developer Waracle - need.

In addition to developing some of the world's biggest selling games it has significant digital capabilities in other fields, including augmented reality, mobile phone app development, data centres and cloud storage, computer hardware for customer transactions, digital media and entertainment.

The region also has an internationally recognised strength in cyber-security which it is believed has the potential to create a significant number of jobs over time. The digital innovation element of the Tay Cities Deal proposal focuses on investment in cyber-security, digital forensic science and digital health.

Combined with the development of world class digital connectivity across both urban and rural areas and the involvement of Perth and Dundee in the Smart Cities Scotland initiative, which is developing the range of city projects from smart waste to intelligent street lighting, outlined by Flanagan and Kyle, "the strengths of the region in digital innovation are bright," says the City Deal bid document.

Why doing nothing is not an option

Digital investment in Stirling is vital in addressing the threat of decline, says council chief executive

BY KEVIN O'SULLIVAN

The arrival of the tech incubator CodeBase has been described as a 'game changer' for Stirling as the city embarks on a journey towards digital-powered economic growth.

Founded in Edinburgh, the UK's largest tech accelerator hub has formally opened a new Stirling base as it looks to replicate its model of nurturing tech talent in the capital.

The new hub is in the middle of an extensive refurbishment that will see prominent tech companies relocate to the former municipal buildings in the city centre by early next year. It will also act as a feeder, hoping to attract and retain graduates from Stirling University and Forth Valley College as they embark on tech careers.

CodeBase is set to be the fulcrum of Stirling's stated ambition to create a 'Digital District', which is just one of six infrastructure projects outlined in its City Region Deal, announced by Chancellor Phillip Hammond in his Autumn Statement last year.

Under the deal, Stirling is hoping to secure investment of up to £600m from the UK and Scottish Governments, and to attract private capital; the money will be used to revitalise the city, creating not only a vibrant digital economy, but also restoring its waterways to public use and creating an international standard city park at the foot of its iconic castle.

Speaking at CodeBase during the Digital Cities series, Stewart Carruth, chief executive of Stirling Council, painted a stark picture of decline if the city - which has established a commission to oversee the City Region Deal - failed to invest in key sectors such as digital.

He said: "The first thing that we recognised was that Stirling's economy was very much driven by what one might term traditional sectors - construction, services, tourism - and we recognised that we had to look after those sectors.

"But we also felt a little bit vulnerable. We felt that if we didn't intervene in some way there was a danger that the economic growth that we were looking

for, which would allow people to stay, or come and work here from outside the Stirling area, actually might go into decline. One of the big drivers for that was some of the information that we were beginning to get around, 'what if we did nothing?' and the impact that would have on average earnings."

He added: "We recognised that if we didn't make a move that in all probability average earnings would decline, and the opportunities for jobs in the whole of Stirling would start to fall, too. So, this is a very deliberate intervention in recognising that digital has a key part to play in strengthening our position not just in Scotland actually but internationally, too. In doing this we've recognised that the digital district is the key to doing that."

Carruth welcomed the fact that CodeBase - founded by brothers Jamie and Stephen Coleman - has taken its venture outside Edinburgh for the first time. In the capital, it has become synonymous with tech development since its launch in 2014, helping to galvanise a community of like-minded coders, web developers and entrepreneurs; it now plays host to 90 start-up companies, employing around 600 people.

CodeBase Stirling will be of an order of magnitude smaller, with space for 50 companies across four floors. It is also geographically well-placed in the Central Belt to attract talent from elsewhere in the country, said Carruth.

"CodeBase Stirling is actually for the rest of Scotland and that for us is exciting because it opens up beyond the city region into other areas and also brings an international dimension as well, so for Stirling this really is a game changer," he said.

The ability to attract people to live, work and play in the city are central to Stirling's plans to turn it into an 'economic and cultural powerhouse', creating over 3,000 additional jobs and increasing the region's GVA by 6-7% over the next ten years.

It is hoped those economic impacts will be supported through the reimagining of some of the community amenities in and around the city - which also include a plan to restore its former river harbour to use.

The city has also put digital skills at the top of its agenda; the creative industries, which includes digital technologies, are one of three key sectors adopted as core elements of its vocational training offer at Forth Valley College.

COMMENT

Let's not waste this once-in-a-lifetime opportunity

BY BILL BUCHANAN

The City Deal for Edinburgh and the south-east region comprises £300m each from the UK and Scottish Governments, with additional related investment bringing the total to around £1bn. With some of the finest data architects, cybersecurity professionals, and cloud architects anywhere in the world, we have the chance to create a new blueprint for the city; in the way that the designers of the New Town did all those years ago.

If, in five years' time, I still need to attend a damp and smelly room in a community centre on a rainy evening on the last Wednesday of the month, to express my concerns and to contribute to the operation of the city, we have wasted our once-in-a-lifetime opportunity. I hope ambitious targets can be set, and which can really stretch those involved to think in new ways.

If we have spent it on a shiny new glass building in the middle of town and have funded a bunch of data scientists to write research papers and to present at "world-renowned" conferences, we have lost sight of creating a new virtual world, and which places the citizen at the centre. I write this as an Edinburgh citizen, and not in my role of an academic.

As tech-driven and innovative as it is, Edinburgh is a long way from being ready for large-scale 'data fusion'. I worry that the new money will go into new buildings and in employing research staff, and, in the end, there will be little change which the citizen can point to and say that their lives have been changed.

Without leadership and a guiding light, and targets which take us into the 21st century, we could end up with an unfocused strategy. I hope that innovation becomes a key part of the new investment and that new thinking can promote the development of innovative companies, who can scale across the world. I hope that our small businesses get a chance to be part of the building of a new city, and that it is not all about universities defining the problems that need to be solved.

There are problems in Edinburgh which need to be solved - as in any city - and if a child in Wester Hailes does not have the same opportunities that a child

with the same abilities in another part of the city has, we are not addressing the core issues. If we educate smart people from around the world, and then allow them to leave (even though they want to stay), we will not build an economy which can take its place in the world.

One thing is obvious; Edinburgh needs an architecture which supports the gathering of data - parsed from existing sets and from new 'frictionless' methods - and its presentation back to its citizens, and for our citizens to play an active part in contributing to this data. That is what democracy is all about.

DATA OVER THE WALL?

Unfortunately, the public sector is often not set up to be a provider and enabler in the capture and provision of data. It often protects the data that it needs, and struggles to release it in a form that could be useful. With political pressure, there is often a resistance to release tracking information on civic issues. There are generally four main approaches: 1 a status quo 'data over the wall' form of government data publishing; 2 a form of 'code exchange', with government acting as an open data activist; 3 open data as a civic issue tracker; 4 participatory open data.

London is on a path from 1 to 4, has passed number 3, and now is working on 4. The London Datastore tracks key civic issues, such as jobs and economy, transport and housing. London is now also investing in full data sharing across the city, with a vision of it having "the most dynamic and productive city data market in the world. City data will be recognised as part of the capital's infrastructure. And London will achieve global renown for data impact".

For my own city - Edinburgh - we are still at 'data over the wall'. From what I see most of the data within the Edinburgh open source portal is in the form of PDFs, and gives little pointers on the general health and activity of the city. There is little in the way of taking data from different sources, and fusing it together, and little in the way of dialogue with its citizens - apart from turning up at community meets to meet my local councillor.

We need to drag our cities into the 21st century, and the City Deal is one way to

take Edinburgh into a new world - built on data and cyber security. I hope that Edinburgh can become an amazing place of new ideas and place that those with great ideas will come to, and be part of a citizen-focused world. Businesses in the city should have an advantage in operating here, and be ready to integrate into a worldwide infrastructure, and where every citizen can be involved in the growth of the city.

I am going to say it: 'Don't let universities define the problem, as they will define their own problems that they want to address'. Let's focus on building a new city, with software and cyber security, don't do as we have done for the previous century.

The City Deal is just too good an opportunity to miss, and I hope that it shows real vision, which doesn't involve doing the same old things and benefit the same old people and organisations.

We need to build new cyber-enabled cities; otherwise, we have failed to properly create an infrastructure for our kids to move into, and they will leave and find the cities which best support their vision of a connected world. We, too, need to attract people with ideas from around the world and provide them with an infrastructure which allows them to take their ideas to the world.

My hope is that in five years' time I can take to an international stage and present on how #edinburgh showed real vision and implemented one of the most advanced Blockchain and smart city infrastructures in the world, and truly engaged with its citizens and businesses. I hope I don't have to make my concerns known through my local community centre - which is rather lovely, but not quite the place to voice major concerns - on a dark, rainy evening on the last Wednesday of the month.

*Civic open data at a crossroads: Dominant models and current challenges <http://bit.ly/2xafm9M>

Bill Buchanan is a Professor in the School of Computing at Edinburgh Napier University, and a Fellow of the BCS and the IET. For the full version of this article, go to <http://bit.ly/2fGfCY>

BUILDING AN IoT NATION FOR ALL

Society is at the beginning of a new era, driven by ever accelerating social and technological trends: a shift to high density urban living, artificial intelligence, smart infrastructure and the connected citizen.

At the core of this revolution are advances at the interface between data analytics and distributed digital infrastructure (the cyber-physical domain) that collects data and informs decisions.

The impact will be similar to the emergence of the internet in the 1990s and is driven by rapid uptake of a new generation of Internet of Things technology.

For the first time, very low-cost battery-powered devices are able to exchange information over long distances for many years.

The first wave of IoT applications is having a profound impact on smart cities in areas as diverse as street lights that respond to need and report faults to improving energy efficiency and life conditions for the poorest in society by effectively targeting fuel poverty.

CENSIS is working at the forefront of this revolution, supporting Scottish companies to exploit these new technologies and create solutions of huge global market potential and societal benefit.

Cities are the engines of our economic future, but the IoT opportunity transcends these boundaries to encompass the whole country. This wide-ranging nature of the challenge demands we deliver seamless capability within, between and beyond our cities, to enable our cities to flourish and to be a true 'IoT nation'.

Scotland is well positioned, with the Scottish Government making a strategic commitment in March 2017 to national IoT coverage and putting delivery of this at the heart of the 2017-18 Programme for Government.

We can look forward to a future where companies, cities and citizens, across Scotland, can all benefit from the dawn of this new era.



"THE FIRST WAVE OF IoT APPLICATIONS IS HAVING A PROFOUND IMPACT ON SMART CITIES."

Mark Begbie
Business Development Director, CENSIS

Fast track your
Internet of Things idea

CENSIS
Innovation Centre for
Sensor & Imaging Systems

If you need help to develop your IoT product but don't know where to start, talk to CENSIS. We have a specialised IoT Centre as well as engineering and project management teams to help take your connected devices idea to market.

Let's have a chat.

[@CENSIS121](https://twitter.com/CENSIS121)

censis.org.uk



Leidos in Scotland

Leidos is a global leader in the integration and application of information, technology and systems working to solve the world's toughest challenges. The company's 32,000 diverse employees support vital missions for government and commercial customers in 30 countries. Leidos UK has more than 1200 employees servicing energy, government, health, and transportation clients.

In Scotland we have offices in Aberdeen, Edinburgh and Glasgow and we are looking for ambitious graduates and experienced professionals to join our team.

We think beyond today's problems to create a better future. We're transforming tomorrow. What impact will you make?

[LEIDOS.COM/CAREERS](https://www.leidos.com/careers)