

Scottish Cities Alliance – Data Driven Innovation Summary

The digital and data economy is growing nearly three times faster than the overall economy - and that trend is set to accelerate. Rapid advances expected in Artificial Intelligence, the Cloud, the Internet of Things, Data Analytics, 5G and Quantum Computing promise to create tremendous value - enabling the development of new products and business models and creating ways for governments to deliver more useful services and better engage with the public and fundamentally altering the way we live, work and interact with one another. As the data revolution takes place all around us, 'data-driven innovation' enables us to take large amounts of data and analyse it to deliver new knowledge and insight, drive value creation and foster new products, processes and markets.

The increasing importance of data-driven innovation will be a key driver of economic productivity and innovation, job creation and internationalisation and has enormous potential to support broad-based inclusive economic growth, reform our public services and empower our communities. Over the next five years, data driven innovation has the potential to deliver **£20bn of business benefits to the Scottish economy** through efficiency savings, improved competitiveness and higher productivity across Scotland's key data-driven sectors such as Energy, Financial Services, Manufacturing and Healthcare.

With established underpinning digital expertise in software, games development, artificial intelligence and sensor systems, Scotland is building a strong global reputation as a data innovation community with a world-class informatics and computing cluster and key interconnected strengths:

Scotland has world-class data research capabilities:

Scotland has a worldwide reputation for excellence in our university research base in data science and data innovation. We are home to the UK's leading research university in data science and informatics, the University of Edinburgh, and the largest concentration of internationally significant and world leading informatics research in the UK. Key research assets in our data innovation infrastructure include:

- **The University of Edinburgh's Bayes Centre for Data Science & Technology** – a world-leading centre of data science and artificial intelligence that aims to develop and apply data science and AI, drawing meaningful insights from vast amounts of information for the benefit of society. The £45 million Centre co-locates an up to 600 strong community of academic, research and commercial expertise at the heart of the University of Edinburgh campus, drawing together the University of Edinburgh Schools of Informatics, Mathematics, and Design together with the Alan Turing Institute, the Data Lab and the Edinburgh Parallel Computing Centre.
As one of five data-driven innovation hubs opened as part of the **Edinburgh and South East Scotland City Region Deal's Data Driven Initiative** which includes the University's **Easter Bush Campus**, **Edinburgh Futures Institute**, **Usher Institute**, and the National Robotarium -a partnership with Heriot-Watt University- the Bayes Centre provides a focal point for data-driven innovation to support industry adoption, entrepreneurship, talent development, applied research and exploitation of regional data assets.
- **Edinburgh School of Informatics** – the largest European centre of its kind with over 115 academics, 130 research staff & over 1600 students from over 75 countries worldwide. Ranked first in the UK for research power in data science and innovation and has produced a record number of start-up and spin-out companies.
- **Edinburgh Parallel Computing Centre** - one of Europe's largest Supercomputing centres and a major provider of training in high performance computing. EPCC hosts an exceptional collection of high performance computing facilities including the UK's primary academic research supercomputer and the UK's shared Research Data Facility and is an internationally recognised centre of expertise for all aspects of big data research.

- **The Urban Big Data Centre** - brings together the interdisciplinary expertise of urban social scientists and data scientists from the **University of Glasgow** & six partner universities to develop data driven solutions to complex urban challenges.

Scotland has a thriving technology company base with the presence of the world’s leading data companies and two data-driven unicorns with global horizons:

Scotland has 150 companies whose products and services deliver value from data, either on a business-to-business basis, or directly to customers. These companies have a combined annual turnover of £1 billion, which is projected to double in the next three years:

- **DeltaDNA**, based in Edinburgh, works with top global video games publishers and applies data science to boost the monetisation of their products.
- **Skyscanner**, also based in Edinburgh, is now a world-leading global travel search site, employing 800 people from over 50 countries.
- **Aridhia**, based in Glasgow and Edinburgh, applies advanced data and analytics services to the pioneering precision medicine, biomedical research and healthcare sectors.
- **Exscientia**, based in Dundee, is at the forefront of using AI techniques to identify candidate compounds for new drugs and is the first company to automate drug design.
- **Ecometrica**, based in Edinburgh with offices in London, Montreal and Boston, is the global leader in downstream space information solutions, turning vast and growing streams of observation data from space, air and land into actionable insights for business, government and society.
- **Cadherent**, based in Aberdeen, supports engineering projects in sectors including oil and gas, construction and civil engineering, food, renewables, recycling and defence. It delivers sophisticated engineering design and visualisation services for clients’ projects in Europe, West Africa, Asia Pacific, Middle East, the Gulf of Mexico and the Caribbean.

Companies in Scotland benefit from access to data markets and sophisticated supply chains in key data-intensive sectors in Energy/Oil & Gas, Healthcare, Financial Services, Digital Industries and Government.

They also benefit from state-of-the-art, specialised facilities to support start-up and scale-up - e.g. **Codebase**, based in **Edinburgh, Stirling and Aberdeen**, acts as a focal point for Scotland’s tech cluster, by providing custom-built space to bring tech companies together and linking them to mentorship, business support and investment. Examples of Codebase Alumni include Aquila Insight, now part of Merkle Aquila; Cyber specialist, Zone Fox; Fanduel, QikServe, Symphonic and UWI Technology, and Cuvva.

Overall, this amounts to a strong investment proposition and Scotland has recently secured increased FDI in the field of data as more global investors, such as **Spiritus, Asystec** and **Smartsheet** are drawn to Scotland’s rich data-friendly business environment.

Scotland has a strong pipeline of ideas and talent for the future:

A well as producing over 10,000 technology graduates annually, Scotland has a strong, long-term and innovative focus on delivering the digital and data talent we need for the future:

- Universities and colleges across Scotland (**Edinburgh, Glasgow, Aberdeen, Stirling, Inverness and Dundee**) have been at the forefront of creating specialist degrees & courses to equip people with the skills they need for careers in data science:
 - Scotland has the highest concentration – over 20% - of all data science postgraduate courses in the UK.
 - The **Data Lab** is working with industry and Scotland’s 14 university computing science schools to ensure a pipeline of data scientists and engineers for the future through The Data Lab **MSc**

programme, PhD & Eng D funding, placements and secondments, online learning and Continued Professional Development.

- We're home to **CodeClan**, an award-winning digital skills academy that offers a range of cutting-edge, hands-on and immersive career development, career change and upskilling digital courses. It aims to train 1,000 diverse 'CodeClan graduates' for the Scottish digital tech industry by 2020 and help over 500 employers grow and retain top quality talent.
- And we have a strong focus on the teaching of STEM subjects in our schools and colleges, a new digital schools programme, delivered in partnership with industry, and a comprehensive set of pathways into digital careers through new Foundation Apprenticeships in software and hardware, Modern Apprenticeships in information and cyber security and data analytics as well as Digital Graduate Apprenticeships in cyber security and software development.

Scotland has strong public-sector support to build a world class environment for data:

- **The Scottish Government** is a strong advocate and customer for the use of data. It contributes to the data opportunity in two ways: first, through a commitment to open data; and second, through its use of data to drive efficiency and affordability in the provision of services. It is pioneering new approaches to openness, transparency, building trust and citizen participation across all government departments through membership of the international **Open Government Partnership** and the roll-out of its second **Scottish Action Plan on Open Government**, alongside projects and programmes to drive innovation in public services:
 - **CivTEch Scotland**, a government-run accelerator that matches digital tech innovators with public sector organisations looking to create digital solutions for a range of 'civic challenges'
 - **IOT Scotland**, a £6 million project to build the most advanced internet of things network in the UK that will allow public bodies and businesses to exchange and analyse data from smart devices.
 - The **National Improvement Service** which provides support to Scotland's local authorities and their partners on a range of improvement issues including those related to data.
- **The Data Lab**, a Scottish government-backed data innovation centre, plays a key role in helping the industry across Scotland to capitalise on a growing market opportunity in data science and data innovation. With a Scotland-wide presence and Hubs in Aberdeen, Edinburgh and Glasgow, it provides a focus for Scotland's growing data community and enables new collaborations between industry, universities and the public sector, driven by common interests in the exploitation of data science. It provides resources and funding to kick-start projects, deliver skills and training, and help to develop the local ecosystem by building a cohesive data science community. The Data Lab currently has a Scotland wide data Community of 3276 members who participate in regular data meet ups across the country.
- **Scottish Cities** are working at a regional level to unlock the potential from data for the public, private and third sectors from their city deals and other focused initiatives:
 - **The £1.3 billion Edinburgh and South East Scotland City Region Deal** is unlocking a total investment of £661 million, with £270 million coming from UK Government, to drive its **Data-Driven Innovation** (DDI) programme over the next ten years. The DDI programme will increase the provision of data and digital skills in the workforce and use world-leading expertise in research and data analytics to improve products and services, transforming the City Region into the data capital of Europe.
 - **Abertay University in Dundee** is leading delivery of a new £11.7m project to create a cybersecurity research and development centre as part of the Tay Cities Deal. 'CyberQuarter' will be a cluster of academic and industry activity and will provide a focus for realising new economic opportunities for cyber security through innovation, cutting edge research in ethical hacking and adoption of products, services and practices in SMEs.

- **The Data Centre of Excellence in Glasgow**, within Glasgow City Council, was set up to encourage ‘design with data’ approaches to innovation, focusing on solutions to real challenges faced by Cities. Working in partnership with citizens, public, private and academic partners, including the 7 cities collaboration, the Centre is delivering tangible benefits to service providers through its focus on data analytics and design and its commitment to open data. It is enhancing the capability and capacity of the skillsets in this growth area to generate the cultural change to maximise the benefit of the huge volumes of data generated in the city.
- Supported by the **Scottish Cities Alliance**, a partnership of Scotland’s 7 cities and the Scottish Government, £60 million, including £25 million of European Regional Development Fund (ERDF) support, is being invested to make Scotland’s cities smarter, using new technologies and data to accelerate and transform the delivery of city services. This investment supports the 7 Scottish cities to work collaboratively to publish the same data sets to the same standard and quality and opens up unique opportunities for industry to work with a range of small and medium sized cities to develop and test smart solutions using data published across 7 city data platforms.

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