



# Wales Data Nation Accelerator



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“ Digital innovation is a game changer... While it presents considerable challenges, it also offers new opportunities to use digital innovation to improve the quality of jobs, business productivity, delivery of public services, and individual wellbeing. Through bold initiatives and creative leadership, Wales can transform the economic landscape to benefit everyone... The challenge... is to make Wales a nation that dares to be different.

**Brown Review, Wales 4.0 Delivering Economic Transformation for a Better Future of Work (2019)**

“ The recent Topol Review (2019) makes recommendations that will enable NHS staff to make the most of innovative technologies such as genomics, digital medicine, artificial intelligence and robotics to improve services.

**Clive Morgan**  
**Managing Director, All Wales Genomics Service, NHS Wales**

“ Our collaboration with the University sector has led to a toolkit to generate synthetic data, to support automated testing of systems and software. We anticipate that this will give us more efficient and accurate testing procedures, leading to a reduction in staff time and costs associated with software and system development and maintenance.

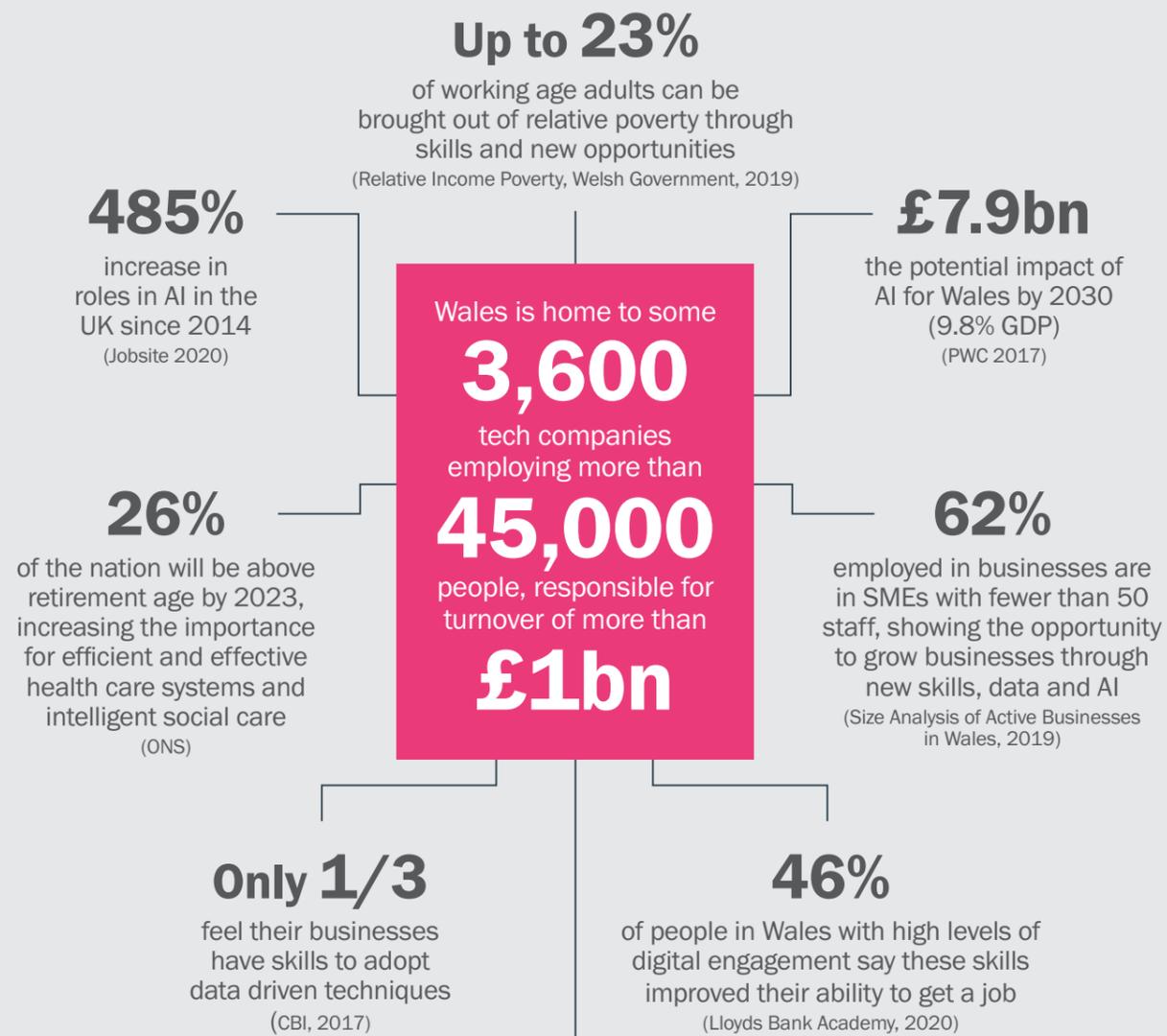
**Kevin Gough**  
**W2 Global Data**



# Building a resilient data nation, for Wales and beyond

The fourth industrial revolution means that data science and AI are fuelling automation and rapidly changing economies, job opportunities, business productivity, public services health care and individual wellbeing.

Through co-creation with business and other parties, the Data Nation Accelerator will innovate through data and AI in key industrial clusters and public services, while supporting an increased talent pool.



## Time is running out

The Data Nation Accelerator will create opportunities for future generations at a disruptive scale while supporting the post COVID-19 recovery

# Goals



## Social, economic and health benefits

£1bn of additional economic activity in Wales over 10 years, and health benefits through intelligent diagnosis, data management and resource efficiency



## Future jobs

supporting future business growth by accelerating a newly skilled and up-skilled workforce across key clusters



## International leadership

to become a world leader in data innovation, application and analytics, consistent with Wales' ambition to become an internationally recognised data nation



## Advancing technology and driving innovation

delivering the step-change required to build nationwide capacity for business transformation and workforce development



## Mission

The Data Nation Accelerator will accelerate new insight, foresight and intelligence from diverse data assets for societal, health and economic impact



## Co-creation

Using business-led challenges and collaborative teams to fuel innovation through data science and AI



## Uniqueness

Developing and exploiting Wales' national data sets, testbeds and assets to accelerate private and public sector innovation, invigorate upskilling and fuel business clustering



## Priorities

A national environment for innovation with data and AI

Challenge areas for co-creation with business and stakeholders

Linking and exploiting data assets, expertise and translation

Talent-pool enlargement via proactive diversity, equality, inclusion and skills

Supporting an increased footprint of start-ups and scale-ups

## Fuelling innovation

**Strengthening business linkage** – sponsored joint business-academia posts (*Master Innovators*) to accelerate innovation, impact and co-creation in tech-facing roles

**Capacity building for co-creation** – data science teams and research software engineers that co-create between business, academia and other stakeholders on key R&D challenges, both for sprint projects and longer-term activities

**Knowledge exchange** – business acceleration activity, from start-ups to large companies, through agile projects with industry having access to rapid data analysis, modelling and AI expertise

## Strengthening the talent pool

**National skills development** – providing a “skills ladder” for data science and AI, from secondary school interventions through to FE, HE and apprenticeships, enabling flexible upskilling, reskilling, entrepreneurial skills and CPD in Academies aligned to business

**Enhanced doctoral training at scale** – developing future leaders and business translators to harness data and AI through new methods and in new application areas, aligned to business and societal needs

## An inspiring national environment

**Accessible compute** – enabling an advanced compute and data environment, including training, for linking and exploiting data at scale for the development of insight, foresight and intelligent techniques

**Collision and working space** – enabling selected locations across Wales that are positioned to enable multi-stakeholder collaborations between business, NHS, government and academia to flourish in the challenge areas

## Challenge areas



**Public Services Innovation**  
Intelligence, efficiency, automation, enhanced decision making, advanced problem solving, personalisation



**Health and Wellbeing**  
Precision medicine, diagnostics and interventions, intelligent healthcare systems, social care through AI



**Net-zero and the Environment**  
Energy and transport, environmental management, circular and green economies, housing, agri-tech



**Future Manufacturing and Systems**  
Factory of the future, advanced materials, resilience in supply chains, digital twins, smart manufacturing, agri-tech



**Creative and Professional Services**  
Legal, financial technology, business systems, social media, human centred systems and communication

## Cross-cutting themes



**Data, Intelligence and Society**



**Safe, secure and ethical AI**



**Skills and training**



**Workforce and business analytics**



**Machine Learning, AI and Data Science**



**Business support and knowledge exchange**



The development of Wales as a “data nation” is highly relevant to our mission, and ONS can significantly benefit from and contribute to the development of a Data Nation Accelerator – in particular, through enhancement of techniques and theory aligned to new data sources, such as online media, and societal issues, alongside advanced skills and training. This requires cross disciplinary expertise related to the use of data, which Welsh Universities are well placed to provide.

**Sir Ian Diamond**  
UK’s National Statistician,  
Office for National Statistics



Siemens has already established strong relationships in Wales and there is a significant opportunity to build on considerable data assets, infrastructure and investment. The Data Nation Accelerator seems an excellent opportunity to bring together these assets, investments and partners in a unique way, to tackle challenges in a cross disciplinary approach, and develop and test innovative solutions that will deliver real tangible benefit.

**Professor Paul Beasley**  
UK R&D Director, Siemens



I see the potential for collaborative working between NHS Wales and the Data Nation Accelerator as an incredibly exciting opportunity. It aligns strongly with our vision for precision medicine services and the wider aspirations of translational medicine programmes in Wales. The close collaboration of our precision medicine programme and the Data Nation Accelerator will undoubtedly drive the health and economic benefits arising from the digital health revolution by releasing more NHS staff time for direct care of patients and to lead on further translational innovation.

**Clive Morgan**  
Managing Director, All Wales Genomics Service, NHS Wales



BT’s Research and Development teams are already playing a lead role developing AI and Data Science technologies, which have the potential transform businesses of all sizes in all sectors. Developing the skills and expertise required is a crucial step to realising those benefits and ensuring that Wales realises its potential. At BT, we are keen to work with universities and government at all levels towards our shared goals of improving productivity, generating positive social outcomes and delivering economic growth – aligning us with the stated aims of this project.

**Nick Speed**  
Wales Director, BT



Energy is changing. Decentralisation, renewables and smart grids are disrupting how we think about, generate and consume energy. Businesses need to embrace digital innovation to succeed. At Centrica, making use of our data is key to us realising and satisfying our customers’ changing needs and keeping our operations running smoothly.

**Peter Sueref**  
Data Science Director at Centrica



Data is everywhere, and data science is the tool that can help small innovative companies to understand customer needs and behaviour as well as to inform and drive innovation and development activities.

**Nick Crew**  
Airbus Endeavr

**Business and public sector co-creation with new levels of depth, innovation and impact**



## Public Services Innovation

- » Personalised, ethical and efficient service provision
- » Enhanced implementation of policies
- » Development of actionable intelligence from data

The Office for National Statistics with Data Science Campus at Newport, enjoys a **strong relationship with Welsh academia**, including joint staff

Home to number of UK Government agencies including **DVLA, Department for Work and Pensions and Patent Office**



Office for National Statistics, Data Science Campus, Newport

Artificial Intelligence can have a significant impact on public services at a fundamental level. AI can help design better policies and make better decisions, improve communication and engagement with citizens and residents, and improve the speed and quality of public services. While considerable progress has been made in the private sector, there is still the opportunity to expand innovation in the public sector. Creative use of AI is possible leading to new levels of personalisation and efficiency.

Challenges include:

- Enhancing diverse decision-making processes through data and intelligence,
- Providing new levels of service and efficiency, with greater levels of automation and transparency for users
- Using AI and data science to better engage with citizens and inform policy

The public sector in Wales can both drive and benefit from innovation in this area through a collaborative approach.

## Health and Wellbeing

- » Precision medicine, diagnostics and interventions
- » Intelligent healthcare systems and population science
- » Social care through AI

The Life Science sector is seen as the fastest growing sector in Wales, employing over **11,000** people in more than **350** companies and contributing around

**£2bn**

to the Welsh economy every year

Unique data assets in different forms, from Secure Anonymised Information Linkage, to imaging and genomics, provide **powerful new opportunities for insight and foresight**

Wales hosts

**1 of 6**

Innovate UK recognised **Centres of Excellence for Precision Medicine**

With the devolution of health services and the nature of the population, Wales is uniquely positioned as a 'living laboratory'. Through the nation's own health, social care and educational data, recognised co-ordinated working of Health Boards and strong collaboration across NHS Wales, academia and business, Wales can utilise AI and data analytics to deliver a step change in health service provision and national wellbeing.

The Data Nation Accelerator will support the Welsh Government vision to create 'A Healthier Nation', empowering responsible citizenship including:

- linkage and exploitation of key national data resources, in support of precision medicine, advanced diagnostics and targeted therapeutics;
- enabling a health systems intelligence capability, that supports new levels of efficiency in treatments, patient care pathways and NHS resourcing;
- revolutionising social care and housing through the exploitation of data and intelligent techniques

This requires a national approach, national data resources and strategy. The Data Nation Accelerator will make this step change based on targeted challenges related to critical areas.



**All Wales Genomics Partnership: top three worldwide for Genomic sequencing efforts during COVID-19**

## Net Zero and the Environment

- » Energy, storage and transport
- » Environmental management
- » Circular and green economies
- » Housing

Wales low carbon and renewable energy sector employs

**13,000**

people, generates annual turnover of

**£2.43bn**

and brings together key industrial players and over 100 academic researchers

The North Wales Smart Efficient Energy Centre (SEEC) works across **ocean energy, nuclear energy, and energy efficient structures**, interconnected by a **cyber-infrastructure hub**



**The award winning, Active Building Office at Swansea, which integrates innovative renewable energy generation and storage technologies, coupled with state-of-the-art digital design**

A low carbon and sustainable Wales is essential for future prosperity, and reflects considerable national capability. This is combined with the country's stunning natural environment and resources. Digitalisation, connectivity and diverse forms of instrumentation are enabling new types of data capture, from which insight and foresight can be extracted to assist with policy, new services, citizen empowerment and achievement of environmental targets.

The Data Nation Accelerator will enable data exploitation to be central in accelerating a low carbon Wales, including:

- harnessing data and intelligent techniques to accomplish decarbonisation in alternative energy generation and storage systems
- supporting the introduction of mass electrification, infrastructure design and carbon reduction in private and public transportation
- accelerating the circular and green economies through data sharing and intelligent asset management

These challenges will be addressed in a holistic manner – spanning from social acceptance of alternative technologies and approaches, through to technical capabilities that support new services, interventions and commercial activity.

## Future Manufacturing and Systems

- » Factory of the future
- » Advanced materials
- » Resilience in supply chains
- » Agri-tech



AberInnovation based Agxio secured £750k investment to support development of advanced data science and AI solutions in agri-tech and agri-fintech

**100's** of companies engage in **knowledge translation** through the ASTUTE and the Data Innovation Accelerator programmes

Based in Wales, the UK's Compound Semiconductor Applications Catapult is **driving the advancement of high value manufacturing**

Wales is home to the **Steel and Metal Institute** and the **TWI Advanced Engineering Materials Research Institute**

Wales' traditional manufacturing base now also includes high value activity aligned to semi-conductor production. Alongside this, capabilities related to the agriculture sector have strengthened and align with an increased dependency on data and intelligence. Turbulence from COVID-19 has also reaffirmed the scope for alternative and disruptive approaches to rethinking the supply and how products may be drawn to market.

These themes will be central to the Data Nation Accelerator, which will address:

- Manufacturing of the future through artificial intelligence in agile production systems and advanced materials
- Resilience in supply chains including management, logistics, alternative production and consumer-facing approaches
- Intelligent approaches to agri-tech, food security and production methods

Co-creation with business is central to this approach.

## Creative and Professional Services

- » Fintech and legal services
- » Business systems
- » Communication and social media

Clwstwr, part of the UK's **single biggest investment in the creative industries** by AHRC

Wales Fintech sector employs around **40,000** people and contributes **£8.5bn** to the economy. Wales is one of fastest growing locations for Fintech, second only to London

A European centre for online insurance aggregators including **Moneysupermarket** and **GoCompare**

Wales has seen rapid growth in financial technology services and is home to one of the UK's "unicorn" data science companies – Admiral insurance. Alongside this, the wider growth of digital technologies has become central to the development of Wales across a number of areas, including the creative sector and data science for public good. Wales is also home to the creative industries initiative "Clwstwr", designed to drive innovation in the screen industries, which is inherently digital.

Key challenges include:

- Using data science and AI to power "disruptors" in creative and professional services
- Enhancing efficiency and redefining business processes
- Awareness and mitigation of misinformation and adversarial activity in digital societies through artificial intelligence

Wales is well-placed to address these challenges through co-creation.



Admiral Group Cardiff: the Welsh headquartered company is one of largest car insurance providers in the UK and a major employer in the region

## Innovation through collaboration

Our mission is to lead the Data Nation Accelerator through partnering with business and other organisations to co-develop innovative solutions to key societal and industrial challenges.

### Knowledge Exchange

Knowledge exchange is a cornerstone of driving innovation and growth in Wales, for instance, from established track record with successful Knowledge Transfer Partnerships, to secondments between business and academia, to active partnerships around talent development and diversity.

**9 successful knowledge transfer partnerships across Wales** in AI and data science since 2017, with partners from large corporates like Admiral and Qioptiq, to innovative SMEs like ActiveQuote and Yard Associates

**Over 500** business research partnerships (HEBCI 2018)

### Co-investment with business



- » The Institute for Compound Semiconductors
- » National Spectrum Centre with QinetiQ
- » Airbus Centre of Excellence in Cyber Security Analytics
- » Panalpina and the PARC Institute of Manufacturing, logistics and inventory
- » Renishaw Advanced Metrology Laboratory



## Strong business acceleration expertise

### Manufacturing

ASTUTE2020 is an industry demand-led, multi-University partnership, driving impactful manufacturing innovation, through meaningful close collaboration with SMEs and large businesses throughout Wales.

### Data Science

Targeting SMEs, the Data Innovation Accelerator works collaboratively with companies to apply data science techniques to produce tangible benefits for the business.

### Health and Wellbeing

ACCELERATE is a collaboration between Welsh universities and the Life Sciences Hub Wales to translate innovative ideas for the health and care sector.

### Energy and Buildings

SPECIFIC concerns research and early commercialisation of building-integrated technologies that can capture solar heat and electricity for later usage.



**Over 200** SMEs engaged in AI and data science accelerator projects

## Business interactions and emerging clusters

### Compound Semiconductors

Home to UK's Compound Semiconductor Applications Catapult, with the country's strength being recognised with £43M investment in Strength in Places Fund, complemented by R&D at both Cardiff and Swansea.

### Precision Medicine

With one of six UK centres of excellence for precision medicine, strong partnership with NHS Wales, unique UK assets and expertise, combined with significant regional investments such as Cardiff Edge Life Science Park, regional strengths in Precision Medicine are strongly developing, incorporating integrated diagnostics and advanced targeted therapies.

### Fintech

Fintech Wales is a managed business cluster that supports the UK's fastest growing Fintech location outside of London, including Admiral Insurance and the online insurance aggregator community.

### Energy and Transportation

Wales low carbon and renewable energy sector employs 13,000 people and generates an annual turnover of £2.43bn, bringing together key industrial players and over 100 academic researchers, with Welsh Universities strongly performing in Energy, Nuclear Energy and Fuel Technology. Electrification in transportation is also strongly developing.

### Cyber Security

A cluster that combines industry interactions with academia, including the Airbus CyberLab, Thales National Digital Exploitation Centre, NCSC recognised Centre of Excellence for Cyber Security Analytics, the Cyber Threats Research Centre (CYTREC) and the Swansea Security Lab.

Collaborators



Co-developed with business, the **National Software Academy, Data Science Academy and Computational Foundry** support transformation through innovative AI and data science skills



National Software Academy supports **over 300 company collaborations** on student projects

Data Science Academy **hosts the Masters in Government Programme for ONS** and extensive company support

Computational foundry works with **DVLA** and leads multiple **Centres for Doctoral Training**

Skills ladder of targeted interventions, from school engagement to higher level

Investment in capacity to drive a proactive and multilevel approach

Supporting the new curriculum with STEM and digital competencies

Break down barriers, raise aspirations and encourage diversity

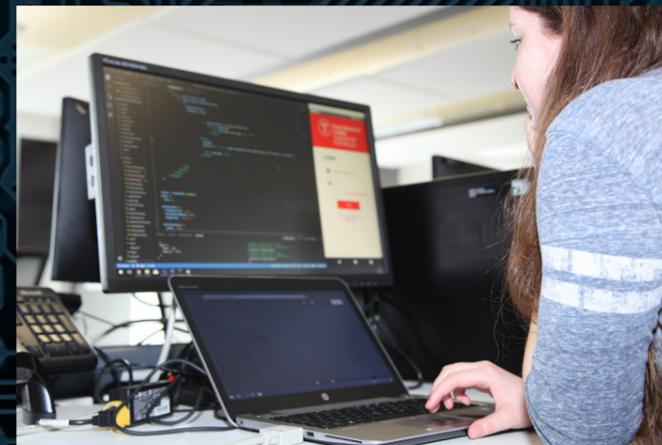
**Enriching and expanding the talent pool**

Deliver an ambassador programme and role models

Increase the PhD and researcher pipelines

Flexible and accessible upskilling and re-skilling

Future leaders and business translators



*'Working with the National Software Academy has been extremely good for our graduate programme. We currently have around 40% of all our UK graduates coming from the Academy and the University.'*

**Gareth James**  
Service Manager, Red Hat

The potential economic impact of AI for Wales could reach

**9.8%**  
of GDP  
by 2030

## Building on Wales' Assets in AI and Data

- » Unique data sets in health and social sectors
  - » Expertise in R&D translation
  - » Strong impact track record
  - » Innovation in skills and training
- » Co-creation with businesses and other partners
- » A sizeable and growing academic research base

These assets give a strong foundation to accelerate the economic and social prosperity in pursuit of a data nation that is internationally connected

**£137m**

research income in Wales since 2015 in AI and data science\*

\*Multifaceted awards have been split in proportion to the data science and AI component

**£51m**

invested in key research infrastructure aligned to facilities, data assets and initiatives that support innovation through AI and data science

**A strong R&D capacity**

# Critical mass and capability aligned to innovating through data science and AI



The Data Nation Accelerator will accelerate significant investments in Wales aligned to social and economic data, alongside academic strengths.

**Sir Ian Diamond**

UK's National Statistician, Office for National Statistics

<b>Health data</b>	<u>NHS Informatics</u>	<u>Data Linkage</u>	<u>Genomics Partnership</u>	<u>Gene Park</u>	<u>Cancer Bank</u>	<u>Health Data</u>	<u>UK MS Register</u>
<b>Health infrastructure</b>	<u>Imaging Academy</u>	<u>Life Science Park</u>	<u>Population Data Science</u>	<u>Brain Imaging</u>	<u>Microbial Bio-informatics</u>	<u>VetHub1 Labs</u>	<u>Life Science Village</u>
<b>Economic and social data</b>	<u>ONS Campus</u>	<u>Administrative Data</u>	<u>DVLA</u>	<u>National Research Data</u>	<u>Crime and Security</u>	<u>Hate, Justice and Legal</u>	<u>Social Science Park</u>
<b>Manufacturing and net zero</b>	<u>Semi-Conductors</u>	<u>Smart Energy and Supply</u>	<u>Testing and Evaluation</u>	<u>Materials and Computation</u>	<u>Active Buildings</u>	<u>Sustainable Manufacturing</u>	<u>AI and Smart Manufacturing</u>
<b>Digital</b>	<u>Super-computing Wales</u>	<u>Threats and Cybersecurity</u>	<u>Computational Foundry</u>	<u>Digital Signal Processing</u>	<u>Data and New Facilities</u>	<u>SMEs and Data</u>	<u>Digital inclusion</u>
<b>Innovation</b>	<u>Innovative workspaces</u>	<u>Entrepreneur support</u>	<u>Medtech Incubation</u>	<u>Menai Science Park</u>	<u>Environmental Sustainability</u>	<u>Aber-Innovation</u>	<u>IP support</u>
<b>Advanced training and skills</b>	<u>Digital Exploitation</u>	<u>AI Doctoral Training Centre</u>	<u>USA-UK Analytics CDT</u>	<u>Human Centred AI CDT</u>	<u>Data and Software Academies</u>	<u>Food BioSystems CDT</u>	<u>Business Leadership</u>



We've developed a technology that enables cooling equipment to maintain a constant temperature without constant power. There are huge potential benefits for developing countries and we think that data science can help us do it even better.

**Colin Kellett**

The Sure Chill Company



Not only have the results been of direct use, they have moved the science forward as apparent from the forthcoming open refereed publications.

**W. R. Johns**

Director, Haemair Ltd, ASTUTE 2020 collaborator



As an online techplace that aggregates pricing of luxury goods, our university collaboration has enabled us to explore new and efficient data science methods for automated product matching processes, which is central to our business and competitiveness.

**Amir Koochek**

Avoir Fashion



The research collaboration has broadened our understanding of the science behind the application and linked this to a structured approach to analysing the results.

**J Cable**

Director, Styrene Systems Ltd, ASTUTE 2020 collaborator



We have worked closely with the Data Innovation Accelerator and benefitted from their data skills and knowledge to help us to develop our smart city energy network solutions.

**Chrissy Woodman**

Sustainable Energy

# The Wales data nation action plan



The Data Nation Accelerator team is currently working with a range of private, public and third sector organisations to help shape and co-create a programme of most benefit to Wales and beyond.

We welcome engagement from partners eager to explore opportunities around this initiative.

For further information, please contact the pan Wales Data Nation Accelerator Team:

 [support@dna.wales](mailto:support@dna.wales)