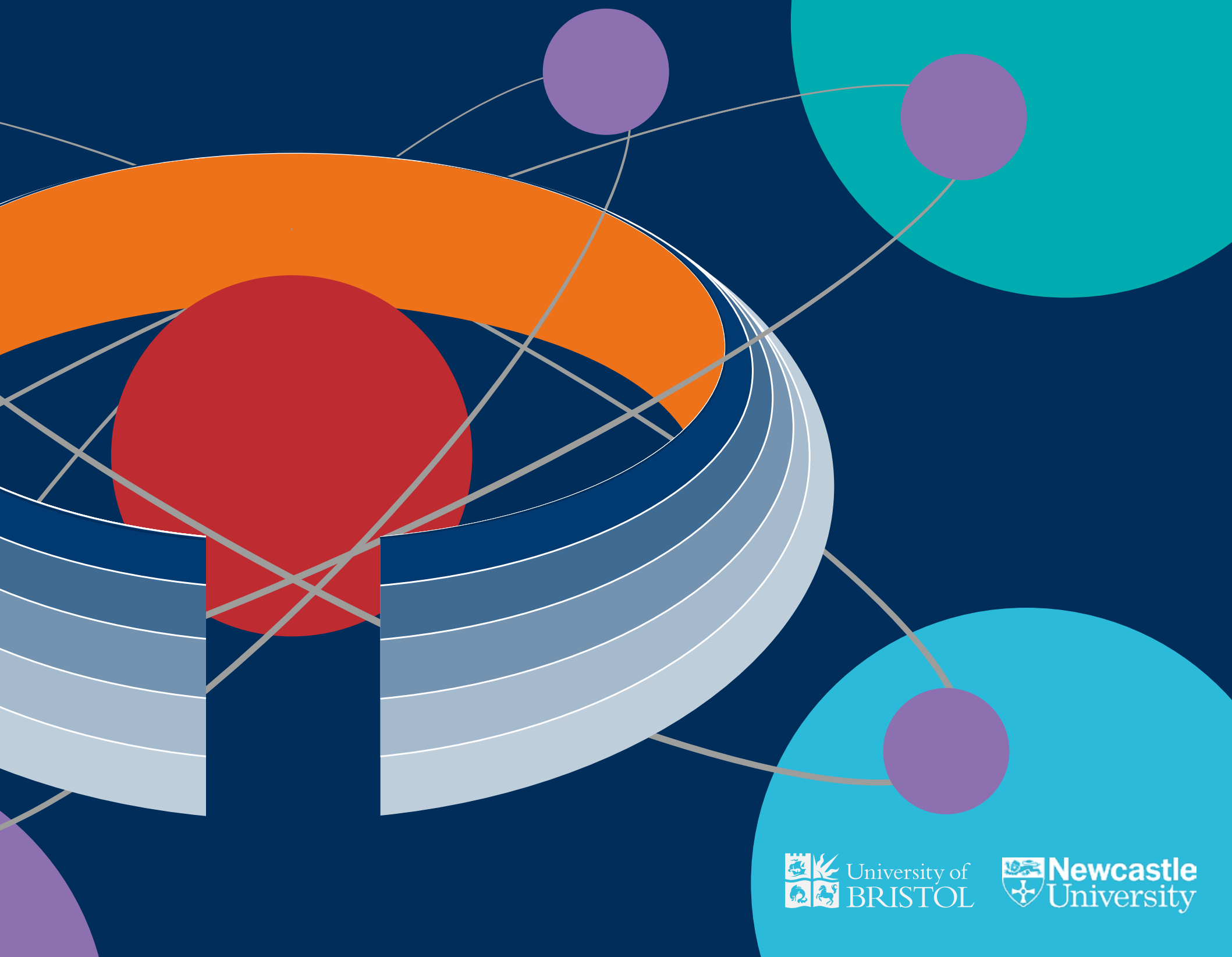


A Blueprint For The Digital Nation

Levelling-up and co-creating the UK's shared digital future

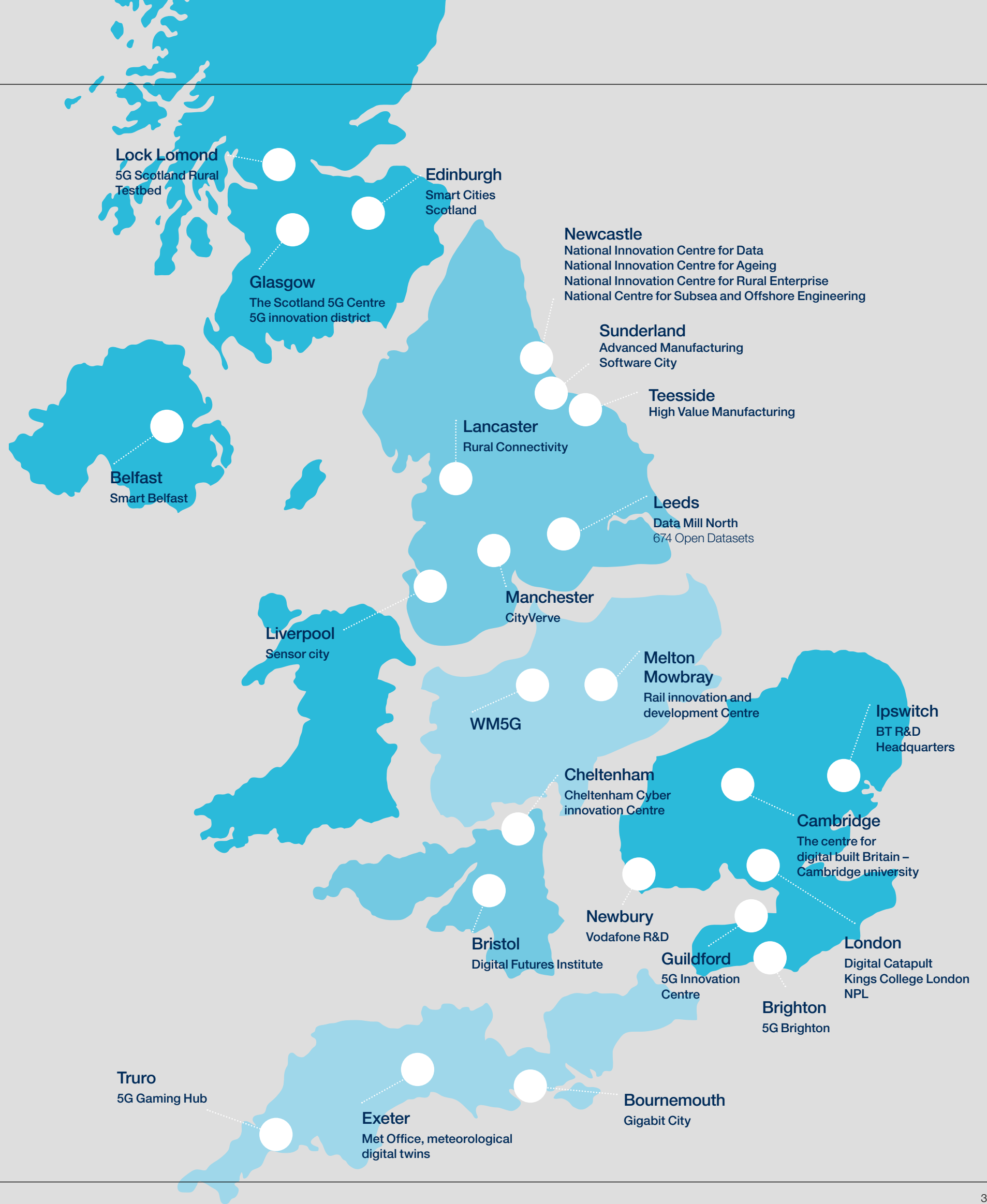


Digital innovation testbeds are beginning to unlock localised place-based innovation across the UK. Now is the time to invest in connecting-up these fragmented digital testbeds so Britain maximises the economic and societal value from them, and unites and levels-up as it leaves the EU.

Our ambition is to encourage UK telecoms supply chain diversity, cyberresilience, SMEcentredinnovation, open standards, inclusive collaborations between places and companies, and shared learning that positively impacts theUKeconomy,societyandtheenvironment, positioning the country as a digital leader on the world stage.

This shared Bristol and Newcastle vision outlines how new investment can create a digital nation by linking-up the assets from the north east and south west, then connecting further UK assets to unlock innovation that deliversinclusiveandscalableUKdigitaltransformation. The ambition is for every part of Britain to share in the rewards of economic growth, with no area left behind.

We are a coalition of public, private and academic partners, ready to develop, manage and drive the exploitation of the innovative digital fabric that facilitates the growth of the digital nation.



Transformation of Society, Economy and Environment

A disruptive approach that embraces technology to unlock new economic, social and environmental value for the whole UK. Now is the time to fuel this disruptive change by bringing together, in new ways, technological innovations with social science, private and public sector partners, investors and government. This disruption will enable Britain to lead, define and own its digital future, giving it the opportunity to have global influence in emerging technologies, societal change and productisation.

Digital signalling allows more train journeys

Economy

Tech companies will account for 10% of world GDP by 2030, up from 5% in 2020. The other 90% will use these companies' tech-services, with £10tn of new economic value created by 'tech intensity'.*

*figures from Microsoft and HIS Markit.

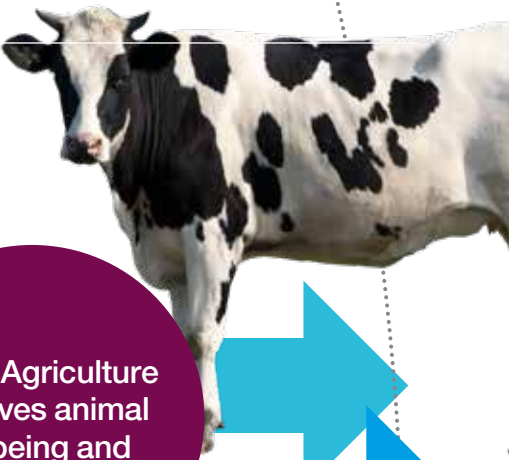
Predictive Maintenance Supports sustainability



Environment

IoT sensors are being deployed in cities and the countryside to monitor air-and-water born pollution, air quality, flooding and drought and more. The next step is programmable mitigation activities including variable road pricing and fluvial-plane flood management.

Smart Agriculture improves animal wellbeing and productivity



Flood

Help manage floods using IoT sensing and automated infrastructure



Society

Securing inclusion, embracing digital technology to redefine and create new ways of delivering education, health & social care, mobility & transport, all of which are combined to enhance society and unlock productivity gains and citizen benefits.

Connect paramedics and doctors for better outcomes

Assisted living helps older people live independently for longer



Disrupt and transform

Digital Infrastructure



Resilience & Security:
Cyber, Distributed Ledgers, Quantum



Operations:
Infrastructure monitoring, OSS/BSS abstraction, slicing, Open APIs, User Plane, control, management, including autonomous operations



Access Network:
Converged xG mobile, fixed, satellite Including: 5G/B5G, WiFi6, Open RAN, PONs, LPWAN, any Gbps access, xHaul and MEC



Core Network:
converged 5G Core, fibre and satellite transport, open interoperable software defined networks with NFV



Next Generation Network Research XG



Data: MEC, cloud, data centres, storage, high performance computing and digital Twins

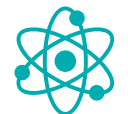


Private Networks
manufacturing & venues

Enabling Technologies



Data Science AI/ML



Quantum Comms and computing



AR/VR, Immersion, media, content



Composites



IoT: Sensors/ Actuators



Robotics, Haptics and Autonomy



HCI



Zero Power Tech



Digital Imaging for Health

People & Economy



Translational Health Care



Socio-technical innovation



Environment



Participation & engagement



Policy/ Regulation



Future of Work & Organizations



Economic growth and prosperity



Inclusion & integration



Social innovation



Public safety and privacy



Civic renewal



Investment



Scaling-Up



Skills



New business models



Consumption

Vertical Sectors



End to end sustainable transport



Smart Cities/ Regions



Digital Health & Care



Digital Creative Arts, Media & Gaming



Education & Skills



Utilities (Water, Energy)



Built environment



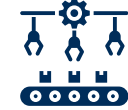
Financial services



Smart Agriculture (incl. food supply)



Sports & Tourism



Industry 4.0



Logistics & distribution and supply chain



Retail



Professional Services



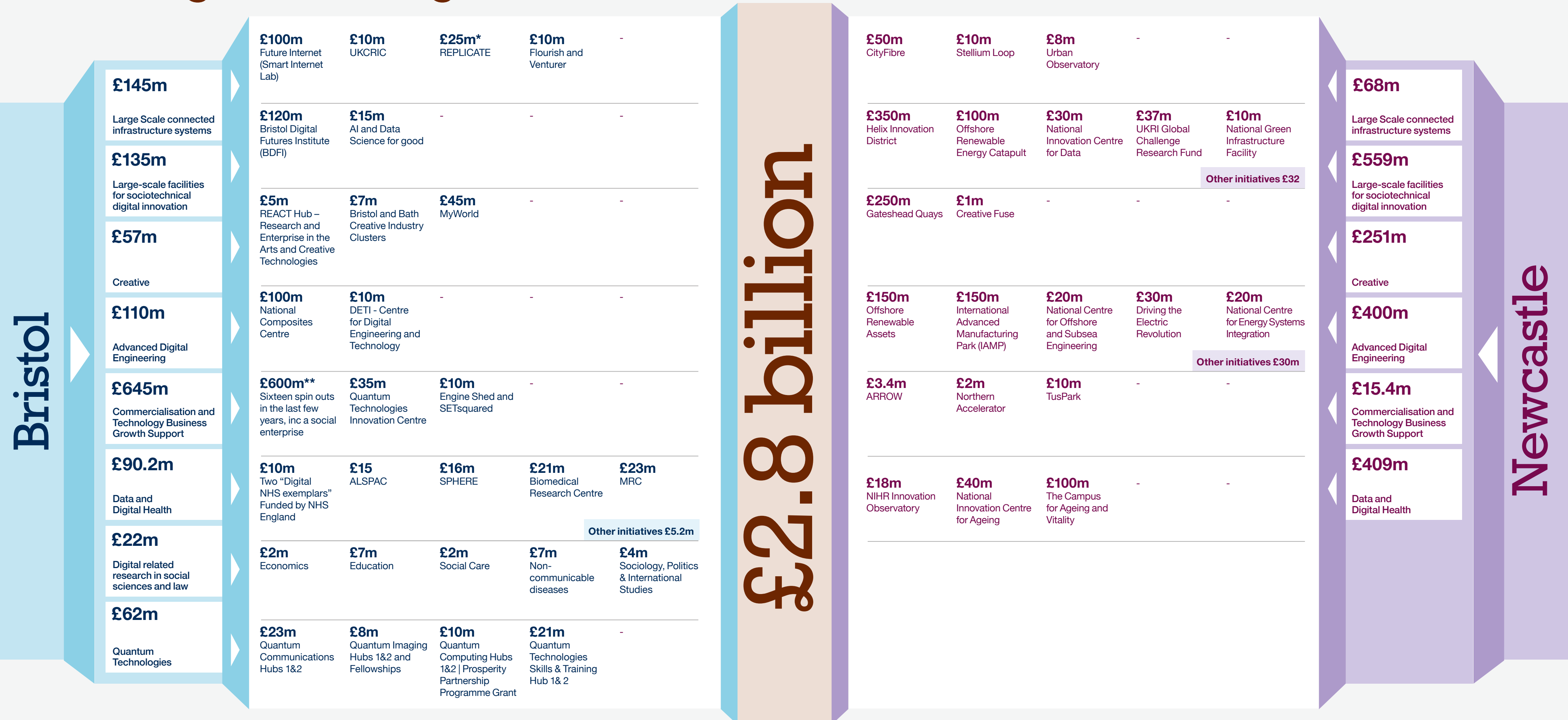
Borders



Sub-Sea & Off-Shore

We have the
know-how to
create a joined
up digital
capability for
the nation

Building on existing investments



**Bristol Digital
Futures Institute**

Social Divisions & Inequalities
Digital Health
Participatory Methodologies
Cyber Security
Entrepreneurship
and Innovation
Communications
and Networks
Organizational Change
Vision Research
Sociotechnical Systems

**National
Innovation
Centre for Data**

Newcastle University hosts the £30m National Innovation Centre for Data (NICD). Improved insight from data creates an unrivalled opportunity to increase the UK's productivity levels. NICD's engagements enable organisations to innovate, using data to optimise existing operations and to create new products and services, potentially adding £232bn p.a. to the UK's GDP.

**Bristol
Robotics
Laboratory**

The Bristol Robotics Laboratory is home to a vibrant community of over 300 industry practitioners, academics, and researchers. It is involved in a wide range of robotics research projects both nationally and internationally and is the most comprehensive centre for multi-disciplinary robotics research in the UK. It is a collaborative partnership between the University of the West of England (UWE Bristol) and the University of Bristol.

**Healthy
Ageing**

Newcastle is home to the national medical horizon scanning facility (NIHR Innovation Observatory) tracking next-stage medicines, devices and diagnostics and the National Innovation Centre for Ageing, creating intelligence that will shape our future health care. It is also home to digital health delivery innovations such as the Movement as Medicine framework, Changing Health's programme to address the £50bn p.a. economic cost of obesity and Type 2 diabetes that is now adopted by the NHS.

**Smart City
Regions**

Newcastle 's Urban Observatory has the UK's largest and most diverse sets of publicly available real time urban data on flooding, air quality, traffic flows and even bee behaviour. With 70% of people living in cities by 2050, it is imperative that we understand and can interpret these large data sets in order to better inform decisions about the sustainable development of our cities.

Bristol is recognised as the UK's leading Smart City, internationally beating Barcelona, Dubai, New York, Singapore and Yinchuan to win GSMA's Glomo Smart City Award. It won TM Forum's Smart City Digital World Award and World Communications Smart City Award. Bristol is in a strong position to capitalise on this national and international reputation.

**5G and beyond
Testbeds and
Infrastructure**

The University of Bristol Smart Internet Lab has created several 5G Testbeds and Trials attracting international attention.

Having established a city-wide 5GUK test network to support vertical sector digital transformation, 5G test-beds in the region's flagship museums, in High Value Manufacturing plants, stadia and theatres.

Connecting nationally and internationally facilitating an open collaborative platform for research and innovation.

**Creative and
Digital Clusters**

Bristol and Newcastle are both at the centre of regional creative and digital innovation ecosystems, both of which are of global significance.

In 2020, the Bristol-led MyWorld Creative Cluster received a £30m cash boost from Government to kick start a new regional collaboration between 28 companies and four universities (Bristol, Bath, UWE & Bath Spa). This is creating digital platforms for collaborative R&D, world leading media facilities, and fostering talent. Companies involved include Aardman, BBC, and it is supported by Netflix and YouTube.

Newcastle is home to FTSE 100 company Sage PLC, Ubisoft's largest UK Games Studio and a new BBC Tech Hub. With strengths across video games, e-commerce, software development, data analytics and immersive technologies.

**Bringing technology and social
science together with business to
co-create positive digital transformation**

Working together is accelerating our outcomes

Cardiff Cheltenham Bristol Bath

The 4.4m people who live in the Western Gateway’s £107bn economy, help to lead the UK’s knowledge in cyber-tech, networks, quantum cryptology and digital creativity. It’s one reason why Bristol is home to more tech start-ups than anywhere else in the country, outside of London.

Cheltenham’s 6,000 strong GCHQ contributes to the development of Cheltenham’s Cyber Central UK, and related Degree programmes. Relations with the tech eco-system in South East Wales are strong. A short trip across the Severn Bridge takes you to Bristol where expertise in Networks, Data, Quantum Cryptology, Composites & Robotics is world renowned, and 12 minutes on the train takes you to the centre of beautiful Bath with its international reputation for film, digital creativity and media, and much more.

SETsquared Innovation Support delivers £10bn to UK



Founded in 2002, SETsquared is the award-winning enterprise partnership of the universities of Bath, Bristol, Exeter, Southampton and Surrey. It has recently started working and collaborating with Cardiff University. SETsquared has worked with nearly 4,000 early stage high growth potential companies, predominantly in sectors where digital is an enabling technology, and helped them to raise over

£1.8bn of investment. These companies have gone on to deliver positive impact for the UK economy independently valued, in 2017, at £8.6bn and forecast to be worth a further £26.9bn by 2030. SETsquared offers an integrated portfolio of programmes dedicated to growing research commercialisation & collaboration, student enterprise, and start-up & scale-up companies across the South of the UK and now in Wales.

25,000+ people a month engage with the region’s TechSPARK collaboration community who produced this interactive cluster map of the region’s tech companies.

Cheltenham & Gloucester



Cyber Central UK is helping to address the national skills gap, by creating a powerhouse of future STEM learning, with a focus on encouraging girls and young women to be involved. The energy is infectious. The planned Cheltenham Cyber Central campus will be GCHQ’s next door neighbour, with 3,000 new homes, a business incubation centre, and a 24 hour cyber innovation research centre.



Cheltenham, home to GCHQ, has the largest concentration of **cyber technology** businesses in the country.

West of England



One third of all global natural history television is produced in

West of England, creating a cottage industry for bespoke high-end film cameras. Over 800 million people each month watch digital content produced in Bristol & Bath. The region hosts one of only three location hubs for the BBC and is home to Channel 4’s new Creative Hub.

With over 130 production companies, the creative sector in Bristol & Bath has impressive scale and international reach, with home-grown talent such as Oscar winners Aardman Animations and global players including Strava and Cookpad.

This is supported by a highly collaborative ecosystem, which includes the world’s #1 University incubator SETsquared, Pervasive Media Studio, Knowle West Media Centre, The Watershed and The Centre for the Analysis of Motion, Entertainment Research and Applications.

800 million

people each month watch digital content produced in Bristol & Bath.

= Number of technology companies in the area

Working together is accelerating our outcomes

Newcastle Sunderland Durham Teesside

Newcastle is one of the UK’s core cities, the regional capital of North East England and an integral part of the Northern Powerhouse.

There are more than 50,000 registered businesses in the city region and you can find some of the world’s most iconic brands here, including Siemens, Sage PLC, Nestlé, Proctor and Gamble, Norton Rose Fulbright, Virgin Money, HMRC, Barclays and Ubisoft – all have chosen the Newcastle city region as their UK home.

Newcastle

Data-Driven Innovation



Newcastle University hosts the UK’s £30M National Innovation Centre for Data (NICD). Surveys show that companies and public sector organisations recognise the value locked in data, but very few have the skills to use it to transform

their productivity, profitability and effectiveness. NICD has a track record in solving this problem – delivering insights and skills into organisations, building on the University’s expertise in applying data science. There is clear evidence that its approach is having a major impact on the economy of the North East and the wider UK, in sectors including manufacturing, healthcare, chemical engineering, transport and finance. NICD is based in an iconic new building, The Catalyst, on Newcastle Helix.

Data-Driven Healthcare

The benefits to society from integrating and analysing genetic, medical record and smart sensor data to transform healthcare are widely recognised. Newcastle is at the forefront of realising this vision, building on a set of key assets. The UK’s National Innovation Centre for Ageing facilitates the commercialisation of key products, services and technologies that help people live better, longer lives. It brings together world-leading applied researchers with industry, the public and the NHS to develop, test and bring to market products. Newcastle is also home to digital health delivery innovations such as the Movement as Medicine

framework, Changing Health’s programme to address the £50bn p.a. economic cost of obesity and Type 2 diabetes that is now adopted by the NHS. The environment for healthcare innovation has been created through close collaboration between industry, the university, and the local NHS trust, now focussed around the £350M Helix Innovation District and the £100M Campus for Ageing and Vitality.



Renewable, Offshore and Subsea Industries

Industry 4.0



Newcastle is a major centre for the renewable, offshore and subsea energy industries, registering a 60% growth rate across the sector in the past four years, as more businesses capitalise on our city’s strategic location.

It’s easy to see why with access to three deep sea ports, 400 hectare of accompanying riverside development land, and close proximity to North Sea developments such as Dogger Bank. Businesses locating here can also benefit from world-leading R&D facilities, including Newcastle University’s £7 million engineering research facility, the Tyne Subsea, as well as the National Centre for Subsea and Offshore Engineering, and the Offshore Renewable Energy Catapult, the UK’s flagship technology innovation and research centre for offshore wind, wave and tidal energy. We’re home to global giants Siemens, TechnipFMC, GE Wellstream, Bridon Bekaert and Shepherd Offshore.

Newcastle and Bristol are ideal partners to drive forward the Digital Nation. Bristol’s world-leading expertise in communications technologies for creating and connecting digital assets is complemented by Newcastle’s expertise in enabling data-driven innovation in the private and public sectors.

The Digital Nation will therefore spread data-driven innovation into every part of the UK, enabling all regions to share in the rewards of economic growth, with no area left behind.

ThoughtWorks analysis reveals that Newcastle is the top UK city when it comes to businesses making full use of their technology assets to win business, improve systems and attract the best talent

“The “Digital Nation” vision is fully consistent with the work of the Telecom Infra Project (TIP) to align the industry around the building of innovative infrastructure solutions to advance connectivity. As a global community of companies, organizations, and institutions, we believe that open, disaggregated and standards-based solutions are the foundation to fostering a robust, diverse ecosystem and talent pool, and to delivering the high quality connectivity that UK citizens and industry need - now and in years to come.

Attilio Zani, TIP Executive Director

“The UK has led in the world of Digital for decades. The Digital Nation initiative will allow us to continue the momentum and grow to support UK business”

Howard Benn, VP Communications Research, Samsung

“Digital Catapult supports the goal to establish a world class digital network across the UK, to connect testbeds and demonstrator sites nationally. This will aid recovery from the pandemic, expedite lasting transformation and support the ambition to ‘level up’ all parts of the UK.”

Jeremy Silver, CEO, Digital Catapult

“Red Hat is the global leader in open hybrid cloud infrastructure and platform capabilities, with our RHEL, OpenShift, OpenStack and JBoss Middleware portfolios to name but four. We partner with all of the major public Cloud vendors and many of the largest global telecoms companies to deliver agile and adaptable open source products which power much of the enterprises today.”

Dr Mark Little, Red Hat VP of Engineering and JBoss Middleware CTO

“We are committed to helping the UK achieve its ambitions through innovative digital transformation, and support the Digital Nation initiative to accelerate the advancement of society, the economy and environmental management.”

Sarah Mills, Head of SSE Enterprise Telecoms Network Operators

“Digital Innovation is driving the creation of more new jobs and high-value growth than anything else in the world today and Digital Nation provides the right focus at the right time to make sure the jobs and growth occur in the UK.

As the world’s No 1 university-business accelerator, SETsquared understands first-hand the power of digital innovation companies to combine with the research capabilities of university’s like Bristol to unlock economic potential.”

Simon Bond, Innovation Director, SETsquared

“The UK 5G innovation network brings together thousands of professionals across the UK’s 5G ecosystem, both in terms of technology supply and market demand. Bristol & Newcastle are active contributors to this digital community which is why this open collaborative initiative from such well-known centres of excellence is exciting, and has the credibility to really accelerate the realisation of a truly digital nation”

Bob Driver, Head of UK5G

The Emerging Digital Nation

“The Scotland 5G Centre is a partnership between the Universities of Strathclyde and Glasgow and the Scottish Futures Trust, with Scottish Government investment. We see a clear fit between our mission and the aspirations of the Digital Nation. As a national Centre covering Scotland’s seven cities and diverse rural communities we offer a complementary breadth of expertise and activity to strengthen the UK’s overall 5G offer”

Paul Coffey, CEO, The Scotland 5G Centre

“Creating a digital network to connect the city test beds that allows us, together, to improve best practice and create joint projects, presents a great opportunity to level up digital transformation across the country.”

Tom Warbuton, Director of City Futures, Newcastle City Council

“With the UK’s highest density of cyber-related businesses, Gloucestershire, as home to Cyber Central UK, already has a strong relationship with the Bristol-Bath tech scene and has a pivotal role, at the heart of this ‘Digital Nation’. We warmly welcome Bristol & Newcastle’s exciting project and we intend to play a supporting role in moving it forward.”

Tim Atkins, MD of Place & Growth Cheltenham Borough Council

“Unlocking digital innovation is vital for our nation’s future; something WM5G is hard at work realising. The next natural step is to foster collaboration projects and testbeds such as ours, Bristol and Newcastle to build a holistic picture nationwide.”

Mark Stansfeld, Chair, West Midlands 5G

“My plan for the West of England’s economic recovery and renewal has a strong focus on making sure we are developing the digital infrastructure and skills we need to create the digital jobs and growth of the future. It’s only by doing this we will maintain our region’s and our national competitive edge and reputation for innovation. This proposition fits directly in to that vision, creating the digital fabric to base that on.”

Tim Bowles, mayor, The West of England Combined authority



Our vision is to create an open digital infrastructure initiative by joining up existing investments and scale up nationally. We will accelerate R&D&I, address market failures, anticipate disruption and develop skills in future challenge areas

