

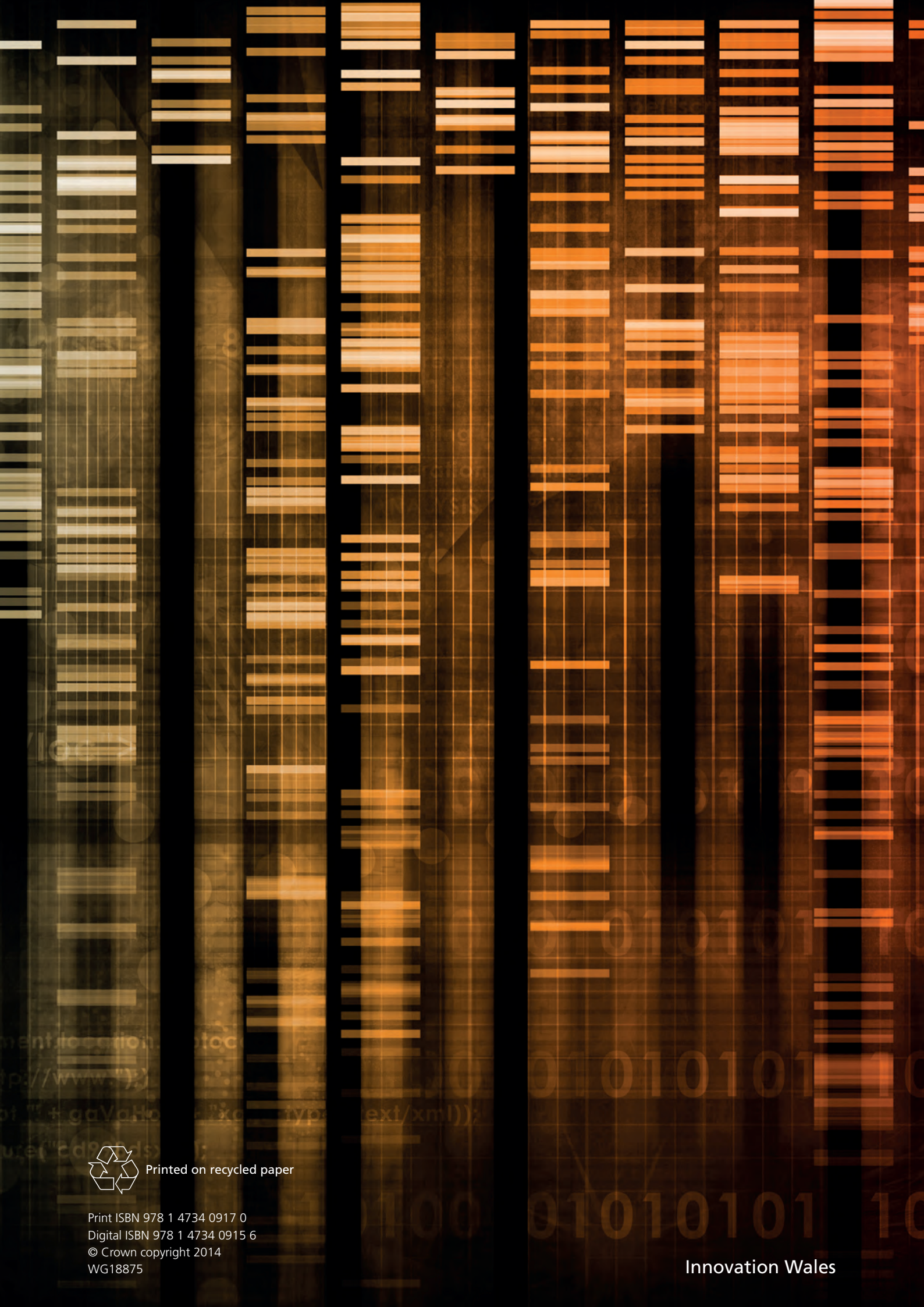


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# Innovation Wales





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Innovation Wales

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# Foreword

There can be no doubting the importance of innovation to our task of delivering jobs and growth for the Welsh economy. People, businesses, academic institutions, hospitals, schools, the public sector and the Welsh Government itself, all need to be more innovative to thrive in our competitive world.

Last year, our strategy for science, *Science for Wales*, laid out a plan for a step-change in Wales' academic performance across the sciences. This in itself will have significant direct economic benefits for Wales. But it also stated that if the step-change is to be translated into widespread, real, and tangible improvements for the Welsh people, then we need to commercialise more of our ideas, discoveries and intellectual property into new or better products and services.

To this end, it recommended a new, forward-looking innovation strategy for Wales; one which researched and explored the relevance of much of the new thinking and concepts being developed around the nature of innovation and how best to encourage it. The strategy should also take account of recent innovation-related initiatives at the UK and European level.

A Call for Evidence last summer yielded an extremely wide-ranging and constructive set of thoughtful responses from stakeholders. In distilling this thinking into a strategy we were advised by a task and finish group of experienced representatives from a range of organisations, including small and large businesses, universities and UK innovation organisations.

The result is *Innovation Wales*, which introduces some important departures in the way the Welsh Government and its partners in innovation will address the issue going forward.

We will move away from a traditional, technology-based definition of innovation by recognising that innovation can be achieved everywhere and anywhere and by anyone.

We have identified one overriding principle; whilst we need to promote, encourage and enable innovation across the whole economy, our key, large-scale interventions will be made on the basis of clear strategic priorities, built on Wales' acknowledged strengths. These are detailed here and in *Science for Wales*.

In encouraging innovation, we will be less prescriptive and more outcome-focussed. This means more competitions and prizes that are open to all, more imaginative public procurement across government departments, and more collaboration between businesses, academia and others who access UK and EU funding streams.

The strategy embraces the European Commission's 'Smart Specialisation' approach. Peer review of *Innovation Wales* by other European regions has already begun, and the process will help Wales unlock EU and UK national funds up to 2020. These will be still more strongly linked to the need to address the innovation agenda.

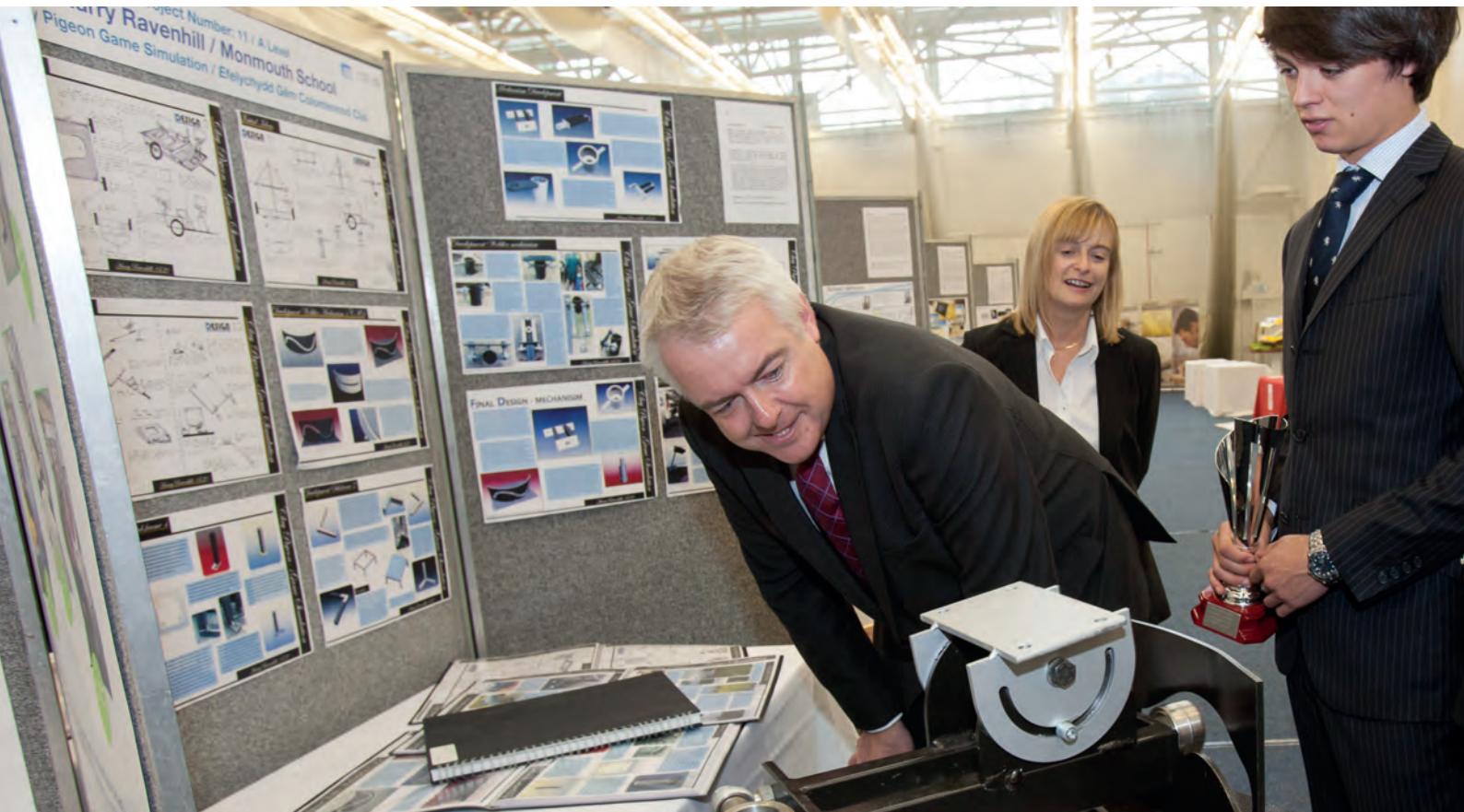
To succeed, this strategy must be owned by more than just the Welsh Government. The public sector can help create the right conditions for innovation to flourish but it is our people, our academics and our businesses that will be the agents for real change.



A handwritten signature in black ink that reads "Edwina Hart".

**Mrs Edwina Hart MBE CSTJ AM**  
Minister for Economy, Science  
and Transport

# 1. Introduction



## ***Creating Capacity for Innovative Thinking and Creativity***

Broadening young people's thinking and encouraging them to be more creative is a key component in driving a culture of innovation. Through a wide range of initiatives, programmes and partners, the Welsh Government aims to encourage young people and equip them with the skills for the future.

Wales, in common with much of Europe and the rest of the world, faces many economic, social and environmental challenges. The current economic circumstances with rising costs and increasing competition highlight the importance of developing new employment opportunities and enhancing business competitiveness. Meanwhile, our public services face increasing challenges and calls for new delivery solutions, as demands on them rise and budgets are squeezed. Resource and energy security are becoming recognised as growing issues across the world.

Innovation is one of the means businesses use to develop new products and services and bring them to market<sup>1</sup>. Greater levels of innovation can allow the public sector to deliver more effective and efficient services<sup>2</sup>. Innovation can also offer solutions to the environmental challenges we face. The Welsh Government is unique in that it has adopted sustainable development as a central organising principle in all that it does, and innovation is one of the best tools to help us to deliver a more sustainable Wales<sup>3</sup>.

Our universities and colleges need not only to continue to break new ground through original research but also to collaborate productively with others to turn ideas and technology into economic gain. Our educators must equip the next generation of learners with the right skills to innovate.

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1 Department for Business Innovation & Skills – Innovation and Research Strategy for Growth, December 2011

2 Nesta – State of Innovation Welsh Public Services and the Challenge of Change, May 2013

3 Welsh Assembly Government – One Wales: One Planet: The sustainable development scheme of the Welsh Assembly Government, May 2009

Government and the wider public sector must be innovative not just in the way that we support our partners, but in the way we deliver our services. This will need the full commitment of all the key actors within Wales.

Sometimes the Welsh Government will be in the best position to initiate action in a certain areas, but it will require a collective and collaborative effort from all stakeholders in Wales to create real change. Wales' future economic success will be determined, at least in part, by the ability of each of us to continually improve what we do. We also need to look outside of Wales, to Europe and beyond, to collaborate with the widest range of partners and make sure we work with the best.

*Innovation Wales* follows an extensive period of public consultation. It attempts to recognise and understand the role of innovation in the Welsh economy and sets out the conditions which will lead to greater wealth and wellbeing for the people of Wales. It complements and builds on existing strategies and policy approaches in Wales, such as *Science for Wales*<sup>4</sup>.

At the heart of *Innovation Wales* lies a desire to re-examine our approach to innovation, in business, in government and in society.

## 1.1 What is innovation?

Innovation is the successful exploitation of new ideas. It can happen in many ways and in any sector. Sometimes it is the result of the application of brand new knowledge, but more often it is the result of incremental changes, or new combinations of existing ideas

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4 Welsh Government – Science for Wales: A strategic agenda for science and innovation in Wales, March 2012

and experience. It can involve the development of new or improved products, of different or better processes for producing goods or services, or the introduction of entirely new services. And these do not have to be for sale; they might also be the way public services are offered or delivered.

Innovation can also reduce the amount and type of material used in production and address whole-lifecycle issues such as reuse and re-manufacture. These developments often incorporate the principles and concepts of eco-innovation and eco-design.

Eco-innovation targets the reduction in the use of natural resources in a process, whilst eco-design considers the full lifecycle impacts of products, processes and packaging. An eco-design approach may lead to an eco-innovative solution. Both contribute to business resilience and economic growth.

Innovation includes new developments in science and research and development (R&D), but is much wider than this. Recent work by **National Endowment for Science, Technology and the Arts (Nesta)** has shown that 'traditional' R&D, usually accepted as the best measure of innovation, is actually only a small part of the overall process. The exploitation and commercialisation phases of innovation are as important, and are very often the longest and most difficult parts.

Our understanding of how the process of innovation actually works is evolving and this is a theme in *Innovation Wales*.

Manufacturing has been the primary area of support for innovation from the Welsh Government in the past. It will remain one of the largest sectors in the Welsh economy, and continue to be a comparative strength for us in the future. However the growth in private

and public services in Wales suggests that they are likely to be one of the major drivers for job creation in the future. Moreover, manufacturers are changing the way they do business, with companies seeking to increase revenue and add value by linking specialist services to their traditional products.

Therefore innovation in services as well as in manufacturing needs to be a high priority. We need to encourage our service businesses to build innovation into their thinking. There are already strong examples of this, such as the cluster of price comparison website businesses in Wales, but more can be done.

Ideas, which are the start of innovation, are increasingly being sourced from new locations. Large companies increasingly look outside their own structures, to universities and to their supply chains, for new ideas to exploit. 'Open innovation', business-to-business networking and the development of new opportunities close to a company's core business, so-called market adjacencies, are increasingly important. This provides both opportunities and challenges for firms in Wales.

The role of social innovation has not been much recognised in the past. This is the harnessing of the talent and ideas of our people, for society's benefit. It has the potential, for example, to allow people to continue to make useful contributions to society as they live longer. Similarly, the intersection of digital technologies and education could enable new ways of learning<sup>5</sup>.

This demonstrates that we need to think in the widest possible terms about innovation.

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<sup>5</sup> Nesta – Decoding Learning, November 2012



## 1.2 Why do we need to innovate?

Wales needs a step-change in our level of wealth generation; many different things need to coincide for this to happen, not all of which are entirely within our control. However we do know that innovation contributes directly to productivity growth and creates sustainable, high-value jobs and we can choose to take steps to help us become a more innovative region.

Apart from the economic impact, there is also a social dimension to innovation. **The European Commission (EC)** and the **Technology Strategy Board** have pointed to a series of emerging challenges, such as ageing populations and the growing scarcity of natural resources which are faced by virtually all developed societies. It is essential for us to find solutions to these challenges, and not only for the wellbeing of our citizens. These issues also present huge potential future costs for governments and the solutions to these challenges will provide commensurate opportunities for our businesses.

The answers to these problems may well be found where different sectors overlap. For example in healthcare, where ICT looks likely to have an increased impact on personalised medicine, or in energy and the environment where innovative materials engineering may lead to the development of stronger and lighter wind turbine composite blades for renewable energy generation.

Innovation can address these challenges by developing new goods and finding more efficient service delivery. We need to understand where we can play a meaningful part in developing solutions to these challenges, on our own or in collaboration with the best from elsewhere. We must be broad-minded and multi-disciplinary in our thinking.

## 1.3 What path should we take? – Smart specialisation

Wales is a small country; we cannot be good at everything. We need to recognise where our strengths are and exploit them more. This means developing distinct and genuine areas of excellence, and not slavishly imitating the successes of other regions.

The EC has invited each region across Europe to develop a *Research and Innovation Strategy for Smart Specialisation*<sup>6</sup>. This will identify a region's particular strengths and opportunities, and increase the impact of EC interventions, so allowing Europe to compete more effectively with the established and emerging economies of the world.

It seeks to identify and prioritise fields or areas where a cluster of activities could be developed. It is not a planning doctrine that forces a region to specialise in a particular set of industries. It is an approach to policy which considers those activities that are already strong or showing promise within a region and can benefit from more research and innovation.

The Welsh Government has adopted the smart specialisation methodology to develop *Innovation Wales*, which, like *Science for Wales*, will recognise our strengths and define our future research and innovation priorities.

The smart specialisation concept is a relatively new approach to policy development. It recognises previous initiatives to support innovation, but in the future it seeks to be more inclusive in the development of strategy and delivery, involving vital stakeholders in a region such as business and universities.

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<sup>6</sup> European Commission – Research and Innovation Strategies for Smart Specialisation, May 2012

## 1.4 A framework of opportunity

*Innovation Wales* sets out a direction of travel for Wales and its institutions. It is not a detailed delivery plan; instead it identifies priorities for intervention by a range of actors. It builds on existing strategies, recognises the importance of innovation to their successful implementation, and sets a framework for future funding programmes. Previous European programmes have been used effectively in Wales to help build research and innovation capacity in priority areas. Now there is an important window of opportunity as two major new European funding programmes are developed for the period 2014-2020.

The year 2014 will see the launch of *Horizon 2020*<sup>7</sup>. This will give organisations in Wales the opportunity to compete for considerable European funding for R&D. Unlike earlier European R&D programmes the EC has identified innovation and the exploitation of research as an essential strand running through the whole Horizon 2020 programme.

A new round of European structural funding is also due to start in West Wales and the Valleys in 2014. Over time Welsh structural funds programmes have placed an increasing emphasis on research and innovation, with major investments in building capacity and centres of excellence. The principles of smart specialisation will determine an even greater emphasis on research and innovation activity during the 2014-2020 round of Structural Funds.

Wales must identify and exploit synergies between these two funding sources, if we are to leverage the forces of innovation to make that step change

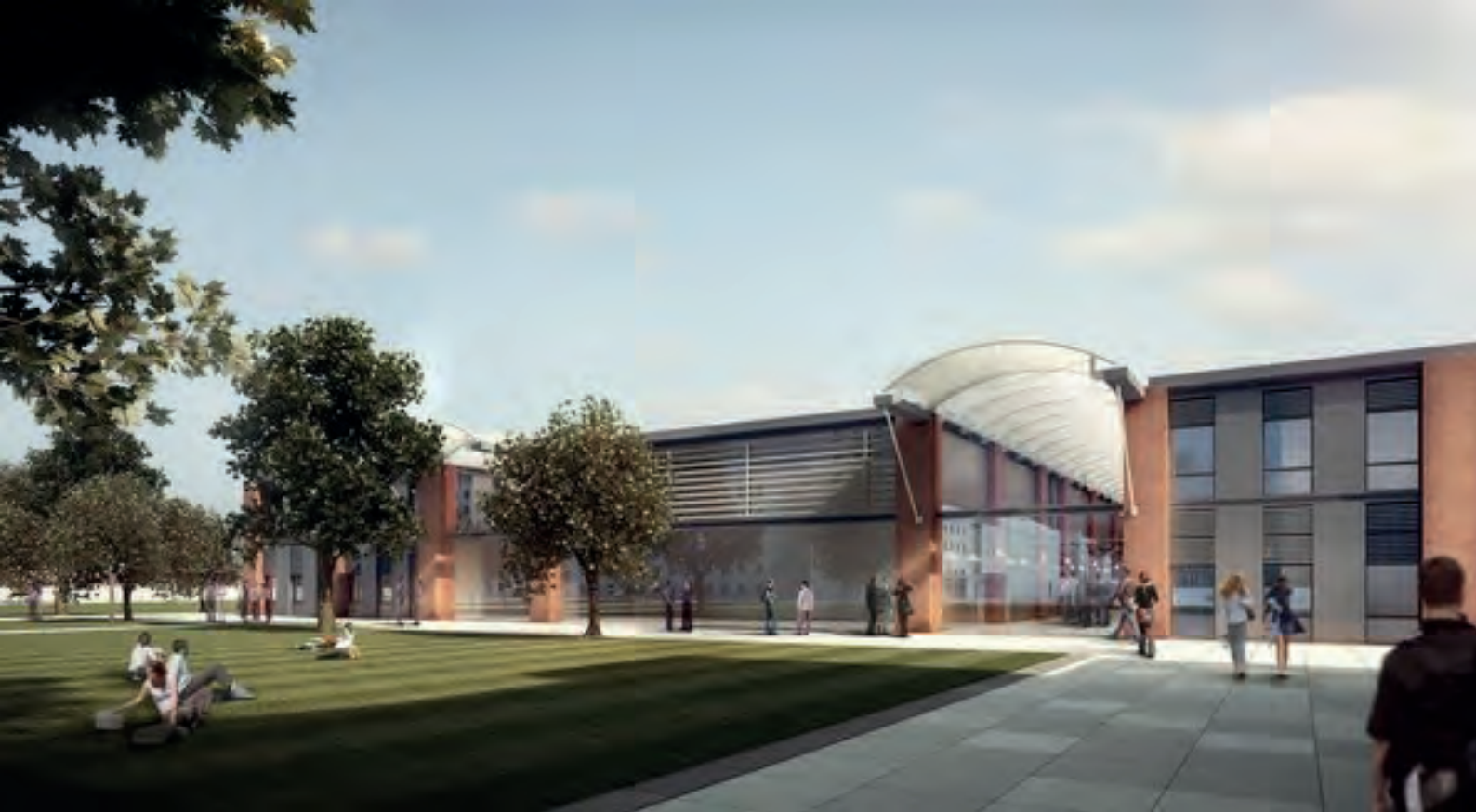
in wealth generation. One obvious and sustainable way to use structural funds is to build the capacity in Wales to compete more successfully for competitive UK and European academic research funding than we have in the past. We need to challenge our best minds in business and academia to develop creative ideas for how this is to be achieved.

These funding opportunities will not always be available. Our successful, long term strategy cannot be based on the immediate prospect of public funding. We need to identify and support our best opportunities in Wales wherever they might emerge.

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<sup>7</sup> <http://wefo.wales.gov.uk/programmes/other/fp7/?lang=en>

## 2. Research and innovation in Wales



### ***Transforming Wales – University Drives Innovation in Industry***

Swansea University's Proposed Bay Campus will incorporate a major engineering complex for Wales including an innovation hub building and an engineering manufacturing centre. It will be an exemplar of how universities can work with industry to enable the development and commercialisation of world leading research driving economic regeneration and creating exciting employment opportunities for its graduates. It is a transformational project involving global companies including Rolls Royce, Tata and BP.

Measures of innovation in Wales give a mixed message. In some respects Wales fares well, in others less so. Traditional measures, such as indicators of R&D activity are particularly troublesome. Whilst *Innovation Wales* sees R&D as only one of several facets of innovation, we should not overlook this aspect of activity.

## 2.1 Innovation

In the 2012 *Global Innovation Index* report<sup>8</sup> the UK was rated 5th out of 141 nations. Wales enjoys many of the same positive underpinning characteristics for innovation, such as a business friendly environment and access to a first class research base, as the rest of the UK. This is a positive foundation on which to build.

Within Wales, our businesses report a relatively high involvement in innovative activities, compared to other parts of the UK<sup>9</sup>. Similarly, the higher education sector performs relatively well on the innovation specific measures in the annual *UK HEBCIS survey*<sup>10</sup>. However, evidence from other studies suggests that some of this innovation may not be particularly groundbreaking. Wales is characterised as an 'innovation follower', the second rank of innovation performance, but, in a finer-grained analysis, our performance is identified as being in the lower spectrum of this

category<sup>11</sup>. It may be that where we are innovating this is largely in terms of incremental changes to existing products and processes rather than developing new market opportunities and added value.

We need a much better understanding of what we do well, and what more we can do. Where gaps have been identified in Wales, they appear to be related to the lack of private finance, and the lack of speed of response from government-backed schemes. In **Finance Wales** we have a valuable asset but more needs to be done to ensure risk and equity finance is available in the responsive way that businesses need it and in ways that adopt a commercial attitude to risk<sup>12</sup>.

Yet, this is unlikely to be the whole story. Although our businesses and universities seem to perform relatively well by UK and world measures, Wales does not appear to enjoy the expected economic benefits. We need to consider the reasons why this is so, and why our policies may not have delivered the outcomes we hoped for. Could our relative lack of corporate head offices or research facilities be part of the answer? It may be that our historical industrial structure means we are under-represented in sectors where R&D and innovation are prevalent. We need to identify where the weaknesses are and modify our existing approaches accordingly.

## 2.2 Research and development

Levels of R&D in Wales are nowhere near as high as we would like, and we do not win a large enough share of available

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8 Insead and the World Intellectual Property Organisation – The Global Innovation Index 2012: Stronger innovation linkages for global growth, 2012

9 Department for Business Innovation and Skills – First Findings from the UK Innovation Survey 2011: Science and innovation analysis, May 2012

10 Higher Education Funding Council for England – Higher Education – Business and Community Interaction Survey 2010 – 11, July 2012

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11 European Commission – Regional Innovation Scoreboard 2012, 2012

12 <http://wales.gov.uk/topics/businessandeconomy/publications/accesstofinance/?lang=en>

competitive funding<sup>13</sup>. We have strengths in our academic base and there are many large global companies with a presence here, but business R&D is particularly low compared to other parts of the UK and well below that of other developed nations.

In the modern, interconnected world, knowledge can be sourced from almost anywhere. The amount of R&D performed in an economy is important because as well as creating new knowledge, R&D generates valuable economic activity in its own right. It provides a base for commercial exploitation, and can help attract skilled workers and businesses into a region.

*Science for Wales* has already proposed ways to increase the level of competitive funding won by Welsh universities by introducing schemes such as **Ser Cymru**<sup>14</sup> and the **National Research Networks**<sup>15</sup>. These initiatives will strengthen Wales' research performance by targeting investment, supporting infrastructure and attracting world-class research talent to Wales. This is intended to foster collaboration between institutions and build critical mass in our academic research effort. This provides an important foundation for *Innovation Wales*.

Research levels in business also need to increase. We should try to attract research-intensive companies to Wales; help those already here to research more and connect with the knowledge base; and support the start up of new,

research active businesses. Our existing researchers should be the starting point for a trajectory of growth, both in university and business, and should reflect the full range of Wales' expertise. Recognising that innovative solutions are likely to be generated where disciplines overlap, our strengths in humanities research and in social sciences could be a valuable asset for government and businesses engaged in service delivery innovation.

Although we have to recognise that there are significant challenges for R&D in Wales, we should at least be optimistic in that we have access to many of the basic ingredients necessary to help us develop a more innovative and successful Wales in the future.

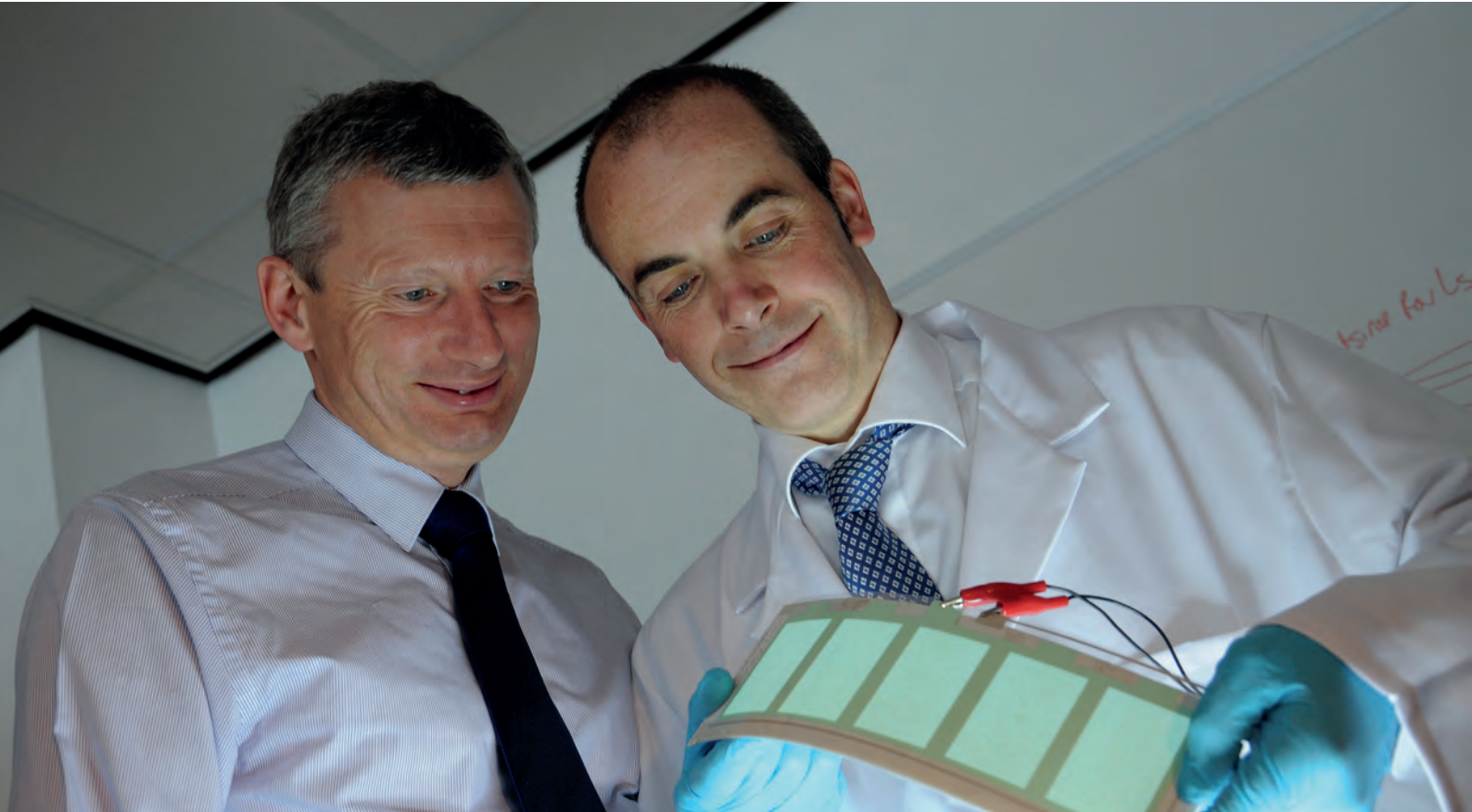
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13 <http://wales.gov.uk/topics/educationandskills/publications/reports/researchreviewplan/?lang=en>

14 Welsh Government – Science for Wales: A strategic agenda for science and innovation in Wales, March 2012

15 Welsh Government – Science for Wales: A strategic agenda for science and innovation in Wales, March 2012

# 3. Foundations for the future



## ***Innovative project is transforming buildings into power stations***

The SPECIFIC Innovation and Knowledge Centre (IKC) is an international collaboration led by Swansea University with Tata Steel and a consortium of global industrial and academic partners. The project aims to commercialise technologies which will allow buildings to become power stations and generate their own energy.

### 3.1 Overriding Principle

In developing *Innovation Wales* we are building on our existing strengths, whilst encouraging the development of new opportunities and future development paths. This has led us to adopt a focused approach leading to a single overriding principle.

The principle is that whilst we need to promote, encourage and enable innovation across the whole economy, our key investments should be made on the basis of clear strategic priorities, built on Wales' strengths.

The first part of this principle is important: By promoting, encouraging and enabling innovation across the whole economy; private and public sectors, services and manufacturing, and working with partners, the Welsh Government can foster a culture and an environment for innovation which is one of the five key themes of *Innovation Wales*. A key imperative here is the ability to bring about the emergence of new combinations of ideas through creating spaces for what has been termed 'entrepreneurial discovery'.

Within this culture, we will prioritise our efforts on the small number of areas where we are truly able to compete and make an impact on a global stage. The Welsh Government will concentrate key investments in a more targeted way than has been done in the past. Too often, Wales has shied away from making tough decisions on funding – spreading the jam too thinly rather than a relentless focus on excellence. We will use the smart specialisation approach to make large-scale interventions which create real critical mass in the areas where Wales already has capability and can see significant opportunities.

### 3.2 Building on strengths and opportunities in Wales

Wales' strengths in the fields of R&D and innovation have been set out in a number of previous policy documents, including *Science for Wales* and *Economic Renewal: a new direction*<sup>16</sup>. We have some internationally renowned industries and some excellent research capability within our universities.

Based on robust data, *Science for Wales* identified a number of areas in which Wales has existing strengths; where strong economic opportunities exist, and where there is potential to combine our assets across a range of industrial and research sectors.

It provided the following four grand challenge areas, where we expect priority investment in innovation capacity to occur:

- Life sciences and health
- Low carbon energy and environment
- Advanced engineering and materials
- ICT and the digital economy

The areas can also furnish the cross-sector, overlapping opportunities which increasingly hold out the promise of creative applications and innovations. They encourage the development of key enabling technologies, such as photonics, and emerging fields, such as cyber-security. We urge our businesses, universities and other actors to look to how strengths in one domain can be combined with strengths in another to give rise to greater opportunities.

*Innovation Wales* builds on these foundations, and will target investments that will build a culture of continuous innovation, adding value to existing

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<sup>16</sup> Welsh Government – Economic Renewal: a New Direction, July 2010

capability within Wales and realise the economic potential which innovation can deliver.

We cannot second-guess the future. Our relative strengths in these areas will inevitably change over time and the body of data demonstrating historic performance in Wales lacks satisfactory detail. Therefore the evidence base for some of these areas will need to be continually updated through independent studies to allow the priority areas to be tested and reassessed over time to take account of emerging technologies.

Some of the opportunities for Wales, and an evaluation of some of our current potential strengths within each of these grand challenge areas are presented here.

### 3.2.1 Life sciences and health

The life sciences and health sector is distinctive in that business growth also delivers big social and economic benefits. For government and for public sector services, this offers a dual benefit.

Demographic changes are creating demand through an increase in the incidence of age- and lifestyle-related conditions like diabetes, dementia and obesity. This drives innovation, the global market is large and growing quickly as people become wealthier, especially in emerging economies with large populations.

Wales has particular strengths in wound healing, e-health, neuroscience, medical devices and some aspects of drug discovery and development. Welsh universities possess key capabilities in these areas. The availability of usable electronic patient data records in Wales is also a clear, differentiated opportunity. We should look to support and exploit these areas of advantage.

The **Institute of Life Science (ILS)** at Swansea University has encouraged the development of a life science cluster of more than 30 affiliate members, comprising companies and individuals, nearly all of whom are involved in research and innovation activity.

Aberystwyth University hosts the **Biotechnology and Biological Sciences Research Council (BBSRC)**<sup>17</sup> – supported **Institute for Biological, Environmental and Rural Sciences (IBERS)**, which, as a recent independent report showed, produces almost £60 million for the economy and supports almost 700 jobs, both directly and indirectly<sup>18</sup>. There are over 300 scientists and support staff in the Institute, the largest collection of expertise of its kind in the UK. IBERS has well-established links with a number of major businesses in such fields as industrial biotechnology and food security.

Collaboration between the NHS, a sleeping giant in Wales social care providers, industry and universities is imperative for innovation in health and social care. **National Institute for Social Care and Health Research (NISCHR)**<sup>19</sup> has developed an **Academic Health Sciences Collaboration** and a new industry policy which will provide the framework to bolster activities in this area.

The NHS in Wales is developing new policy approaches and interventions to encourage innovation in health and social care, including a new **Health Technology & Telehealth Fund** which will support investment in the latest technology delivering advances in healthcare.

<sup>17</sup> <http://www.bbsrc.ac.uk>

<sup>18</sup> <http://www.aber.ac.uk/en/ibers/about-us>

<sup>19</sup> <http://wales.gov.uk/topics/health/nhswales/nischr/?lang=en>



NISCHR is also increasing activities which provide support for innovations in the NHS and social care, such as proof of concept funding, access to UK innovation schemes such as **Invention for Innovation**, and industry engagement with the NHS for clinical trials which will deliver new medicines for patients and also raise present levels of care provision through innovative practices.

### 3.2.2 Low carbon energy and environment

Specifically, there are many opportunities for Wales in the field of energy where priorities in smart living, energy resource-efficiency and large scale electricity generation have been identified. The opportunity to procure social housing to the highest low-carbon standards is just one of many opportunities to commercialise R&D and increase our international resource efficiency and low carbon energy credentials.

Meeting the challenges of climate change mitigation and adaptation including the development of new products which smarten our use of energy, turn our buildings into mini-power stations, enable local energy micro-grids and the use of low-carbon vehicles are areas where Wales can lead.

The **SPECIFIC Innovation and Knowledge Centre**<sup>20</sup> is a collaboration led by Swansea University with Tata Steel and a consortium of industrial partners, drawing funding from the Technology Strategy Board and **Engineering and Physical Sciences Research Council (EPSRC)**<sup>21</sup>, amongst others. It aims to commercialise technologies by which buildings generate their own energy using functional, conductive steel

20 <http://www.specific.eu.com>

21 <http://www.epsrc.ac.uk/Pages/default.aspx>

and glass products on a pilot scale. These are integrated into the fabric of roofs, walls and ceilings of new and existing buildings. It builds on local industrial strengths in the steel industry and academic expertise in coating technologies. In addition, the **Sustainable Building Envelope Centre (SBEC)**<sup>22</sup> is a further collaborative project involving Tata and the **Low Carbon Research Institute (LCRI)**<sup>23</sup>.

In our universities we have many strengths including the multi-disciplinary LCRI and the **Climate Change Consortium for Wales (C3W)** which is just, one of the interdisciplinary institutes supported by **Higher Education Funding Council for Wales (HEFCW)**. Bangor University is home to a part of the Natural Environment Research Council's (NERC) **Centre for Ecology and Hydrology (CEH)** which is the UK's centre of excellence for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere. This is complemented by expertise in water resources and management in Cardiff and Swansea Universities. Marrying these initiatives and other energy related activities further could create a critical mass in Wales of a world class standard.

The **Anglesey Energy Island**<sup>TM24</sup> programme is a collective effort between the public and private sector to put Anglesey at the forefront of energy research development, production and servicing. It represents an opportunity for Wales to develop low carbon energy solutions, partnering with major international businesses such as Hitachi, who are investing in new nuclear generation on the island.

22 <http://www.sbec.eu.com/en>

23 <http://www.lcri.org.uk/>

24 <http://www.anglesey.gov.uk/business/energy-island>

**The Wales Low/Zero Carbon Hub**<sup>25</sup> is working towards the target of all new buildings in Wales achieving a zero carbon standard. The **Building Research Establishment**<sup>26</sup> also have a Welsh base, and Wales can legitimately claim to be leading in areas related to low-energy buildings.

### 3.2.3 Advanced engineering and materials

As competition grows from emerging, low wage economies, opportunities are presented for manufacturing higher value-added products and services. Three new sector specific Enterprise Zones have been established at Deeside, St Athan and Ebbw Vale to add further support manufacturing industry.

Wales has a particularly strong presence in the aerospace and automotive industries, including key anchor<sup>27</sup> companies such as Ford, Toyota, Airbus, GE and BA, as well as process industries giants Tata and Dow Corning and significant numbers of tier one suppliers.

Over 20% of all the UK's aerospace maintenance repair and overhaul activity takes place in Wales<sup>28</sup>. We also have strengths in one of the key enabling technologies identified by the EC, photonics. Companies in this area employ around 5,000 people in Wales, and have an annual turnover of over £1bn<sup>29</sup>. Many key photonics technologies are

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25 <http://wales.gov.uk/sustainabledevelopment/design/zerocarbonhub/>

26 <http://www.bre.co.uk/page.jsp?id=659>

27 <http://wales.gov.uk/topics/businessandconomy/sectors/anchor/?lang=en>

28 [http://www.wales.com/en/content/cms/English/Business/Business\\_Sectors/Advanced\\_Materials/Advanced\\_Materials.aspx](http://www.wales.com/en/content/cms/English/Business/Business_Sectors/Advanced_Materials/Advanced_Materials.aspx)

29 <http://www.wof.org.uk/resource/WOF%20Photonics%20Enabled%20Innovation%20Strategy%20for%20Wales.pdf>

represented, including expertise in the development of speciality semiconductor materials like Gallium Nitride.

The research and technology organisation, TWI, has a Welsh presence and is involved in a number of Framework Programme 7 projects based around their expertise in non-destructive testing of structures and components. There is potential to attract greater activity to Wales based around their specialised facilities and expertise, especially in composite structures.

The **Morgan-Botti Laboratory**<sup>30</sup> in Cardiff University, is one of only two facilities in the UK that can test the effects of lightning strikes on large composite structures such as aeroplane wings or wind turbine blades.

Wales also has particular academic expertise in alternative fuels, including hydrogen, low carbon powertrains, and in finite element modelling. Capability in advanced manufacturing techniques such as additive layer manufacturing is also developing within Wales.

Wales has further strengths in 'eco innovation' and 'eco design' through the **Ecodesign Centre**<sup>31</sup> at Cardiff Metropolitan University, which is active in a number of EC networks and Framework Programme projects. Ecodesign supports businesses save money by reducing waste and becoming more resource-efficient. This results in better designed products using less material, creating minimal waste, and which are easily reused, remanufactured, recycled or recovered.

### 3.2.4 ICT and the digital economy

The public sector in Wales has significant

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30 <http://www.cardiff.ac.uk/news/articles/lightning-research-advances-7430.html>

31 <http://www.edcw.org>

ICT network assets, including the **Public Sector Broadband Aggregation (PSBA) Network**, the Joint Academic Network, **JANET** and the **Fibrespeed** Network which, when considered with the EU-supported **Superfast Cymru**<sup>32</sup> project, form a high quality infrastructure.

The Welsh Government has led on ICT 'Trust & Security' and e-Crime prevention since 2005 and has built up a significant reputation and capability in its work with businesses, law enforcement and academia. South Wales is home to a growing and dynamic 'Trust & Security' cluster of SMEs, academic expertise and global companies such as EADS Cassidian and General Dynamics UK.

Other assets include Welsh Government-supported projects such as the £25M investment in **High Performance Computing Wales (HPCW)**, **EADS Foundation Wales** and other emerging private sector clusters of software businesses.

The Welsh Government has a dedicated team, **Digital Wales**<sup>33</sup>, to help support opportunities, such as the **Digital Powys**<sup>34</sup> project, which includes, among its aims, the provision of more efficient public services with joined-up delivery of health and social care as a potential model for highly rural areas.

Focusing on exploiting the existing investment in the PSBA network and the Superfast Cymru project, Digital Wales works with other sectors, across government, the broader public sector, the third sector and the private sector.

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32 <http://www.superfast-wales.com/home>

33 <http://wales.gov.uk/topics/businessandeconomy/digitalwales/?lang=en>

34 <http://wales.gov.uk/newsroom/healthandsocialcare/2012/121217dp;jsessionid=3A5335C30ABD21B989BB537435B54E9A?lang=en>

## 4. Five key themes for innovation



### ***EDGE UK®: Helping SMEs break through barriers to the defence and security market***

One business that recognises the value of SMEs in the innovation challenge is General Dynamics UK Ltd.

Operating in South Wales, the company has created the EDGE UK, a state of the art environment where SMEs can use facilities, expertise and contacts to help them develop their potential.

Resulting from the consultation process, *Innovation Wales* identifies a number of key themes where Wales needs to improve its performance.

These key themes are:

- Improving collaboration
- Promoting a culture of innovation
- Providing flexible support and finance for innovation
- Innovation in government
- Prioritising and creating critical mass

This section recommends a number of actions to address these themes. To clarify how these might be delivered, we have identified a number of lead organisations together with other essential partners. Often the Welsh Government is identified as one of the prime movers, but in many cases this is only to initiate activity and identify delivery partners. The Welsh Government will only deliver solutions itself when it is in the best position to do so.

## 4.1 Improving Collaboration

### 4.1.1 Collaborating inside and outside of Wales

To be successful Wales needs to help set the agenda with funding bodies from outside of Wales and to play a major role in the wider UK and European innovation system. Our interaction and influence with external bodies such as the Technology Strategy Board and the Research Councils has not always been as effective as it might be. Our success in winning funding in competition with the rest of the UK and other EC regions has been disappointing.

*Science for Wales* highlighted our under-representation in the various research council committees. Our businesses and academics are similarly under-

represented in the various **Knowledge Transfer Networks (KTN)** run by the Technology Strategy Board, which help to influence the content of future funding calls. All parties concerned in Wales need to up our game in this regard. We need to participate in as many groups as possible, especially those concerned with mapping future technology areas.

We will work with Welsh businesses and universities to help them collaborate and engage with the newly established network of **Catapult Centres**<sup>35</sup>. We will also help them take advantage of the other opportunities presented by challenge-led and collaborative R&D competitions run by the Technology Strategy Board.

Understanding and accessing external funding opportunities is difficult for many SMEs. Wales will provide systematic, professional help and brokerage services to enable SMEs to gain critical mass and application expertise. We will also help anchor companies and other non-SMEs to build strategic bids, to increase Wales' success rate with these funds.

We should make better use of the wider UK Innovation 'ecosystem' including higher education institutions outside of Wales and organisations with a UK-wide remit. For example the BSI can make sure the role of standards in new products and process development is properly considered, the **Intellectual Property Office (IPO)** has a major presence in Newport and the specialist R&D facilities at Harwell and Daresbury are only a short distance from our borders and within easy reach of our businesses. We also need to consider how we participate

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<sup>35</sup> [https://www.innovateuk.org/web/corporate1/programme-display-page/-/asset\\_publisher/b61wJfKPbeu8/content/catapult-centres](https://www.innovateuk.org/web/corporate1/programme-display-page/-/asset_publisher/b61wJfKPbeu8/content/catapult-centres)

in the newly established **European Innovation Partnerships**<sup>36</sup>.

The new **National Research Networks** currently being established following recommendations in *Science for Wales* will be a potentially very practical means to build critical mass and present a common voice across academia in Wales. The networks will enable our interests to be more strongly and coherently represented in UK bodies and ensure our priorities are embedded in UK and European funding programmes. We need to find means to ensure the voice of business is also heard.

**Action Area 1: Wales needs to collaborate and engage more productively with external bodies.**

**Actions:**

1.1 Senior representatives from Welsh businesses and academia will be encouraged to work with and influence external bodies to make sure Wales' needs are recognised when setting funding priorities.

1.2 The Welsh Government will explore the potential for joint investments with funding bodies in areas of strategic importance to Wales.

1.3 The Welsh Government will assist organisations to access external funding by maintaining strategic relationships with key funding bodies and promoting and disseminating opportunities within Wales.

1.4 The Welsh Government will bring together parties such as Technology Strategy Board and Research Councils with Welsh companies and universities to develop high quality projects. We will encourage and enable Welsh organisations to form productive relationships with e.g. the new network of Catapult Centres.

Actions by: HE, Business and Welsh Government

Partners: Technology Strategy Board, Research Councils

#### 4.1.2 Knowledge exchange and commercialisation

We must redouble our combined efforts to ensure that knowledge in universities and colleges is used to underpin innovation in business and so increases economic activity. Government, academia and business will work to identify mechanisms to make this happen and overcome barriers to successful exploitation.

Support will be firmly focused on projects which commercialise knowledge, promote collaboration and produce economic or social impact. Existing programmes such as **Academic Excellence for Business (A4B)** will be independently evaluated and modified or discontinued if not fit for purpose.

Future programmes will be market-driven, based on the need and ability of businesses to exploit knowledge. For example many innovation voucher schemes in the UK and Europe operate by offering funding to the academic institution to market its services to local businesses. Wales has adopted a demand-led model where the vouchers are awarded directly to businesses to spend on the expertise they deem most

<sup>36</sup> [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=eip](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=eip)

appropriate, whether from academic or non-academic sources. In future the presumption for new schemes should be that they be demand-led.

The **Knowledge Transfer Partnership (KTP)** scheme managed by the Technology Strategy Board is another good example of collaborative projects based on clearly defined business needs. Wales has a very strong track record in supporting KTP projects, including innovative new approaches such as the shorter KTP projects, the involvement of the FE sector, and pioneering the new **Enhanced KTP**<sup>37</sup>.

This offers the opportunity for the first time to incorporate an international element to the KTP projects we support. Working initially with our anchor companies, this will provide businesses with a mechanism to form links, and undertake R&D projects with their own overseas operations, so enhancing Wales' reputation for high value R&D activities among influential, global businesses. The first projects were approved in 2013.

Working with business and maximising the impact of their activities is a fundamental role for the HE and FE sectors in Wales. Funding streams are emphasising this as a priority. These interactions lead to a two-way exchange of knowledge, beneficial to both partners and contribute towards the new **Research Evaluation Framework (REF)** used by the UK Government to rank academic research performance. Future funding from Welsh Government should be based on a long term commitment from institutions towards impact and commercialisation.

<sup>37</sup> <https://connect.innovateuk.org/web/espkn/articles/-/blogs/welsh-government-funds-enhanced-ktp-projects>

On a macro level, part of the rationale for our city region approach is that by concentrating economic activity we will increase collaboration and knowledge transfer.

**Action Area 2: Knowledge exchange and commercialisation of R&D will be given a high priority in Wales and will favour a demand led approach.**

**Actions:**

2.1 Higher and Further Education institutions will be required to confirm and reinforce the role of knowledge transfer and commercialisation in their core strategies, providing a long term commitment to these activities as a condition of Welsh Government support.

2.2 The effectiveness of current knowledge exchange programmes funded by Welsh Government will be evaluated and changed where necessary.

Actions by: HE, FE, Welsh Government, HEFCW

Partners: Welsh Government

## 4.2 Promoting a culture of innovation

### 4.2.1 Adopt a broad definition of innovation

A strong research base is a common feature of all highly performing, innovative regions. However innovation does not only exist in the fields of science and technology but can be applied to all disciplines and should be recognised as part of every business process. The economic and social value of other forms of innovation such as design, for example, or marketing needs to be more widely identified and celebrated.

In a recent series of reports Nesta have emphasised that the amount of activity in the 'innovation system' is often underestimated. The Welsh Government and other stakeholders need to introduce more flexibility into our understanding of what is innovative. We will recognise and promote the contribution of design and the creative industries to the innovation process.

The Welsh Government will examine the operation of current programmes and ensure they promote innovation in this wider sense. We will also work with outside bodies such as Nesta and the European innovation partnerships to help deliver this commitment.

**Action Area 3:** The value of all types of innovation should be recognised, not only those which are technology led.

**Actions:**

3.1 The Welsh Government will actively encourage people and organisations to bring forward ideas for promoting innovation across the whole economy, establishing links between government, health, universities and industry in prioritised areas and supporting social innovation and e.g. the creative industries.

Action by: Welsh Government

Partners: NHS, Local Authorities, HE, others

#### 4.2.2 Education and skills

There are already many good examples of how enterprise, entrepreneurship and innovation are encouraged through the education system in Wales.

One example of the way education

can be used to promote an innovation culture is the **Innovations Awards Scheme** for students studying Design and Technology at A level and GCSE in Welsh schools and colleges. It is run by the **Welsh Joint Education Committee (WJEC)** with support from both the IPO and Welsh Government.

The scheme encourages young people to be technologically innovative and to appreciate the importance of design and technology. Whilst the actual competition is important, the aim of the event is to develop teachers' and students' understanding and competence in the field of design, technology and innovation.

Another good example of the promotion of entrepreneurship in Wales is the **Alacrity Foundation UK**<sup>38</sup>. Alacrity provides an intensive training environment with mentors and industry partners to prepare graduates for entrepreneurship in the technology sector. It is a registered charity founded by Sir Terry Matthews based on a proven methodology first demonstrated in Canada.

There are also a number of UK initiatives such as **STEMNET**<sup>39</sup> and others supported by the **National Science Academy**<sup>40</sup> promoting the uptake of science and technology to young people and others.

The education system needs to give priority to the future employment prospects of students and include an appreciation of commercial matters in the curriculum. For example, skills likely to be vital to all, such as the ability to pitch and present ideas, should be practised. Business also has a key

38 <http://alacrityfoundation.co.uk>

39 <http://www.stemnet.org.uk/regions/1527>

40 <http://wales.gov.uk/topics/businessandconomy/csaw/nsa/?lang=en>



role here to work with HE and FE to communicate their future needs and providing placement opportunities.

The natural enthusiasm and appetite for innovation, present in many Welsh companies, needs to be formalised into a greater ambition for adopting high performance working practices. Total innovation can only happen when investment is made in both corporate leadership and management skills as well as R&D<sup>41</sup>. Because innovation is a process, not an end, these skills need to be renewed through continuing professional development, if workers are to exploit next generation discoveries and innovations.

**Action Area 4:** Innovation, entrepreneurship and enterprise should be given a prominent position in the curriculum and should feature strongly in the education of young people from an early stage.

**Actions:**

4.1 We will continue to work with all educational institutions to identify ways of building innovation and entrepreneurship into their delivery of curricula for all ages.

4.2 We will encourage Welsh organisations to adopt high performance working practices.

Action by: FE, HE, Schools, Business, HEFCW

Partners: Welsh Government, Local Authorities

### 4.2.3 Post graduate training

Wales has a good track record of finding innovative means of using Structural

<sup>41</sup> Wales Employment and Skills Board – High Performance Working, July 2011

Funds to support post graduate higher level training and research. Projects such as **Steel Training Research Innovation Partnership (STRIP)** and **Knowledge Economy Skills Scholarships (KESS)** were highlighted positively in the Call for Evidence. The proposed Doctoral Training Schools linked to the National Research Networks will also support significant numbers of PhD students in areas linked to the grand challenge areas.

The KTP scheme, discussed earlier, is also strong in Wales.

Such projects provide a means to maintain support for post graduate education in Wales when it appears likely that financial pressures on UK providers may put strains on funding in the future.

**Action Area 5:** Wales must look to use all means to ensure that post graduate training continues to be supported in the key strategic areas.

**Actions:**

5.1 Wales will build on successful post graduate support programmes supported in the last round of structural funding, particularly schemes that encourage collaboration with business and operate in the 'grand challenge' areas.

Action by: HE, Business, HEFCW

Partners: Welsh Government, Research Councils

### 4.2.4 Promotion and celebration of innovation

To strengthen and diversify our economy it is important to promote Wales as an attractive place to locate and grow innovative businesses. Our international marketing and publicity should

emphasise this. We should also promote events and initiatives which reinforce this image of Wales as a country that recognises and values innovation, and showcase Welsh achievements and good practice.

There are already a number of organisations in Wales running events, competitions and lists recognising achievements in innovation. The Welsh Government will work with these bodies, wherever appropriate, to support these initiatives.

There is a growing interest in the use of 'Challenge Prizes' to stimulate innovation and bring forward ideas, but the concept is far from new. One of the most famous examples was the reward offered by the British Government in 1714 for a simple and practical method for the precise determination of a ship's longitude. Challenge Prizes can create an open market for the solution of defined problems without presuming any given methodology<sup>42</sup>.

Recent UK challenge competitions have included prizes for innovations which reduce social isolation, and one for cheaper, more portable and efficient renewable energy technology for displaced people. In a deeper sense, competition and the profit motive are as essential to innovation as collaboration is.

The Welsh Government will introduce a headline Challenge Prize. We will work with organisations within Wales to identify a major issue which also presents an opportunity to develop an innovative solution. Of potentially significant intrinsic value in itself, the process will also help portray Wales as a dynamic and innovative country.

<sup>42</sup> [http://www.nesta.org.uk/areas\\_of\\_work/challengeprizes](http://www.nesta.org.uk/areas_of_work/challengeprizes)

The Welsh Government will use novel approaches such as crowd sourcing to identify solutions to challenges and ensure that innovative companies are encouraged to come and stay in Wales.

**Action Area 6:** Wales must present itself to the world as an attractive place to locate and grow innovative businesses and to attract mobile research and innovation projects.

**Actions:**

6.1 The Welsh Government will introduce a headline challenge prize competition on a strategic issue and opportunity for Wales.

6.2 Events showcasing and highlighting innovation success in Wales will be encouraged.

Action by: Business Support Organisations, Welsh Government

Partners: Business, HE, FE

## 4.3 Providing flexible support and finance for innovation

### 4.3.1 Finance

Private sector finance is critically important in driving innovation and delivering growth. We recognise sources of risk finance are problematic and that the demands of risk capital providers can be difficult for early stage businesses to meet. We will seek ways to remove the barriers to private sector financing in Wales and we will help our businesses develop their investment readiness.

There is also a role for the public sector to bridge gaps in financial availability. The provision of financial products and the delivery model for innovation-related funding must become more user-friendly, less bureaucratic, less restrictive and, most of all, more risk-aware rather

than risk-averse. For example the **Life Sciences Investment Fund** has now started to make investments. This fund is managed on a commercial basis by a very experienced team of investment professionals and sector experts will invest in life sciences companies within Wales.

Funding mechanisms need to be faster and more agile. Most importantly, they need to take a commercially informed approach to risk – only by an acceptance of the possibility of a certain number of failures can investments in innovative projects deliver some successes.

With Wales' small size, the availability of prioritised funding and our ability to act independently in given areas as a result of newly devolved status, all present opportunities for Wales to respond quickly to developing opportunities.

Finance Wales continues to address the need for 'fit for purpose' funds to support the best fast growth, Intellectual Property (IP) rich, technology businesses in Wales. In the four year period up until 2013 their dedicated technology Ventures team has invested £21m of JEREMIE funded risk capital in 30 early stage businesses. A number of their leading portfolio companies include businesses that have relocated to Wales to take advantage of favourable 'venture' infrastructure that has developed in recent years. A number of Finance Wales portfolio companies have benefited from external co-investment from private and institutional, sector-focussed investors.

Subject to successful fundraising in the future, Finance Wales will continue to drive technology venture investments across Wales.

**Action Area 7:** We will work to develop financing products to bridge the gap between research and the deployment of new products and ideas.

**Actions:**

7.1 The Welsh Government will work with external partners such as Finance Wales and venture capital organisations to develop the sources of finance available to Welsh businesses and infrastructure developments, and the investor readiness of companies to attract this funding.

Action by: Finance Wales, Welsh Government

Partners: Private sector business support sector, accountants, legal sector

#### 4.3.2 Welsh R&D funding for business

There is a need to increase the levels of research and innovation within businesses in Wales. We need to attract businesses active in research to Wales, help the ones here to research more and to link with the knowledge base, and we need to support the start up of new research intensive businesses.

There are many sources of funding from outside Wales which support business R&D and we will encourage our businesses to compete vigorously for these. However many of these are not always suitable for smaller businesses or those who do not wish at this stage to enter in complicated collaborative arrangements.

Also, these sources of funding are often specific in their scope of activities or are released on a periodic 'call and compete'

basis. This means that businesses have to wait for a suitable call to open before they can bid for support, which often does not meet their need to act quickly.

Locally available more flexible forms of R&D funding support can help smaller Welsh businesses take their first steps into formal R&D but can also assist much larger multi-national companies to attract mobile R&D projects into Wales.

**Action Area 8:** Local sources of R&D funding support in Wales are necessary to complement UK-wide schemes and be ready to respond rapidly and flexibly to meet the requirements of business.

**Actions:**

8.1 The Welsh Government will provide a wide range of interventions designed to increase levels of R&D within businesses located in Wales. This will involve support for all aspects of the Innovation and R&D process.

Action by: Welsh Government, Business

Partners: HE, FE

### 4.3.3 Innovation support and delivery

The call for evidence revealed a level of confusion about the innovation support that is already available in Wales and over the respective roles of Welsh, UK and European bodies.

It appears that much of this confusion has been caused by a proliferation of programmes with similar aims. Care must be taken in the future to avoid duplication and integrate activities in a more targeted way.

We will direct our support towards the most important parts of the innovation process, being proactive rather than reactive, and stimulating demand for innovation activity, especially by underpinning design, research and commercial exploitation. We should target support into priority areas which produce the greatest impact, doing fewer things more strategically and at scale.

Mentors and other forms of expert advice are needed in the areas of finance, start-ups, IP, patents, and legal advice, but also to indicate how companies can work together for their mutual benefit, reducing risks and prospering from the exploitation.

The Welsh Government will work with business to spread knowledge and experience across the SME community. This will also increase awareness of funding streams and provide practical assistance to companies in drawing down these funds. Any approach will be based on making best use of existing support rather than reinventing it.

Effective networks are a powerful way of engaging business with the knowledge base, stimulating interaction and the cross-fertilisation of ideas. We need to find ways to bring people together and facilitate the 'coffee shop' effect. One example is the Life Sciences 'hub', which will act as a focus for the sector, providing a platform for access to private and public funding, and collaboration across academic, business and clinical sectors.

This hub concept is one which could potentially be replicated within different priority areas. The hubs will create a supportive habitat for innovation and also benefit from similar sectors in close proximity. It could also create

the backdrop for partnership projects between global leaders and local networks of businesses which set up in Wales.

These developments should be less about property and more about IP. Iconic buildings have their place, can be greatly beneficial to an area's image and perception and can also be a spur to wider regeneration. But the success of future projects should be based soundly on business development objectives.

**Action Area 9: Support for research and innovation needs to be delivered in a clear, flexible and business friendly manner.**

**Actions:**

9.1 The Welsh Government will work with external partners in the private and third sectors to deliver new innovation activities in a flexible and fast acting manner through means such as the proposed Life Sciences Hub.

Action by: Welsh Government

Partners: Business, Third Sector, HE, LA

#### 4.3.4 Intellectual property

In supporting the adoption of intellectual property (IP), one size does not fit all. The requirements of the different sectors of the economy vary widely when it comes to the importance of IP. Large companies handle IP commercialisation very differently from the typical SME.

The marketplace for IP does not seem to function at an optimum level in Wales, with knowledge holders and knowledge exploiters often arriving at very different valuations of the same IP. Steps should

be taken to evaluate and improve our approach. A proactive, value-add approach to IP is required. Value can be non-commercial such as to patients in the NHS and social care, or commercial, for example to business growth and jobs. It is important that realistic values are put on publically funded IP and that IP does not develop into a barrier that prevents collaboration.

Wales has an important asset in the IPO<sup>43</sup> which is based in Newport. There are clear opportunities to increase the understanding and knowledge of IP issues by organisations in Wales by, for example, using staff secondments or making greater use of the expertise and advice available at the IPO.

**Action Area 10: Universities and the NHS should identify the most appropriate ownership vehicles for the IP that they generate, with a view to maximising the economic and social impact of their investments.**

**Actions:**

10.1 The Welsh Government will continue to support the current reviews of IP commercialisation strategies in HE and the NHS, supporting the outcomes as appropriate.

10.2 Organisations in Wales should ensure full use is made of the expertise and advice available from the IPO.

Action by: HEFCW, HE, NHS

Partners: IPO, Welsh Government

43 <http://www.ipso.gov.uk>

### 4.3.5 Open innovation

The culture of open innovation has gained widespread interest. It is based on the realisation by large companies that they cannot find the solutions to all of their problems in-house and that there might be relevant ideas in other businesses or universities. Similarly, there may be ideas they have developed themselves but do not wish to progress that may have value to others.

Networks that allow potential collaborators to come into contact with each other and develop new ideas is essential to the creation of this culture.

Open innovation benefits larger companies but creates significant opportunities for SMEs to work with those larger companies and find new routes to market. There are already successful examples within Wales run by some of our anchor companies, such as EADS and General Dynamics. We will continue to support these initiatives but will also pilot other business-to-business models.

**Action Area 11:** Wales should seek to develop a culture of open innovation.

#### **Actions:**

11.1 The Welsh Government will ask our anchor businesses to bring forward ideas to encourage collaboration with other businesses and universities, and develop a culture of open innovation within Wales.

Action by: Business, Welsh Government, HE

Partners: Business support organisations, SMEs

## 4.4 Innovation in government

### 4.4.1 Procurement

The public sector has the potential to play a significant role in encouraging innovation through the targeted use of procurement. Studies in the USA have shown that government funded defence spending has a major effect on the development of innovative businesses. The public sector should not be prescriptive; schemes such as the **Small Business Research Initiative (SBRI)**<sup>44</sup> have been successful by identifying an issue or challenge and inviting new approaches and innovative solutions from individuals and businesses.

As with open innovation, SBRI represents a huge opportunity for smaller businesses to innovate. Even micro businesses have the opportunity, if they have the right ideas, to compete with global companies.

Whilst the Welsh public sector looks for more opportunities to use SBRI mechanisms for procurement, we should also ensure Welsh businesses are fully able to exploit the resulting opportunities, as well as those arising from SBRI competitions in other parts of the UK.

The whole of the public sector in Wales should look to allow the market to provide solutions and innovation by procurement practices through outcome-based specifications.

Taking a lead from the **Wales Procurement Policy Statement**, the Welsh Government, and its procurement arm **Value Wales**, will work with the public sector to improve supplier engagement. Our **Business Wales**

<sup>44</sup> [https://www.innovateuk.org/web/corporate1/programme-display-page/-/asset\\_publisher/b61wJfKPbeu8/content/sbri](https://www.innovateuk.org/web/corporate1/programme-display-page/-/asset_publisher/b61wJfKPbeu8/content/sbri)

operation will support the supply-side in promoting these proposals, identifying opportunities for businesses to introduce innovative solutions.

**Action Area 12:** The public sector in Wales should be encouraged to support innovative methods of procurement.

**Actions:**

12.1 The Welsh Government will collaborate with the Technology Strategy Board, work to identify and support opportunities within Wales to facilitate SBRI competitions.

12.2 Value Wales will raise Welsh public sector awareness of the scope to use innovative procurement to improve outcomes.

Action by: Welsh Public Sector

Partners: Technology Strategy Board, Business, particularly SMEs

#### 4.4.2 Partnership Approach

The public sector including local authorities, the NHS, the Welsh Government and universities need to work together to encourage innovation. We believe that there is great untapped potential for innovation in public service delivery and that Wales can act as a test bed for innovative public services. Work is already underway in this area in, for example **Wales Public Services 2025**<sup>45</sup>, which includes input from Nesta and Cardiff Business School.

Wales' sustainable development organising principle, supervised by a sustainable development commissioner, should provide opportunities for innovation to accelerate the eco-

innovation agenda. The ambitions set out in *Energy Wales: A Low Carbon Transition*<sup>46</sup> are heavily dependent on successful exploitation and investment in research and innovation.

The health and social care sectors have long been recognised as a significant catalyst in Wales's innovation system. Now, there is increased emphasis on more accurate diagnosis, earlier detection and more targeted treatments, and on reducing the cost of care, including by providing much more care in the community.

We believe that there is great untapped potential for innovation in public service delivery, and that Wales can act as a test bed for innovative public services. Work is already ongoing in this area, via the Welsh Government's **Public Service Leadership Group (PSLG)**. Together the PSLG and the Partnership Council for Wales provide national leadership for public service reform and collaboration, and drive the pace of improvement in the development and delivery of public services within Wales.

The work of the Group focuses around four national work programmes, each led by a senior public service leader to help drive forward this agenda:

- **Asset management**  
This aims to make more effective and efficient use of the multi-billion pound public service estate.
- **Procurement**  
This aims to transform the way public services procure and commission its goods and services. This spend is currently worth £4.3 billion per annum.

<sup>45</sup> <http://www.walespublicservices2025.org.uk/about-us>

<sup>46</sup> Welsh Government – Energy Wales: A low carbon transition, March 2012

- **Organisational development and simpson implementation**

This is taking forward the recommendations from the Simpson Review and developing approaches to support change and broader organisational development across the Welsh public service.

- **Effective services for vulnerable groups**

This is promoting the mainstreaming of successful innovation and good practice to make a much greater impact and encourage further innovation, particularly in joining up services around vulnerable people and groups, especially those with complex needs. The programme also explores ways in which people can help to design and deliver services and shift interventions from cure to prevention.

The PSLG encourages innovative collaboration rather than competition to deliver effective and efficient public services in Wales. The work of the PSLG will help to stimulate an innovative culture within the public sector, recognising the value of all types of innovation and adopting best practice. The effective services for vulnerable group's national programme, for example, is supported by a KTP as part of its work for promoting independent living and wellbeing for older people. Under its national procurement programme, the PSLG will help identify opportunities to use established mechanisms such as the SBRI.

**Action Area 13:** Public sector organisations in Wales should trial innovative solutions in areas such as health, digital education, transport etc., where Wales is of a suitable scale to act as a pilot to demonstrate new ideas.

**Actions:**

13.1 Welsh Government will work with other parts of the public sector, businesses, the third sector and other funding bodies to identify practical opportunities to trial new ideas with commercial potential for Wales.

Action by: Welsh Public Sector, Business

Partners: HE, Technology Strategy Board, Nesta

## 4.5 Prioritising and creating critical mass

So, the public sector can play a role in helping to stimulate innovation by better procurement, education curricula, availability of risk finance, and so on.

It can also make large strategic interventions in capacity building.

Specialisation and a focus on Wales' strengths and existing assets are essential. The financial sustainability of these centres and the level of long term commitment from those involved should be a prime consideration for support.

Wales needs to develop a UK and global reputation by building on those areas of research and innovation facilities that are genuinely world-class, and target resources at them. This will inform decisions as available funding becomes more limited. Together with our universities and the supplier base, we should develop a compelling 'offer'



which will be undeniable to the large multi-national enterprises and specialist players alike, in these chosen fields.

Wales will make targeted, prioritised investments in research capability, facilities and people based on the criteria set out in *Science for Wales*. It will build on the strengths highlighted in section 3.2 of this document. This will allow Welsh researchers the ability to compete more successfully in the future for a range of competitive and commercial R&D funding and increase the attractiveness of Wales for inward investment from research intensive and innovative companies.

The proposed **Swansea Bay Campus**<sup>47</sup>, which builds on the university's existing research strengths and relationships with major companies, is one example of such a project.

All future innovation support of significant scale will be conditional on an evidence-based rationale, tested wherever appropriate by expert peer review.

The Welsh Government cannot specify now those projects it will support and those it will not in the rapidly transforming sectors described in Section 3. But we can lay down the criteria that will guide us in the future.

Any activity qualifying for prioritised investment should:

- Be based on existing or emerging capability in business and/or academia that is competitive on an international stage and is capable of attracting investment from bodies outside of Wales.
- Address major emerging market opportunities e.g. those emerging

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47 <http://www.swan.ac.uk/campus-development/science-and-innovation-campus>

from the series of major societal challenges identified by the EC.

- Possesses full commitment from delivery partners to support activities after initial establishment funding is exhausted i.e. have a plan for financial sustainability that would ultimately satisfy commercial criteria for investment.

There may be a greater number of smaller, worthwhile projects which do not yet meet all of the criteria above but in which capability can be developed. We should ensure we have a fast-acting means of support for these worthwhile projects to enable early pilot and demonstration work to be started quickly and build the case for more significant investment while capability is developed.

There may also be opportunities within Wales to work with the Technology Strategy Board to utilise the **Launchpad**<sup>48</sup> approach, for example. First used to support a cluster of hi-tech digital companies in Shoreditch in East London, Launchpads provide funding for business innovation that aims to support the development and strengthening of clusters of high-tech companies in specific theme areas and geographical locations. Opportunities in Wales exist through existing clusters in the areas of medical technologies, photonics, cyber security etc.

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48 <http://www.innovateuk.org/deliveringinnovation/launchpad.ashx>

**Action Area 14:** Wales needs to identify opportunities for a small number of major investments designed to have a transformational effect of Wales' research and innovation capabilities.

**Actions:**

14.1 We will support our universities and businesses to develop a small number of centres of excellence, in areas of well evidenced comparative strength and market opportunity, with an explicit remit to exploit and commercialise knowledge and create wealth.

14.2 The Welsh Government will work with the Technology Strategy Board to identify opportunities to support cluster development activities e.g. through a Launchpad competition in Wales.

Action by: HE, Business

Partners: Welsh Government

# 5. Appendices



## ***Innovative Procurement Provides Win-Win Opportunities***

A collaboration between Welsh Government, Technology Strategy Board and Ordnance Survey, the Wales Coast Path Geovation Challenge is an example of how innovative procurement practices are extending opportunities for small and medium-sized businesses, as well as enabling the public sector to tap into this highly innovative resource.

## Appendix 1 – Glossary of Acronyms

A4B	Academia for Business
ATM	Access to Masters
BBSRC	Biotechnology and Biological Sciences Research Council
BRE	Buildings Research Establishment
BSI	British Standards Institution
CEH	Centre for Ecology and Hydrology
EC	European Commission
EIP	European Innovation Partnerships
EPSRC	Engineering and Physical Sciences Research Council
ESRC	Economic and Social Research Centre
HEBCIS	Higher Education Business, Community and Innovation Survey
HEFCW	Higher Education Funding Council for Wales
HPCW	High Performance Computing Wales
IBERS	Institute for Biological Environmental and Rural Sciences
ILS	Institute of Life Sciences
IPO	Intellectual Property Office
KESS	Knowledge Economy Skills Scholarships
KTN	Knowledge Transfer Networks
KTP	Knowledge Transfer Partnerships
LCRI	Low Carbon Research Institute
MRO	Maintenance, Repair and Overhaul
NERC	Natural Environment Research Council
Nesta	National Endowment for Science, Technology and the Arts
NISCHR	National Institute for Social Care and Health Research
NSA	National Science Academy
REF	Research Evaluation Framework
SBEC	Sustainable Building Envelope Centre
SBRI	Small Business Research Initiative
SPECIFIC	Sustainable Product Engineering Centre for Innovative Functional Industrial Coatings
STRIP	Steel Training Research Innovation Partnership
WEFO	Wales European Funding Office
WJEC	Welsh Joint Education Committee

## Appendix 2 – Task and Finish Group

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Cardiff University (Chair)

Dr Adrian Healy –  
Cardiff University (Chair)

Professor Robin Williams –  
HEFCW Council

Professor Simon Bradley –  
EADS

Dr Roy Bichan –  
North Wales Economic Forum

Ron Jones –  
Creative Industries Sector Panel, Tinopolis

Professor Colin Whitehouse –  
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Dr Grahame Guilford –  
Life Sciences Sector Panel

Frank Holmes –  
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Nesta

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case studies, please visit  
[http://wales.gov.uk/topics/  
businessandconomy/publications/  
innovation/?lang=en](http://wales.gov.uk/topics/businessandconomy/publications/innovation/?lang=en)