

HEART OF THE SOUTH WEST

Local Enterprise Partnership

Heart of the SW Smart Specialisation Approach

Final Report 3rd July 2014



Contents

Contents.....	2
Introduction	3
Initial Assessment	6
In Depth Review.....	8
Conclusions and Recommendations.....	9
Appendix 1: AEA Summary Profiles	15
Appendix 2: In Depth Review – Detailed sector/technology profiles.....	22
Smart Specialisation – Aerospace.....	23
Smart Specialisation – Agricultural Sciences	32
Smart Specialisation –Environmental Sciences	40
Smart Specialisation – Health and Social Care.....	45
Smart Specialisation – ICT/Big Data.....	53
Smart Specialisation – Marine	58
Smart Specialisation – Nuclear	66
Smart Specialisation – Photonics	75

Introduction

The purpose of this document is to set out our approach to ‘Smart Specialisation’ in the Heart of the SW, within the context of the EUSIF and potentially other delivery routes.

Smart Specialisation in the Heart of the SW Context

Our EUSIF (31st January 2014) committed £20.5m to innovation related activity. The majority of which (£19.5m) from ERDF and £1m from EAFRD (which can only fund knowledge transfer/dissemination activity). Of this ERDF allocation, £2m was allocated to ‘sector blind’ innovation (i.e. supporting SMEs from any sector to develop new products, processes and services). The remainder, £17.5m, was allocated to supporting innovation through Smart Specialisation. This was split £11m for the transition area and £6.5m for the ‘more developed area’. Full details of our wider EUSIF proposals and allocations can be found with the Heart of the SW EUSIF strategy on our website. This document, therefore, **sets out those parts of the economy in which we wish to prioritise Smart Specialisation investment.**

The focus, is therefore on targeting, a relatively modest innovation focused investment. Those sectors not selected for inclusion **will not be precluded from accessing the sector blind approach** to innovation or the wider EUSIF investments (approx. £100m). However, the needs of our Smart Specialisation sectors will be a consideration in the development of other EUSIF activities (such as in relation to higher level skills needs).

It is also our ambition to align other sources of funding to complement and add value to our EUSIF notional allocation. For instance, our 15/16

Growth Deal included a number of projects that align with our Smart Specialisation priorities.

What is Smart Specialisation?

Smart specialisation has been described as:

"a process of developing a vision, identifying competitive advantage, setting strategic priorities and making use of smart policies to maximise the knowledge-based development potential of any region, strong or weak, high-tech or low-tech".

It has arisen out of recognition of the central role of innovation in sub-national growth and EU cohesion policy. Innovation has accounted for increasing proportions of cohesion spend, rising to 25% in the current 2007-13 period. However, the European Commission (EC) has been criticised in the past for cohesion-funded innovation interventions for being too linear, poorly-aligned with wider EU and national programmes, too supply-side focused and divorced from market demand – which has led to **'copycat strategies'** often on an implicit 'closed region' model.

In response to such criticisms the EC has promoted smart specialisation as a key underlying principle for EU SIF – including the need to focus on **fewer priorities and better coordination of place-based policies** across the EC. As a result, the EC has established an ‘S3 platform’ based in Seville to support regions and member states to develop smart specialisation strategies. In this context local and regional smart specialisation strategy entails:

- A process of ‘entrepreneurial discovery’ to discover regional strengths with potential for experimentation, innovation and growth;
- The seeding of intellectual capital;

- Strengthening of local innovation ‘ecosystem(s)’ and building local capabilities to enable and support this process;
- Stimulating local supply chains to invest and collaborate;
- Catalysing and leveraging the differing opportunities of social innovation; and
- Positioning and branding places as credible centres of smart specialisation opportunities to target private and public sector audiences.

Fundamentally, smart specialisation calls for ***evidence-based identification of competitive advantages around which inputs of regional stakeholders and resources can be concentrated***. On top of this, it asks for measures to strengthen regional innovation systems in order to maximise knowledge flows and spread the benefits of innovation throughout the entire regional economy.

The Process of Entrepreneurial Discovery in the Heart of the SW

The Heart of the SW LEP has undertaken work to support Smart Specialisation priorities over a long time-frame. The LEP funding group initiated work which explored the potential for Smart Specialisation of a number of ‘Areas of Economic Activity’ in the development of its EU funding prospectus in Spring 2013. These were broadly accepted in the development of the draft EUSIF, but it was proposed that further work be commissioned to finalise and prioritise these AEAs.

Further work was commissioned between November 2013 and January 2014 to explore further these Emerging AEAs and produce a SWOT analysis for each. This work highlighted the need for further engagement with local stakeholders and the need to set up an innovation leadership group.

In concluding this work, a Smart Specialisation working group was established to take forward the process of entrepreneurial discovery and refine and agree an approach.

The working group includes representatives from the four upper tier authorities, higher education institutions and the Academic Health Sciences Network. In taking forward the task, the working group have engaged widely with the business community, business networks, higher education institutions and other relevant stakeholders.

The working group were tasked with:

- Agreeing ‘Areas of Economic Activity’ for further investigation;
- Collating and filling gaps in the evidence base for each of the Areas of Economic Activity;
- Engaging with relevant local businesses and stakeholder organisations to validate the evidence base and identify potential interventions; and
- Agree an approach or options for taking forward Smart Specialisation.

Approach

The working group have adopted a phased approach to this task as follows:

Phase 1: Initial Assessment – Conducting a high level review of all sectors in the Heart of the SW to identify those that have good alignment with the Smart Specialisation concept and which warrant further investigation.

Phase 2: In-depth review – For those Areas of Economic Activity identified for further investigation, members of the group undertook a process of:

- Desk-based review
- Engagement with businesses and stakeholders

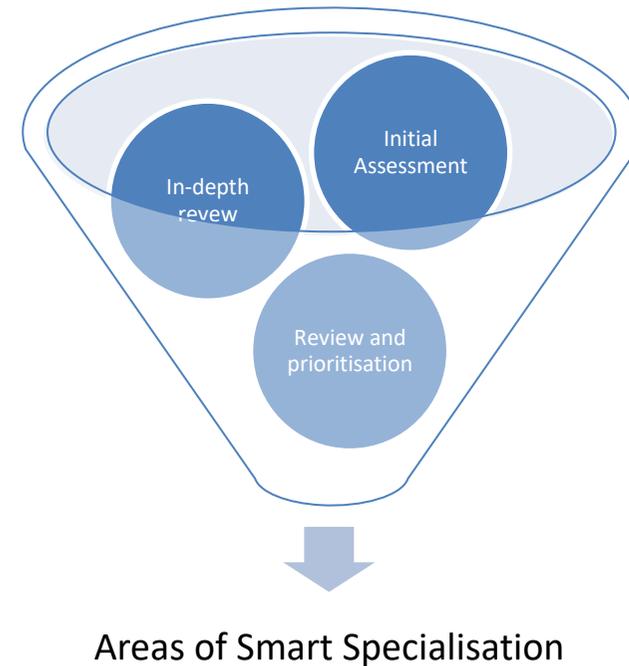
To populate an agreed evidence template.

Phase 3: Review and Prioritisation – Having conducted the in-depth review, the working group then met twice to discuss relative priorities for EUSIF innovation investment.

Phase 4: LEP Governance – The Business Leadership group were asked to review and endorse the agreed prioritisation.

The Heart of the SW is adopting a proportionate approach to this task and as such does not think that the work required to produce a strategy for ‘peer review’ through the S3 Platform can be justified.

Figure 1: Approach



Initial Assessment

Whilst much work has been done over the last year to explore the potential of a number of AEA's, it was agreed that the LEP needed to provide a more transparent rationale for their selection as well as ensuring that other potential opportunities were not being missed. We therefore conducted a high level review of the LEP's broad industrial sectors against a number of qualitative and quantitative criteria.

These are:

1. **Current Strength** - Does the sector currently show an existing comparative advantage in our area
2. **GVA/FTE** – Does the sector have the potential to improve productivity?
3. **Distinctive Assets** – Qualitative assessment – Does the Heart of the SW have distinctive assets relating to this sector (e.g. natural assets, unique/global businesses, unique facilities etc.)
4. **Local Strategies** - Does the sector feature in local strategies/plans
5. **Industrial Strategy** - Does the sector feature in the Government's Industrial Strategy as one of the 11 sectors or 8 great technologies?
6. **Research Capability** - Does the Heart of the SW have distinctive/world class research capabilities relating to this

opportunity (e.g. HE research units, other research organisations)?

Table 1 overleaf shows the results of this initial profiling exercise. A short profile of each of these sectors is included in Appendix 1.

Initial Assessment – Discussion

The initial assessment exercise was a high level, but evidence based review of the main sectors in the Heart of the SW economy. The aim of the exercise was to reveal those sectors, where there may be scope for the **adoption of a Smart Specialisation approach to innovation investment**. Sectors highlighted with strong potential at this stage, are then subject to a more detailed investigation, through the in-depth review.

The initial review identified the following areas for further investigation:

- Advanced Engineering - in particular **Aerospace, New Nuclear, Marine** and **Photonics**;
- **Agri-food/land based**;
- The **environmental sector**, in particular **environmental futures** and the **marine environment**;
- **Health and Social care**; and
- **ICT**, with an emphasis on the **Big Data** opportunity.

Table 1: Initial Review Results

	Current Strength	GVA/FTE	Distinctive assets	Local Strategies	National Strategy	Research Capability	Score	Potential	Areas of explore
Advanced Engineering/ manufacturing	3	3	2	3	2	2	15	Strong	Aerospace, nuclear, marine and photonics
Aerospace	3	3	3	2	3	2	16	Strong	
Agri-food/land based	3	1	3	3	2	3	15	Strong	
Professional Business Services	1	3	1	1	3	1	10	Low	
Construction	3	2	2	1	3	1	12	Med	
Creative	1	1	2	2	1	2	9	Low	
Distribution /Logistics	1	1	1	1	1	1	6	Low	
Environmental Goods and Services	2	2	3	2	2	3	14	Med-Strong	Environmental Futures, Marine Environment
Health and Social Care	3	2	2	2	2	3	14	Med - Strong	Finding a differentiator
ICT	1	3	3	2	3	2	14	Med-Strong	Big Data
Marine	3	3	3	2	2	3	16	Strong	
Nuclear	2	3	3	2	3	2	15	Strong	
Retail	1	1	1	1	1	1	6	Low	
Tourism	3	1	3	2	1	2	12	Med	

In Depth Review

An in-depth review was conducted for the following 'Areas of Economic Activity':

- Aerospace;
- Agricultural Sciences;
- Environment (including Environmental Futures);
- Health and Social Care;
- ICT (Big Data);
- Marine;
- Nuclear; and

- Photonics.

The in-depth reviews were conducted by members of the Smart Specialisation working group, using a common template. All used a combination of:

- Desk-based research (interrogating statistics, strategy documents and research reports); and
- Stakeholder engagement – Seeking input from a wide range of business representative organisations, higher education partners and other stakeholders.

The full review for each AEA can be found in Appendix 2.

Conclusions and Recommendations

Our process of entrepreneurial discovery has confirmed that the Heart of the SW is a diverse economy with valid strengths and opportunities in a number of areas. This work has also highlighted different, yet complementary, competitive advantages in the transition and more developed areas, several of which are parts of nationally recognised wider clusters to the east and west (e.g. Aerospace in Somerset is part of a wider West of England cluster).

Through an extended process of discussion and dialogue with the Smart Specialisation working group, the following prioritisation was agreed.

The rationale for this prioritisation was:

- Areas of Economic Activity (AEA) should have potential to be transformational for the LEP area, therefore the four evidence-based transformational opportunities outlined in the SEP (Marine, Nuclear, Aerospace and Environmental Futures) should be prioritised. Our in-depth reviews have confirmed that the marine and environmental futures AEAs are particularly relevant to the transition area, whilst aerospace and nuclear AEAs are concentrated in the more developed area;
- Healthy Aging is particularly relevant to the transition area and should also be prioritised because:
 - it provides a mechanism to secure economic growth at the same time as addressing a key socio-economic challenge for the area;
 - EUSIF resources can complement and add value to other regional investments being channelled through the NHS and the Academic Health Science Network;
 - The benefits have the scope to be pan-LEP.

- The Environmental Sciences sector has particular strengths in the area, in particular around climate change, centred on the Met Office asset. The Heart of the SW has considerable commercial and research assets within the Environmental Sciences field, which could be further exploited to develop a world leading knowledge based cluster.
- The Agri-food sector is an important part of our economy and where we have nationally recognised research and education assets, whose activities are already aligned with the national agenda of ‘sustainable intensification’. The opportunity to collaborate as part of a multi-LEP agri-tech project also provides an opportunity to secure maximum return on investment.
- **Photonics** and **Big Data** were considered ‘underpinning technologies’ that have the potential to support the Core Transformational Areas of Economic Activity.

Table 2: Proposed Smart Specialisation Priorities

Transition	More Developed
Core Transformational Areas of Economic Activity	
<ul style="list-style-type: none"> • Marine • Environmental Futures • Healthy Aging 	<ul style="list-style-type: none"> • Nuclear • Aerospace
<ul style="list-style-type: none"> • Agricultural Sciences 	
Underpinning Technologies	
<ul style="list-style-type: none"> • Photonics • Big Data 	

We also recognise the importance of innovation in promoting rural productivity and competitiveness in the HotSW. We will, therefore, deploy EAFRD resources in support of the innovation agenda in rural

Devon and Somerset, potentially, subject to further eligibility guidance from Defra, particularly targeting the agri-tech / agricultural sciences sector.

Detailed Rationale

Transition

The Core Transformational Areas of Economic Activity in the transition area are: Marine, Environmental and Agricultural Sciences and Healthy Aging.

Marine

- ✓ Clear existing competitive advantage in terms of existing business base (in Plymouth and more broadly across the Peninsula) and unrivalled cutting edge marine research and demonstration facilities;
- ✓ Wide portfolio of investment activity through the Plymouth and SW Peninsula City Deal, to which EUSIF innovation investment has the potential to add value and complement;
- ✓ Strong degree of relatedness/connectedness to other advanced engineering niches (e.g. aerospace and nuclear);
- ✓ Existing collaboration with Cornwall and the Isles of Scilly, as well as potentially with Portsmouth and Solent LEP, Humber LEP, Dorset LEP, Greater Lincolnshire LEP and Scotland, Orkney and Shetland.

Environmental Sciences

- ✓ Environmental Futures, was highlighted in the Strategic Economic Plan as a particular niche where, the Heart of the SW already demonstrates significant comparative advantage, catalysed in part by the relocation of the Met Office to Exeter.

- ✓ Investment in developing this niche was an important ask of the 15/16 Growth Deal and as such, we would wish to use EUSIF innovation funding to complement this investment (if successful).
- ✓ This niche sits within a broader field of environmental expertise, which is highly connected to the agricultural sciences.

Agricultural Sciences

- ✓ The Agri-food chain is an important part of our economy with significant potential to benefit from innovative technology, practices and processes. Our research assets provide a firm foundation to catalyse innovative developments.
- ✓ The opportunity to participate in a national pan-LEP initiative that brings together LEPS in both the East of England and the SW (Cornwall and the Isles of Scilly) in a complementary programme of activity that aligns with national research, provides an exciting opportunity to lever added-value to our ERDF/EAFRD investment.

Healthy Aging

- ✓ Existing leadership position developing integrated models of health care, could be brought together with the area's demographic profile under the banner of 'Healthy Aging'. Securing growth from a socio-economic challenge.
- ✓ Maximise economic and social benefits for the Heart of the SW arising from the change in the way the NHS supports innovation and enterprise.
- ✓ High degree of relatedness and connectedness to other prioritised AEAs and Underpinning Technologies (i.e. Environmental and Agricultural Sciences, Photonics and Big Data);

More Developed

The Core Transformational Areas of Economic Activity in the more developed area are: Aerospace and Nuclear. These have been prioritised because:

- ✓ Aerospace and nuclear were identified as transformation opportunities in our Strategic Economic plan
- ✓ Hinkley Point C is the first new nuclear development in the UK providing the Heart of the SW with a unique opportunity to be at the forefront of the creation of an expert new nuclear supply chain which can go on to serve wider new-build projects in the UK and overseas.
- ✓ Somerset has an existing long-established, sizeable and knowledge-intensive aerospace and advanced manufacturing production cluster centred on prime manufacturer AgustaWestland, which is an integral part of a wider West of England cluster
- ✓ Our 15/16 Growth Deal has sought national support for the two opportunities and as such as would wish to see EUSIF innovation funding complementing this investment (if successful)
- ✓ Both sectors are core sectors with the national industrial strategy and as such are supported by national initiatives, providing an

opportunity to maximise national investment in the Heart of the SW;

- ✓ Both sectors show a high degree of relatedness to each other, as well as Smart Specialisation areas in the transition area.

Underpinning Technologies

Photonics

- ✓ Existing high value local cluster, predominantly in Torbay, an area with particularly low productivity;
- ✓ A key technology, particularly associated with Aerospace, telecoms and health sciences;
- ✓ Existing support infrastructure in the form of the Torbay Hi Tech Forum;
- ✓ Building on past ERDF investment in materials sciences (e.g. Centre for Additive Layer Manufacturing)

Big Data

- ✓ Emerging local expertise connected to the Met Office;
- ✓ Big Data is one of the 8 great technologies in the UK industrial strategy; and
- ✓ Potential for the use of Big Data to underpin all areas of Smart Specialisation.

Taking forward the priorities

Smart Specialisations	Potential Areas of Focus	Examples of opportunities	Collaborative Potential	Potential Interventions (examples)
Core Transformational Areas of Economic Activity				
Marine	<ul style="list-style-type: none"> Marine renewables and offshore R&D, Manufacturing and services (including ship building (defence related and leisure)). Marine science/blue bio-technology 	Potential opportunities: <ul style="list-style-type: none"> ✓ Commercialisation of anti-fouling developments at PML for off-shore applications ✓ Commercialisation of research linked to climate change and impact on the oceans ✓ Adaptation of wave technology to shipping ✓ Composites and materials 	<ul style="list-style-type: none"> Cornwall and Isles of Scilly LEP through the City Deal Neighbouring SW LEPs through SWMEP Other potential: <ul style="list-style-type: none"> Portsmouth and Solent LEP (tbc) Humber LEP Greater Lincolnshire LEP 	<ul style="list-style-type: none"> ✓ Specialist infrastructure (Marine Industries Production Campus) ✓ Innovation vouchers ✓ Utilise European Marine Biological Resource Centre (EMBRC) as a catalyst to grow marine science infrastructure and stimulate blue bio-technology sector
Environmental Sciences	<ul style="list-style-type: none"> Environmental Futures (linked to Met Office supercomputer and Growth Deal 15/16), 	<ul style="list-style-type: none"> ✓ Deriving value from the information generated by the Met Office ✓ Capitalising on potential super-computer investment and BIG data approaches 		<ul style="list-style-type: none"> ✓ Our growth Deal 15/16 includes an LGF ask to create 'an international centre for environmental science, building on the reputation of the Met Office and the university, attracting research and enterprise activity. EUSIF activity would complement any investment secured through the Growth Deal.
Agricultural Sciences	<ul style="list-style-type: none"> Agricultural Science (Ruminant Animals & speciality crops), with a focus on resource efficiency in the production process 	<ul style="list-style-type: none"> ✓ Development of innovative technologies and products to support dairy industry 	Agri-tech - A Pan-LEP initiative involving: <ul style="list-style-type: none"> ✓ Agri-tech leadership council ✓ Agriculture and Horticulture Development Board ✓ Cornwall and Isles of Scilly LEP 3 LEPs in East of England	<ul style="list-style-type: none"> ✓ Joint investments in agri-science research platforms, applied research, SBRI type initiatives ✓ Linked to EAFRD knowledge transfer
Healthy Aging	Position the Heart of the SW as a Hub for integrated care research, development and innovation, using:	Problems requiring solutions are likely to be:	Cornwall and the Isles of Scilly through the AHSN	<ul style="list-style-type: none"> ✓ Innovation ecosystem within the regional health sector – already in progress through the AHSN;

	<ul style="list-style-type: none"> • Medical technologies • Big Data • E-Health – telehealth and telecare 	<ul style="list-style-type: none"> a) Reductions in unplanned emergency and hospital admissions b) Reduce length of stay in hospital settings; c) Reduce the number of individuals requiring permanent residential care 		<ul style="list-style-type: none"> ✓ Financial and business development support to enable the development, testing, incubation and growth of SME and entrepreneurial innovations (e.g. SBRI) ✓ Supporting Social Enterprise to respond to health challenges ✓ Enable the commercialisation of university and NHS spin-outs
Aerospace	<ul style="list-style-type: none"> • Supply chain diversification into civilian markets and related sectors (e.g. nuclear, marine) • Innovation to retain and grow market position in the context of increased global competition 	<ul style="list-style-type: none"> ✓ Materials, technology and processes for improved performance and production rates ✓ Environmental performance to make aircraft leaner, greener and quieter. 	<p>There is significant potential for collaboration across the HotSW and West of England LEPs, capitalising on shared assets, priorities and critical mass. It may also be possible for this to be extended into the neighbouring LEP areas of Gloucestershire and Dorset, Bournemouth and Poole, recognising supply chain linkages.</p> <p>Where appropriate, we will explore wider collaborative activity with the North West (Lancashire and Cheshire) and East Midlands (Derby, Derbyshire, Nottingham and Nottinghamshire) aerospace clusters.</p>	<ul style="list-style-type: none"> ✓ Innovation infrastructure, tailored to the needs of the aerospace sector and acting as a ‘catapult-lite’ with strong links to the national High Value Manufacturing Catapult ✓ Building the innovation capacity of the supply chain e.g. practical in-company support, networking and innovation vouchers ✓ Supporting the supply chain to move up the value chain, e.g. support for design, technology / product development, IP , innovation in manufacturing processes and access to state-of-the art facilities / equipment ✓ Facilitating greater collaboration and knowledge exchange in the sector, including: between industry and academia; between prime / first tier manufacturers and suppliers; and horizontally in the supply chain

Nuclear	Address significant and recognised civil, mechanical and electrical challenges to the development of Hinkley Point C, arising, for example, from new designs and high UK standards;	<ul style="list-style-type: none"> • Increase the capacity, capability and competitiveness of local businesses / collaborative projects in order for them to secure supply chain contracts; • Exploit the potential for companies currently serving the area's naval nuclear and aerospace industries to diversify into the new nuclear supply chain; • Maintain the highest standards of safety; and meet the industry's need to drive down costs 	There is particular potential for collaboration across the HotSW, Gloucestershire and West of England LEP areas, given shared SW geography, opportunities and priorities and the potential to increase critical mass	<ul style="list-style-type: none"> ✓ Developing flexible innovation and grow on space , tailored to the needs of the nuclear supply chain and acting as a 'catapult-lite' with strong links to the national High Value Manufacturing Catapult ✓ Enabling collaboration in the nuclear supply chain across upper tier suppliers, SMEs, HE and FE and supporting spin outs / commercialisation, e.g. knowledge and technology transfer, joint ventures, product and process innovation to address technical challenges, innovation vouchers etc. ✓ Facilitating diversification into the nuclear supply chain from the aerospace and marine AEAs in the HotSW, capitalising on relatedness and building supply chain capacity and capability
Underpinning Technologies				
Photonics	As an underpinning technology to support other Smart Specialisations	<ul style="list-style-type: none"> ✓ Development of products to support the clinical environment ✓ Lasers for industrial processes ✓ Photovoltaics for low carbon energy 	Solent LEP via the Set Squared Partnership	<ul style="list-style-type: none"> ✓ Specialist regional centre providing businesses and SMEs with key equipment and infrastructure required for: <ul style="list-style-type: none"> ○ Innovation driven product and process development ○ Collaborative research ○ Prototyping ○ Training development
Big Data	As an underpinning approach to support other Smart Specialisations	<ul style="list-style-type: none"> ✓ Continued use of 'Big Data' within the field of Environmental Futures ✓ Application of 'Big Data' approaches to new areas (e.g. agri-science) 	tbc	<ul style="list-style-type: none"> ✓ Improve business/university collaboration in the field of big data ✓ Establish business networks to bring together companies working with big data, including electronic products and monitoring devices ✓ Attract inward investment ✓ Support businesses/institutions to access national opportunities

Appendix 1: AEA Summary Profiles

Table 3: Advanced Engineering/Manufacturing

Quality	Score	Commentary
Current Strength	3	Employment high/medium tech manufacturing higher than national average. Strong supply chain linkages supporting aerospace Somerset and hi tech/photronics cluster in Torbay.
GVA/FTE	3	2012 GVA per FTE was £51,879 in Heart of the SW
Distinctive Assets	2	Previous investments from the competitiveness programme (e.g. Centre for Additive Layer Manufacturing).
Local Strategies	3	Identified in a number of local strategies.
National Strategy	2	Not directly identified as a key industrial sector, but strong linkages those that are, such as aerospace, nuclear and automotive. Significant national investment in advanced manufacturing .The EC defined photonics as one of 6 Key Enabling Technologies.
Research Capability	2	Advanced Composites Manufacturing Centre at Plymouth University & Exeter University's Advanced Technologies department (X-AT) providing commercially orientated research. National Composites Centre nearby at Bristol.
Score	15	Strong - Advanced manufacturing has strong potential, but is a very broad sector. Suggested areas of further review include aerospace, nuclear marine and photonics.

Table 4: Aerospace

Quality	Score	Evidence
Current Strength	3	SW has largest aerospace cluster in the UK, of which Somerset is integral part. Location Quotients show Heart of the SW Aerospace is heavily concentrated on Somerset.
GVA/FTE	3	2012 GVA per FTE was £56,849 in Heart of the SW
Distinctive Assets	3	Agusta Westland, an Italian-owned helicopter company with its UK plant based in Yeovil and associated supply chain. Flybe regional aircraft maintenance facility in Exeter is largest in Europe.
Local Strategies	2	Identified in some local strategies, notably in Somerset.
National Strategy	3	Identified as one of 11 key industrial sectors for the UK. Plans include a £2bn aerospace technology institute and a Manufacturing Accelerator Programme for Aerospace.
Research Capability	2	Centre for Additive Layer Manufacturing (CALM) & The Centre for Alternative Materials and Remanufacturing Technologies (CALMARE) at the University of Exeter. Yeovil College
Score	15	Strong - This is an area where the Heart of the SW demonstrates clear comparative advantage, with a national and international reputation, strong GVA/FTE and excellent alignment with national strategy and funding.

Table 5: Agri-food/land based

Quality	Score	Evidence
Current Strength	3	Agriculture, forestry and fishing represent 17.7% of Heart of the SW businesses compared to 5.2% for England.
GVA/FTE	1	In 2012, GVA/FTE in food and drink manufacture was £41,907, whilst for agriculture, forestry and fishing it was £27,678.
Distinctive Assets	3	Extensive rural nature, natural assets and farming and food producing industry. Including both large and small operators.
Local Strategies	3	Agriculture and food and drink are highlighted in a large number of local strategies.
National Strategy	2	Agricultural technologies are listed as one of the Government's 8 great technologies in the industrial strategy. Supporting this is the Agricultural Technologies Strategy aligned with £160m of investment.
Research Capability	3	Key institutions and facilities include: <ul style="list-style-type: none"> • Faculty of Agricultural Science at Exeter Uni • University of Plymouth (2nd highest no's of qualifiers in 'agricultural and related science') • North Wyke, an farm platform that is part of Rothamstead research • A number of specialist colleges offering land based skills
Score	15	Strong: Existing comparative advantage, alignment with national strategies and strong research capability.

Table 6: Professional Business Services

Quality	Score	Evidence
Current Strength	1	Location Quotients show that the Heart of the SW does not have a comparative advantage in this sector.
GVA/FTE	3	In 2012, GVA per FTE for the 'professional services' sector was £38,398 and £83,931 for 'financial and insurance activities'.
Distinctive Assets	1	There are currently few sector specific assets that are associated with this sector. However assets such as our quality of life and natural environment were important in attracting companies such as the Blur group to Exeter.
Local Strategies	1	Professional and business services are recognised as important in some local economic development strategies, recognising their potential to grow as a result of wider economic growth.
National Strategy	3	Generating 11% of UK GVA and 12% of employment, the professional and business services sector is recognised as a key industrial sector within the industrial strategy.
Research Capability	1	No distinctive research capability identified, although recognise that the areas HE/FE institutions run relevant courses.
Score	10	Low – Whilst it is recognised that this sector is an important part of the economy and with significant potential to drive improvements in productivity. The Heart of the SW does not currently have a comparative advantage in this area, or any distinctive assets or research capability on which to develop a Smart specialisation approach.

Table 7: Construction

Quality	Score	Evidence
Current Strength	3	The sector currently contributes £2bn to the Heart of the SW economy (7.6%) and accounts for 12.6% of the number of enterprises (compared to 11.8% nationally). It is therefore a significant employer with demonstrable comparative advantage.
GVA/FTE	2	In 2012, GVA per FTE was £41,620
Distinctive Assets	2	Demand for construction related skills and expertise is expected to grow markedly over the next 10 years as the construction of Hinkley Point C starts. National Skills Academy for Construction at Exeter University.
Local Strategies	1	Construction does not feature strongly within local economic development strategies.
National Strategy	3	With the global construction market forecast to grow by over 70% by 2025, the construction sector has been identified as a key sector in the industrial strategy. National activity is to be developed alongside the Construction Leadership council.
Research Capability	1	No universities in the Heart of the SW were listed in the top 20 for construction within the Witty Review. Although neighbouring Bristol University tops the list.
Score	12	Medium: The forecast growth of the construction sector in coming years makes it a very important sector for the Heart of the SW economy. The most important issue identified for the construction sector is the provision of relevant skills, which is already prioritised within ESF provision. Whilst there is significant potential to explore construction further, the lack of significant research capability inhibits its potential for Smart Specialisation.

Table 8: Creative

Quality	Score	Evidence
Current Strength	1	The Creative Industries sector can be difficult to define precisely, ranging from craftspeople and artists through to graphic design and media businesses. SERIO research for Devon CC identified the creative industries sector (focusing on creative media) as one with high growth potential.
GVA/FTE	1	In 2012, GVA per FTE for the 'Arts, Entertainment and Recreation' sector was £25,190.
Distinctive Assets	2	Devon hosts some prominent creative businesses such as TwoFour Media, 3D solutions and Breyleino. High quality natural environment is also considered to be a distinctive asset linked to the creative sector.
Local Strategies	2	The creative sector does feature within some local development strategies.
National Strategy	1	Whilst the creative sector is not identified as a key industrial sector, the 2013-2016 Creative Industries Strategy expects to oversee £30m of Government investment.
Research Capability	2	Whilst the Heart of the SW universities do not specialise in activity linked to the creative industries, Exeter University has a strong faculty for film studies and Plymouth University has a strong school of Art and Media.
Score	9	Low: Whilst the creative industries are notable in the Heart of the SW, other sectors show stronger potential for Smart Specialisation investment.

Table 9: Distribution/Logistics

Quality	Score	Evidence
Current Strength	1	The distribution and logistics sector is an important sector, serving businesses across the SW peninsula. However, the proportion of distribution and logistics businesses is similar to that found nationally.
GVA/FTE	1	GVA/FTE for the 'Transport and Storage' sector in 2012 was £34,043.
Distinctive Assets	1	Langdon's Haulage in Somerset recently secured an Employer Ownership of Skills Pilot to ameliorate skills shortages in the area. SERIO research (2013) identified the 'Distribution and Logistics' sector in Devon as one with potential for high employment growth.
Local Strategies	1	The sector does not feature significantly within local economic development strategies.
National Strategy	1	The sector is not identified as one of the key sectors in the Government's industrial strategy. However, the Logistics Growth Review in 2011 presents a diverse package of measures that targets the barriers to growth to the sector.
Research Capability	1	The University of Plymouth provides renowned courses in fields such as international and maritime logistics.
Score	6	Low – The sector does not currently exhibit comparative advantage, distinctive assets or strong research capabilities.

Table 10: Environmental Goods and Services

Quality	Score	Evidence
Current Strength	2	However, national research into the LCEGS sector by BIS suggests that the Heart of the SW LEP area has just 2% of the England market, with little evidence of comparative advantage.
GVA/FTE	2	It is difficult to extract an accurate GVA/FTE figure for the low carbon sector as it cuts across several other industries.
Distinctive Assets	3	The Met Office located in Exeter provides world leading environmental analytical services. Also located in Exeter are the head-quarters of SW Water and the Environment Agency. High quality natural environment/resources.
Local Strategies	2	The low carbon sector is highlighted in several local economic development strategies.
National Strategy	2	The industrial strategy does not identify the whole LCEGS sector as a key sector, instead identifying key elements such as 'offshore wind' and 'energy storage' and 'big data' as one of the 8 great technologies.
Research Capability	3	The Met Office along with the Universities of Plymouth and Exeter have recognised strengths in low carbon/environmental fields.
Score	14	Med-Strong – The combination of distinctive assets, potential strong GVA and research capabilities suggests that this sector should be examined further. With a focus on environmental analytics.

Table 11: Health and Social Care

Quality	Score	Evidence
Current Strength	3	Location quotients for employment show that the area is more reliant on health care than the rest of the UK, reflecting our aging demographic. Evidence of a small but significant pharmaceuticals cluster in Devon (SERIO 2012)
GVA/FTE	2	In 2012, GVA/FTE for Health and Social Work Activities' was £31, 780. A good estimate for health science would be for 'Scientific and technical activities' which was £40,456.
Distinctive Assets	2	Two medical schools (Exeter and Plymouth) and large hospitals across the area. Expertise and facilities in association with genetics, clinical trials and healthcare.
Local Strategies	2	Several local strategies identify aspects of health and social care as important for economic development.
National Strategy	2	'Regenerative medicine' and 'synthetic biology' are identified as 2 of the 8 great technologies in the industrial strategy, alongside 'life sciences' which is identified as a key industrial sector.
Research Capability	3	South West Peninsula Clinical Research Collaboration (SWPCRC) is a partnership of local NHS trusts and the Universities of Exeter and Plymouth.
Score	14	Medium-Strong – There is evidence to warrant further investigation, in particular to find a differentiator or niche, within this very broad sector.

Table 12: ICT

Quality	Score	Evidence
Current Strength	1	Location Quotients show that employment within ICT is less than the UK average. Research by SERIO in 2013 highlighted that the 'business services' sector has potential to grow both in employment and value terms.
GVA/FTE	3	In 2012, GVA/FTE for the 'Information and Communication' sector was £60,887 in the Heart of the SW.
Distinctive Assets	3	The Met Office, with its supercomputer and expertise in big data and mathematical modelling represents a unique asset to the Heart of the SW. In addition, there is a growing 'big data' presence, with companies such as the ATASS group, Solent Statistics, Tangerine Bee and the Blur Group.
Local Strategies	2	ICT and growth of the professional services sectors are recognised as important in several local economic development strategies.
National Strategy	3	Information Economy is identified as a key sector in the Government's industrial strategy.
Research Capability	2	The Met Office and its associated Academic Partnerships with leading UK Universities (including Exeter), is an important research asset. University of Plymouth also has research expertise in relation to ICT.
Score	14	Med-Strong – There is evidence to warrant further investigation, in particular relating to the Big Data niche.

Table 13: Marine

Quality	Score	Evidence
Current Strength	3	Location Quotients reveal the Heart of the SW has a strong comparative advantage in this area. Plymouth in particular holds an international reputation with businesses such as Princess Yachts International and Babcock Marine.
GVA/FTE	3	GVA/FTE in 2012 was £51,782.
Distinctive Assets	3	Development of the Marine Industries Production Campus as part of the City Deal as well as a multitude of ports and marine infrastructure. The UK's first marine energy park.
Local Strategies	2	Marine features significantly within both Plymouth and Torbay economic development strategies. It is a central feature of the Plymouth and SW Peninsula City Deal.
National Strategy	2	Offshore wind is identified as a key sector within the industrial strategy.
Research Capability	3	Plymouth University hosts a number of internationally renowned research institutes and centres relating to marine (e.g. Marine Innovation Centre). In addition there are a number of independent research companies and organisations (e.g. Plymouth Marine Laboratories, Marine Biological Association)
Score	16	Strong – There is a strong evidence of existing comparative advantage, distinctive assets and research capabilities.

Table 14: Nuclear

Quality	Score	Evidence
Current Strength	2	Location Quotients show an existing comparative advantage in the nuclear sector, reflecting the existing power station at Hinkley as well as nuclear expertise in Devonport.
GVA/FTE	3	In 2012, GVA/FTE in the energy sector was £162,568.
Distinctive Assets	3	The development of the UK's first next generation nuclear power plant in Somerset – Hinkley Point C, will result in job creation and supply chain opportunities across a significant part of the Heart of the SW.
Local Strategies	2	Nuclear is a key sector identified within Somerset's growth plan and Somerset districts.
National Strategy	3	Nuclear is identified as one of the key industrial sectors in the industrial strategy. As a result, Government has developed an extensive industrial strategy to support the nuclear sector involving the new Nuclear Industry Council. The NIC has announced several planned investments to develop the industry which is forecast to see global investment of £930bn to build new nuclear reactors.
Research Capability	2	Plymouth University is ranked 12 th for nuclear related publications in the Witty review. A SW Nuclear Research Hub, run in collaboration with EDF, is to be established at nearby Bristol University.
Score	15	Strong – There is strong evidence of existing and potential comparative advantage, truly distinctive assets and strong alignment with the industrial strategy.

Table 15: Retail

Quality	Score	Evidence
Current Strength	1	There are a number of town/city centre locations within the LEP which specialise in retail activities, notably Exeter and Plymouth City Centres as well as Clarks Village in Somerset amongst others. Location Quotients suggest that employment in our retail sector is marginally above average.
GVA/FTE	1	GVA/FTE in 2012 was £27,873.
Distinctive Assets	1	There is little evidence for distinctive assets within the Heart of the SW Retail sector, beyond the retail centres described above, which are not dissimilar to retail centres elsewhere in the UK.
Local Strategies	1	Retail is highlighted as a key sector within a small number of local economic development strategies.
National Strategy	1	Retail is not a key sector outlined in the industrial strategy, although Government published 'A Strategy for Future Retail' In October 2013.
Research Capability	1	There is limited retail research capability in the Heart of the SW.
Score	6	Low – Whilst retail is important within any local economy, the low added value within the sector, lack of distinctive assets and research capability mean that other sectors present a better opportunity for Smart Specialisation.

Table 16: Tourism

Quality	Score	Evidence
Current Strength	3	Visit England statistics show that the Heart of the SW is ranked first amongst LEPS in terms of the number of holiday nights/year, with estimated spend of £925m.
GVA/FTE	1	GVA/FTE for the 'Accommodation and Food services' sector in 2012 was £19,872.
Distinctive Assets	3	The Heart of the SW has a number of distinctive assets relating to the tourism sector, including both natural and cultural assets.
Local Strategies	2	Tourism features in several economic development strategies across the Heart of the SW.
National Strategy	1	Tourism is not identified as a key industrial sector within the industrial strategy and there is limited alignment with the key industrial sectors and eight great technologies. However, the Government has set out a strategic framework for tourism to 2020 through Visit England.
Research Capability	2	Both Exeter and Plymouth Universities have research faculties covering tourism.
Score	12	Med – Whilst Tourism is a vitally important to the Heart of the SW economy, other sectors provide greater potential for higher value growth through Smart Specialisation interventions. Tourism sector businesses will be able to access other business support interventions through the growth hub. EAFRD support will also be used for strategic interventions in relation to rural tourism.

Appendix 2: In Depth Review – Detailed sector/technology profiles

In Alphabetical Order.

Smart Specialisation – Aerospace

Introduction

The Area of Economic Activity (AEA) explored here is the Heart of the South West's (HotSW's) aerospace sector, including associated advanced engineering, manufacturing and services. This is set in the wider South West context given the strong functional economic linkages between the HotSW and the West of England in this sphere.

Consultation and Engagement

In developing the aerospace template, the following organisations were consulted:

- AgustaWestland;
- The West of England Aerospace Forum;
- EEF;
- The GW4 partnership (the Universities of Bath, Bristol, Cardiff and Exeter);
- The National Composites Centre;
- Sema; and
- Yeovil College.

Heart of the SW Business Context

The Government-commissioned ERC Research Paper No.15, 'Localisation of Industrial Activity across England's LEPs', identifies aerospace as the only sector in the Heart of the SW with both a high location quotient and a significant employment contribution. Based on 2012 IDBR data, the Heart of the SW has 28 businesses (4% of GB total) active in the manufacture of air and spacecraft with direct employment of 5,941 (7% of GB total) and a

location quotient of 3.76. Further analysis of these IDBR data at a local level reveals that this Heart of the SW activity is **heavily concentrated in Somerset**, which has 20 businesses (2.8% of GB total and 71% of HotSW total) active in the manufacture of air and spacecraft with direct employment of 4,740 (5.6% of GB total and 80% of HotSW total).

A locally-commissioned earlier study into the aerospace sector¹ explored broader definitions and Standard Industrial Classification (SIC) groupings, recognising that the above 'manufacture of air and spacecraft' code alone does not capture all aerospace-related activity. This study considered the direct and indirect elements of employment within this sector; the latter reflecting the supply chain industries related to the core aerospace sector. The report, using 2010 BRES data shows:

- The aerospace sector is unusually important to Somerset – the County is host to 5% of all GB aerospace employment and 91% of all Heart of the SW aerospace employment. **Somerset has a location quotient of 6.4** for employment in the aerospace sector.
- There is significant employment in Somerset in other sectors which include some aerospace activity (i.e. supply chain or 'indirect' employment).
- Manufacturing employment in general is more important in Somerset (12.2% of all employment) than in the Heart of the SW (9.5% of all employment) and Great Britain (8.5%) as a whole..

¹ Strategic Economics Ltd, 'Economic Role of the Civil and Defence Aerospace Sector in Somerset', March 2012

The following table illustrates the scale of direct and indirect employment in the aerospace sector².

Definition	GB	SW	HotSW	Somerset	South Somerset
Employment in 'manufacture of air and spacecraft' and 'repair and maintenance of aircraft and spacecraft'	104,100	17,300	5,800	5,300	5,300
Employment in other groupings including some aerospace activity ³	118,200	9,800	2,100	800	500
Manufacturing employment	2,372,400	222,400	69,700	28,500	13,500

This study also modelled GVA, indicating that Somerset's aerospace sector was **worth £329 million in 2008**. The sector represents 3.8% of the County's total GVA, 23% of the County's manufacturing GVA and 78% of the County's advanced engineering GVA. The County's aerospace output accounted for virtually all of the sector output in the Heart of the SW LEP area, 28% of the sector output in the SW region and 4.4% of the sector output in Great Britain.

The Somerset aerospace sector is centred on the **prime manufacturer AgustaWestland** (located in Yeovil) and its supply chain. AgustaWestland is owned by Finmeccanica (Italy) which the PWC 'Aerospace Top 100' report places in the top 10 global aerospace companies⁴. AgustaWestland operates globally in the aerospace, defence and security markets and is Britain's only helicopter manufacturer that retains a complete indigenous design, development, production, manufacturing and support capability.

² Source: Economic Role of Civil and Defence Aerospace sector in Somerset, March 2012 – Strategic Economics.

³ Manufacture of made-up textile articles, except apparel; manufacture of communication equipment; manufacture of instruments and appliances for

It is a leader in a number of the world's most important helicopter markets, offers the widest range of advanced rotorcraft available for both commercial and military applications and has specific expertise in: advanced rotor systems; transmission / gearbox design and manufacture; optimal matching of engine, rotors and transmissions; and active vibration management / control systems.

The company has traditionally had a dependency on public sector (namely Ministry of Defence) orders - in 2012, 70% of AgustaWestland's active businesses came from the MoD and the company had outstanding MoD orders of £2.3 bn. However, market conditions for defence-related aerospace are challenging as a result of industry, technology and policy changes. As a result, over the last four years, AgustaWestland has been **investing significantly in civil aviation** in order to transform the business, reducing the reliance on military orders and moving toward a more balanced and sizeable customer base.

A number of other world-leading aerospace companies also have a presence in Somerset, including:

- Honeywell and BAE Systems (in the top 15 global aerospace companies);
- Thales (in the top 20 global aerospace companies);
- GKN (in the top 40 global aerospace companies); and
- Doncasters (in the top 100 global aerospace companies)⁵

The sector is research intensive – AgustaWestland alone invested **£30 million in research and innovation in 2012**, has company R&D activities spanning 13

measuring, testing and navigation; manufacture of other electrical equipment; manufacture of other special purpose machinery

⁴ http://www.pwc.co.uk/en_UK/uk/assets/pdf/aerospace-top-100-2012.pdf

⁵ http://www.pwc.co.uk/en_UK/uk/assets/pdf/aerospace-top-100-2012.pdf

different technology areas and has strategic relationships with 15 UK universities⁶. Its workforce is also highly qualified - 35% of AgustaWestland's workforce is qualified to graduate or above level, compared to an overall Somerset average of 30%.

This Somerset aerospace sector forms an integral part of a wider South West / West of England aerospace and advanced engineering cluster. This is the largest UK aerospace and defence cluster, and one of the largest concentrations of aerospace activities in Europe. It is home to further leading global companies (such as Airbus, Rolls-Royce, Safran and Claverham Ltd) and their supply chains, is worth £1.04 billion and supports 23,400 jobs⁷.

The Global/National Context

The National Industrial Strategy for Aerospace, 'Lifting off – Implementing the Strategic Vision for UK Aerospace', provides the following context:

- The UK aerospace sector has a 17 per cent global market share, making it the number one aerospace industry in Europe and globally second only to the U.S. It creates annual revenues of over £24 billion, or just under one per cent of total UK GVA, and exports approximately 75% of what it produces. The sector consists of 3,000 companies in the UK, directly employing 100,000 people and supporting 130,000 jobs indirectly in the supply chain. Aerospace is highly R&D intensive with an annual R&D spend of £1.4 billion (representing 12 percent of total UK manufacturing R&D spend) and requires a broad range of high-value skills and disciplines, including engineering, science, project management, production, service, training and finance.
- The UK aerospace sector is expected to grow at a rate of 6.8% over the next few years. Between now and 2031, there is a global requirement for

⁶ <http://www.agustawestland.com/content/delivering-innovation-britain>

over 27,000 new passenger aircraft worth circa \$3.7 trillion. Over the same time period, the global market demand for new commercial helicopters is expected to be in excess of 40,000 units, worth circa \$165 billion.

- Capturing this opportunity is critical to the UK growth agenda. However, the UK incumbent position is at risk from growing international competition and substantial changes in product and manufacturing technologies.
- Future government support will, therefore, focus on four key, high-value and highly complex areas of modern aircraft in which the UK has developed strong comparative advantage – aerodynamics, propulsion, aerostructures and advanced systems.

In addition, it is important to note, as context, that global defence expenditure is expected to remain flat over the next few years dampening orders and driving changing business models and increased civilianisation. This is particularly relevant to the Heart of the SW given AgustaWestland and its supply chain's reliance on the defence industry.

Strategic Context

National

Aerospace is one of the eleven national Industrial Strategy sectors. 'Lifting off – Implementing the Strategic Vision for UK Aerospace', the Industrial Strategy for aerospace, has four key priorities of: technology; manufacturing; supply chain competitiveness; and skills and engagement. In addition, there are strong linkages between the aerospace AEA and the Government's identified Eight Great Technologies, namely: big data (high),

⁷

http://www.westofenglandlep.co.uk/assets/files/About%20Us/Strategic%20Plan/LEP225%20SEP%20Prospectus%20AW4_final.pdf

advanced materials and nano-technology (high), robotics (medium), space (low) and energy storage (low).

Local

The Heart of the South West's Strategic Economic Plan and Growth Deal identify aerospace as a 'transformational opportunity' for the area. Unsurprisingly, given its importance to the county, the AEA is also featured in the Somerset Growth Plan, as a core part of the vision and a priority for investment. Aerospace/advanced manufacturing are also cited as key sectors within Somerset's five district level economic development strategies.

Key Assets/Infrastructure

FE/HE

Exeter University

- Strong relationships with Airbus and Rolls-Royce;
- The **Centre for Additive Layer Manufacturing (CALM)** at the University of Exeter, part-funded by the 2007-2013 SW Competitiveness Programme, which seeks to generate greater value to SMEs through world-class research, expertise and facilities in additive manufacturing technologies;
- The **Centre for Alternative Materials and Remanufacturing Technologies (CALMARE)** at the University of Exeter, part-funded by the 2007-2013 SW Competitiveness Programme, which provides businesses with access to expertise, support and facilities to develop new alternative materials, recycle and re-manufacture;

Other expertise in the University of Exeter includes:

- Expertise in wireless sensing, energy harvesting and vibration engineering;
- Research centre in functional materials (including graphene)

- Business School expertise in operations, supply chain management and innovation management
- Engineering department ranked in the UK top 10 offering degrees in electrical, mechanical, materials and mathematical engineering

Yeovil College (University Centre Yeovil)

- Expertise in composite and advanced materials, as both standalone programmes and Continuing Professional Development for industry, connected with the National Composites Centre and National Composites Alliance
- Strong relationships with AgustaWestland, Thales, Tods Aerospace, Honeywell, GKN Aerospace and Ministry of Defence across engineering and business and management provision
- Extensive outline of vocationally directed higher-level programmes: HNC/Ds in aeronautical, electrical, electronic, mechanical engineering; plus HND/Foundation Degree/BEng (Hons) programmes in materials engineering (with particular focus on composites in partnership with University of Wales Trinity Saint David)
- HNC/D programmes in Aeronautical, Mechanical and Electrical / Electronic Engineering delivered across UK to Ministry of Defence candidates, as well as those in Civil Aviation
- Range of apprenticeships and higher apprenticeships serving regional economy in aerospace and related materials / engineering fields
- Direct advanced relationship with the University of Derby in relation to aerospace / aeronautical who themselves are also very connected with Rolls Royce

Higher Education Assets Outside Heart of the SW

- **University of Bristol** - Whilst located outside the HotSW LEP area, the University of Bristol is within a 90 minute journey time of the Somerset aerospace cluster and offers leading assets and expertise, namely including:

- AgustaWestland Bristol University Technology Centre, specialising in structural dynamics, vibration mechanics and composite materials.
- Relevant specialisms identified in Sir Andrew Witty's review, including Aerospace (ranked 9th)
- The Advanced Composites Centre for Innovation and Science, complemented by the Centre for Doctoral Training in Advanced Composites for Innovation and Science which offers a four-year interdisciplinary PhD training to address industry's demand for composites specialists.
- Leading fluid and aerodynamics computational research and experimental research and engineering dynamics research
- The University offers a MEng Aeronautical Engineering course and a range of post-graduate programmes.
- **University of Bath** - Whilst located outside the HotSW LEP area, the University of Bath is within a 90 minute journey time of the Somerset aerospace cluster and offers leading assets and expertise, namely:
 - Relevant specialisms identified in Sir Andrew Witty's review, including Aerospace (ranked 8th)
 - The Aerospace Engineering Research Centre, with a number of specialisms
 - The University offers a range of highly-regarded research degrees and Masters of Engineering Programmes (including aerospace engineering).
- **University of Liverpool** - AgustaWestland Liverpool University Advanced Rotorcraft Centre which provides expertise in computational fluid dynamics, flight mechanics and simulation and ranked 6th for Aerospace in Sir Andrew Witty's review.

Non HE/FE Assets

- **AgustaWestland's world-class Civil Helicopter Hub**, part funded by the Regional Growth Fund, which comprises: a commercial helicopter final assembly line; helicopter maintenance facility; helicopter training

academy in conjunction with the AeroHub at Newquay Cornwall Airport; and a helicopter R&D centre in conjunction with industry and academia.

- The **AgustaWestland Training Academy UK in Yeovil** which is a dedicated and state-of-the-art aircraft training facility offering leading-edge courseware design, production and delivery.
- The **Aerospace and Advanced Engineering i-net** for the South West, led by WEAFA and part funded by the 2007 – 2013 SW Competitiveness Programme, which encourages innovation by: offering bespoke support; providing access to specialist information and research; and bringing together businesses, universities and others to share knowledge, expertise and best practice.
- Geographical proximity to **RNAS Yeovilton** in Somerset which, as one of the Navy's two principal air bases, is home to more than 100 aircraft operated both by front-line squadrons and by training units including all Fleet Air Arm Lynx and the Commando Helicopter Force
- **Flybe's regional aircraft maintenance facility in Exeter**, including a state-of-the-art hangar
- The **Flybe Training Academy at Exeter Airport** which is part of Europe's largest regional airline and offers a wide range of aviation training programmes
- The **Met Office** with specialisms, as identified by 'Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth', in aerospace (ranked 1st) and satellites (ranked 7th)
- **Yeovil Innovation Centre** which offers flexible office space as well as meeting and conference facilities
- Strong local participation in national aerospace networks and partnerships as well as an active and dedicated local business network in WEAFA

Assets within the West of England serving the HotSW / Somerset:

- **The National Composites Centre (NCC)**, part funded by the 2007-2013 SW Competitiveness Programme, which forms part of the Technology Strategy Board's (TSB's) High Value Manufacturing Catapult. The NCC delivers world-class innovation in the design and rapid manufacture of

composites and facilitates their widespread industrial exploitation. It is within a 90 minute journey time for the HotSW/Somerset aerospace cluster and a number of aerospace companies with a presence in Somerset are tier one or tier two NCC members, including AgustaWestland, GE, GKN Aerospace, AGC Aerocomposites Yeovil and BAE Systems.

- The **Laboratory for Integrated Metrology Applications (LIMA)**, part funded by the 2007-2013 SW Competitiveness Programme, which is an independent centre of excellence for collaborative research and delivery of innovative metrology enabled applications at the University of Bath
- Geographical proximity to **MoD Abbey Wood** in Filton which is the main site for the Defence Equipment & Support organisation, including procurement and support project teams.

Delivery Capacity

Business Networks

- The **Aerospace Growth Partnership (AGP)** brings together the UK aerospace industry and Government to address barriers to growth, boost exports and grow the number of high-value jobs in the UK. Industry representatives on the Partnership and its supporting groups include AgustaWestland and GKN
- **ADS** is a trade organisation advancing the UK aerospace, defence, security and space industries, with 24 members from the Heart of the SW. The Technology Strategy Board's (TSB's) **Aerospace, Aviation and Defence Knowledge Transfer Network (KTN)** is hosted by ADS and enables the sector community to connect, collaborate and discover new opportunities.
- **EEF** is a membership organisation that helps manufacturing businesses evolve, innovate and compete in a fast-changing world, with 27% of SW members coming from the Heart of the SW.
- The **West of England Aerospace Forum (WEAF)** is a membership trade association that champions and supports the interests of the aerospace and defence industry in the South West of England. The forum leads the

sector in delivering national supply chain initiatives which connect the SME community to the Primes. There are 63 members from the HotSW.

Collaboration with Other LEPs

At an England level, the Government-commissioned ERC Research Paper No.15, 'Localisation of Industrial Activity across England's LEPs', shows that aerospace activity is particularly concentrated in our own LEP area as well as four others. A review of strategic plans (SEP/SIF) for these areas has confirmed that aerospace and/or advanced engineering / manufacturing is identified as a competitive advantage and investment priority. Key details are highlighted in the table (right). This suggests that there is potential to:

- Further the South West's position as the leading aerospace cluster in the UK through collaboration across the Heart of the SW and West of England LEPs, capitalising on shared assets, priorities and critical mass. Recognising supply chain linkages into other neighbouring LEPS including: Gloucestershire, Dorset, Bournemouth and Poole; and
- Ensure complementarity and, where appropriate, collaboration across the South West, North West (Lancashire and Cheshire) and East Midlands (Derby, Derbyshire, Nottingham and Nottinghamshire) aerospace clusters.

In addition, the global nature of the market offers opportunities to collaborate outside of England and the UK, notably in China, Asia and the Pacific where there is significant market demand and new emerging capability.

LEP Area	ERC report references (based on 2012 IBDR data)	LEP Priorities for Aerospace
West of England	30 businesses active in the manufacture of air and spacecraft with direct employment of 7,944 and a location quotient of 4.66.	Advanced technology centre, virtual growth hub, composite bridge construction, National Composites Centre, invest Bristol and Bath continuation, Rolls-Royce Bristol aero engine capabilities, and inward investment for recovery of critical materials
Lancashire	23 businesses active in the manufacture of air and spacecraft with direct employment of 11,048 and a location quotient of 7.71	High value manufacturing catapult 'spoke' and engineering innovation centre,
Cheshire and Warrington	29 businesses active in the manufacture of air and spacecraft with direct employment of 6,213 and a location quotient of 4.33	Engineering and advanced materials are identified as potential areas of Smart Specialisation
Derby, Derbyshire, Nottingham and Nottinghamshire	30 businesses active in the manufacture of air and spacecraft with direct employment of 10,685 and a location quotient of 3.95	A sector development plan including business support, innovation and skills. Innovation centre at infinity Park supporting advanced engineering sector, including the automotive, rail and aerospace industries and their supply chains.

Connectedness and Relatedness

The aerospace, nuclear and marine AEAs are all underpinned by advanced engineering and manufacturing and, as a result, share a number of technology, production and skills requirements. This presents opportunities for collaboration and diversification across these AEAs in the Heart of the SW.

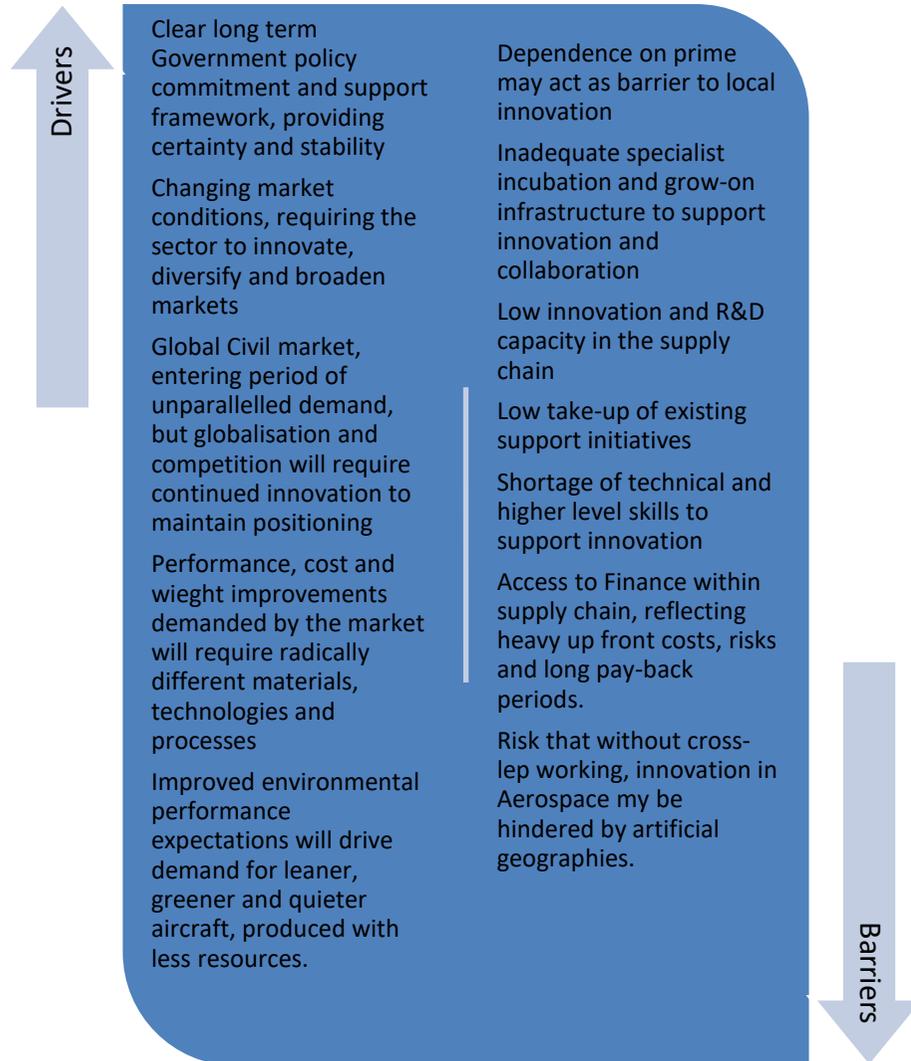
⁸ Drat Smart Specialisation Strategy for England

The Government's exploration of the interfaces between the national Industrial Strategy sectors and the Eight Great Technologies reveals the following linkages across aerospace, nuclear and offshore wind (used here as a proxy for the wider marine AEA)⁸:

Sector	Big data	Space	Advanced materials and nano-technologies	Robotics	Energy Storage
Aerospace	High	Low	High	Medium	Low
Nuclear	Medium	-	High	High	-
Offshore Wind	Medium	Low	High	High	High

This analysis also highlights the importance of big data to the aerospace, nuclear and marine AEAs.

Drivers and Barriers to Growth



Potential Action (innovation action highlighted in blue)

Place

What facilities/infrastructure are needed to support the growth of this area?

- Developing enhanced innovation infrastructure, tailored to the needs of the aerospace sector and acting as a 'catapult-lite' with strong links to the national High Value Manufacturing Catapult

Business

How can we support businesses to exploit this opportunity?

- Building the innovation capacity of the supply chain to access and exploit new knowledge and ideas and to compete in global markets, e.g. ambassadors/mentors from industry
- Supporting the supply chain to move up the value chain, e.g. design, technology/product development, IP and innovation in manufacturing processes
- Facilitating greater collaboration and knowledge exchange in the sector, including between industry and academia; between prime manufacturers and suppliers and horizontally in the supply chain
- Facilitating the supply chain's collaboration with and diversification into nuclear and marine AEs in the Heart of the SW e.g. joint development and transfer of technologies, processes and products
- Raising SME's awareness and take-up of existing innovation support, including grants - e.g. building SME's financial and business expertise to improve access to grant funding
- Developing strong and strategic public-private capacity and coherence in relation to the aerospace sector
- Facilitating access to finance (including aerospace finance initiatives) through the Growth Hub
- Supporting the sector to broaden and diversify its customer base and to exploit export opportunities
- Specifically positioning and promoting Aerospace in the Heart of the SW to inward investors, as a credible centre of excellence, through proactive engagement activity.

People

What skills do we need to exploit this opportunity?

- Raising SME awareness and take-up of existing support, available to companies to develop workforce skills
- Promoting the image of the aerospace sector to make it a more attractive careers choice e.g. strengthening links between education and business, work placements, careers advice and high profile events/challenges
- Increasing the number of people with the necessary education background (maths, physics and design and technology) to pursue a career in the sector
- Actively seeking to increase the sector's 'talent pool' by addressing diversity issues (including the gender gap) e.g. through targeted programmes
- Supporting traineeships as pathways to apprenticeships
- Increasing the number of apprenticeships, particularly higher level apprenticeships (potentially including through innovative delivery mechanisms)
- Increasing participation in and delivery of specialist degree and masters qualifications
- Increasing the supply chain's skills in leadership, management and operations to maintain and build competitiveness

Smart Specialisation – Agricultural Sciences

Introduction

Given the importance of agriculture, food and drink and the environment to the Heart of the SW economy, this review considers the role of technology, science and innovation in creating an area of Smart Specialisation to support the agri-food sector.

This is consistent with the interpretation of agri-tech provided through the UK Strategy for Agricultural Technologies which states:

The constituents of the agri-tech sector, from public and private sector agricultural research, through the supply chain spanning seeds, agro-chemicals, machinery, engineering and other inputs across arable and livestock agriculture, horticulture and food processing and packaging and retailing by globally recognised brands, are easily recognisable. However, the full economic potential of the appliance of technology and innovation across the whole agri-food supply chain, as part of an interconnected sector sharing a common theme – producing ‘more with less input and impact’ – is only just starting to be understood.

Consultation and Engagement

There is a very strong base of research partners (see below for a list). The LEP is the key business network, and has consulted widely with FE and HE partners, and a range of organisations, including those listed below, to ensure that thinking and information around this AEA is developed:

- South West Food & Drink
- Defra

- NFU
- Environment Agency catchment management plan officers
- West Country Rivers Trust
- North Devon Biosphere
- Royal Bath & West Agricultural Society (RBWAS)
- Various business councils and organisations across the LEP
- Businesses seeking funding through the RDPE are often food related and innovative.
- Vets, agricultural supply chains, auctioneers, accountants, land agents, and other professionals closely associated with this sector.
- Harvesting the Future Project (Torrige)
- Dartmoor and Exmoor Hill Farm projects
- Various biogas and other significant RE installations fuelled by land based products.
- Soil Association
- Supermarket chains

Heart of the SW Business Context

Agriculture and Food and Drink are important sectors in Devon and Somerset with major land and employment footprints, and some international brands (e.g. cider, yoghurt etc.).

The Government-commissioned ERC Research Paper No.15, ‘Localisation of Industrial Activity across England’s LEPs’, identified that the sectors of key importance in terms of Location Quotients included agriculture-related activities. The table below shows that 11 of the Heart of the SW’s top 20 SIC codes by Location Quotient are in the agri-food sector. This therefore shows a clear area of comparative advantage.

SIC Codes	Location Quotients	Jobs
Manufacture of cider and fruit wines	15.42	437
Butter and cheese production	10.51	1153
Growing of other tree and bush fruits and nuts	7.83	133
Raising of cattle and other buffaloes	7.67	1196
Wholesale of grain, unmanufactured tobacco, seeds and animal feeds	6.64	1242
Raising of dairy cattle	6.01	1721
Wholesale of agricultural machinery, equipment and supplies	4.10	1138
Liquid milk and cream production	4.01	589
Wholesale of live animals	3.9	109
Farm animal boarding and care	3.81	171
Wholesale of dairy products, eggs and edible oils and fats	3.58	875

The same report shows that the ‘agri-tech’ sector as defined by Government’s industrial strategy has a Location Quotient of between 2-3 in the Heart of the SW.

Another important element of our agri-food sector, is our fisheries which are a mature and important industry in the coastal communities of the Heart of the South West. The LEP is home to Plymouth, the largest fishing port in terms of tonnage landings in England and Brixham with the

highest value of catch landed in England worth £27m in 2012, as well as 28 other working ports and aquaculture.

Devon is the most wooded county in the region with 64,668 hectares (9.6%) of which 60% is currently under managed and 84% is privately owned. There is huge economic and landscape potential from properly managed woodland and forestry.

Current Examples of agri-food Innovation Activity

- ✓ Using ‘green’ techniques to utilise waste from the food and construction sector to improve soils;
- ✓ Development and manufacture of specialist machinery designed to plant Miscanthus by a Somerset farmer. The planter is now recognised globally as the leading planter for elephant grass;
- ✓ New products, for example farmed sturgeon by the Exmoor Caviar Company.
- ✓ Exmoor-based Shearwell Data which provides a range of goods to aid identification of cattle and sheep from ear tags to electronic identification systems. The EID technologies can be used to improve herd and flock performance by providing data specific on individual animals to help in selective breeding etc.

Global and National Context

Nationally agriculture generates £8.7bn in GVA (0.7% of GDP), employing 440,000 people. One third of agricultural businesses generate 92% of the output of the entire sector (Defra Farm business survey). This is due to a range of factors including geography, farm size, training & skills and degree of uptake of new and existing innovative technologies. Average farm size is about 50 ha, however the majority of the land is farmed by smaller number of holdings over 100ha.

Agricultural science and technology is one of the world's fastest-growing and exciting markets. It is driven by global changes: a rising population, climate change, rapid development of emerging economies with western lifestyle aspirations, and growing geopolitical instability around shortages of land, water and energy. A technology revolution is also taking place. Breakthroughs in nutrition, genetics, informatics, satellite imaging, remote sensing, meteorology, precision farming animal health and low-impact agriculture are driving major global investment in agri-tech.

The entire agri-food chain, from agriculture to final retailing and catering is estimated to contribute £96 billion or 7% of GVA and employs 3.8 million people. The UK exported £18 billion of food, feed and drink in 2012 and is one of the top 12 food and drink exporters.

Strategic Context

In 2012, the Government's industrial strategy identified 'Agri-tech' as a key industrial sector and agricultural science as one of the 8 great technologies. This is now supported by the UK Strategy for Agricultural Technologies⁹, which sets out drivers and opportunities as well as a series of actions for Government and industry to deliver in partnership.

The key challenge articulated in the strategy, is ***how we can feed a growing population without damaging our natural environment.***

It has become a focus for significant government investment, £160 million in total, comprising £70 million for Agri-Tech Catalyst funding and £90 million for Centres in Agricultural Innovation, to develop, adopt and exploit new technologies and processes. The Agri-Tech Catalyst will provide a single fund for projects, from the laboratory to market, the

9

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/227259/9643-BIS-UK_Agri_Tech_Strategy_Accessible.pdf

second call for the Agri-Tech Catalyst is now open, with two calls planned a year until £70 million is spent. The calls for Centres in Agricultural Innovation are expected during 2014, the first, anticipated for April, will be focused around Agricultural Informatics. The remaining calls are anticipated for summer 2014 and the focus of these is currently being developed with industry.

In October 2013 Environment Secretary Owen Paterson launched the refreshed Food and Drink International Action Plan. Last year UK food and drink exports amounted to £18.2bn. This is nearly 50% higher than a decade ago. The new plan builds on the joint industry and Government Exports Action Plan launched in 2012 and reflects Government and industry's ambitious commitment to increase exports even further.

Local

Most local county or district economic development plans will contain something around sustainable use of our natural environment. The Exmoor National Park Partnership Plan also includes a specific action to research how '***sustainable intensification***' can operate in an upland context and designated landscape.

Key Assets/Infrastructure

FE/HE

Exeter University

The University of Exeter has research specialisms and industry relationships in key areas for agri-tech, these include world leading plant pathology and crop protection research, pollination biology, animal health and welfare including agriculturally important livestock such as

dairy cows, rural policy and economics, supply chains, food and nutrition, climate change, soil science, environmental and ecosystems science, engineering and additive layer manufacturing. Highlights include:

- Exeter is leading **Defra's landscape scale Sustainable Intensification Platform Project** (£2m) which will underpin the agri-tech strategy to develop an understanding of how to get novel interventions and strategies out to the farming community.
- Exeter has invested in a £9m state of the art **aquarium** which supports a research strength in aquaculture as a source of protein production, an area of research highlighted in the agri-tech strategy (Exeter was awarded an agri-tech catalyst grant in the first round of awards for developing novel cultivation techniques for the lobster).
- Exeter's Centre for **Rural Policy Research** brings together an interdisciplinary group focused on rural economy and society including, agricultural, environmental and bioenergy policy, sustainable land management, agro-food regulation, sustainable communities, social and economic development of agriculture and the impacts of climate change on farming and land use.
- Sustainable water systems – The [Centre for Water Systems](#) meets a real need for research into water systems engineering. Supporting, developing and operationalising sustainable water management is a key challenge for the future that is strongly addressed by the Centre's activities.
- **Climate change and earth system science** - strengths in climate dynamics, the global (especially the land) carbon cycle, assessment of mitigation, adaptation and geoengineering options, vulnerability and resilience of individuals/societies, oceanographic observations and modelling and Quaternary paleo-research.

[Plymouth University](#)

The **Centre for Agricultural and Rural Sustainability (CARS)** at Plymouth University provides key analytical facilities (genomics, aquaculture, ecotoxicology and ISO9000 accredited chemical analytical laboratories) and a Nanotechnology centre. CARS extends into Cornwall with a partnership in research training with Duchy College at Stoke Climsland and Rosewarne.

[Other Research Assets](#)

- **North Wyke** – North Wyke is part of Rothamstead Research and provides a globally unique farm platform that can be used to test a range of research scenarios, across 3 hydrologically isolated farmlets. The Farm Platform provides three farming systems consisting of five component fields comprising just over 20 ha in total per farmlet. All the water leaving individual fields is channelled through a flume. Each farmlet is managed differently and the impact on water, air and soil and livestock production recorded. As a National Capability, it provides a set of quality controlled core data from across the Platform that is available to all research users and collaborators.
- **Fossil Free Farming (F3)** – F3 is a partnership project in sustainable land-use led by Bicton College and Dartington Hall Trust Estate. The project aims to demonstrate sustainable intensification, evidencing increased productivity from less land through the integration of good agricultural practice and advanced technologies.
- **Duchy College** – There are a number of specialisms provided by the college, which although based outside the HOTSW LEP area, provides services throughout the south west and beyond. Key specialisms include:
 - Duchy College Stoke Climsland and Rosewarne. Significant infrastructure exists at the College. Duchy College is now one

of the largest specialist land-based colleges in the UK. Significant investment is being made in new applied research facilities in dairy production, agricultural and land-based technologies, animal management and higher education. The college already houses class leading knowledge and skills facilities for food production and added value at its Stoke Climsland Agri-Food Innovation Centre.

- Duchy College Rural Business School (RBS): the largest successful programme of knowledge exchange under RDPE in the UK. The SW Skills Framework and Healthy Livestock projects have delivered more than 1,000 training events to 9,700 farmers/foresters in Devon & Somerset over the last three years. www.ruralbusinessschool.org.uk
- Rural Business Research www.fbpartnership.co.uk. The most comprehensive data collection and analysis resource for farm business economics in the UK is based at Duchy College's Devon offices in Exeter.

Commercial Assets

- Holsworthy Agri-Business Centre the other modernised markets at Bridgwater, Exeter and Cutcombe which could provide the focus for Agri-tech developments.
- Sedgemoor Auction Centre and Junction 24 Ltd
- Date Palm Developments in Glastonbury - a leading producer of date palm plants by tissue culture and exports worldwide (<http://www.date-palm.co.uk/>)
- Royal Bath & West Agricultural Society (RBWAS) who plan to develop an agri-tech centre of excellence at the Bath & West Showground.
- Yeo Valley, due to the scale of their operations and supply chain.

Partnerships and Collaborations

- University of Exeter, Rothamsted and Bristol Vet School are leading partners in Defra's Sustainable Intensification Research Platform starting in May 2014. Exeter is leading one of the three SI Platform projects.
- Currently 4 major projects run in Cornwall and the SW in partnership with AHDB and Duchy College in Cereal Production, Brassica production and Animal Health, and upland management.
- The Food Security and Land Research Alliance www.fslra.ac.uk/about/ (includes: Rothamsted Research, Exeter University, Bath University, Cardiff University and Bristol University).
- Rothamsted Research/Duchy College, Exeter and Bristol universities are partners in Defra's Demonstration Test Catchment Consortium.
- Healthy Livestock - New approaches to ruminant animal health are being successfully rolled out in Devon and Somerset, with real on-farm impact, through a collaboration led by Duchy College Rural Business School's 'Healthy Livestock' project. The work involves rolling out successful initiatives from research (e.g. Bristol University, Royal Veterinary College and internationally) with locally based livestock health informatics company (Myhealthyherd.com) and all farm veterinary practices. This is now being taken up as a national model.

Delivery Capacity

Business Networks

- South West Food & Drink
- NFU
- West Country Rivers Trust
- North Devon Biosphere
- Royal Bath & West Agricultural Society (RBWAS)
- Harvesting the Future Project (Torrige)
- Dartmoor and Exmoor Hill Farm projects
- Soil Association
- Member's farm suppliers (e.g. Mole Valley)

Collaboration with Other LEPS

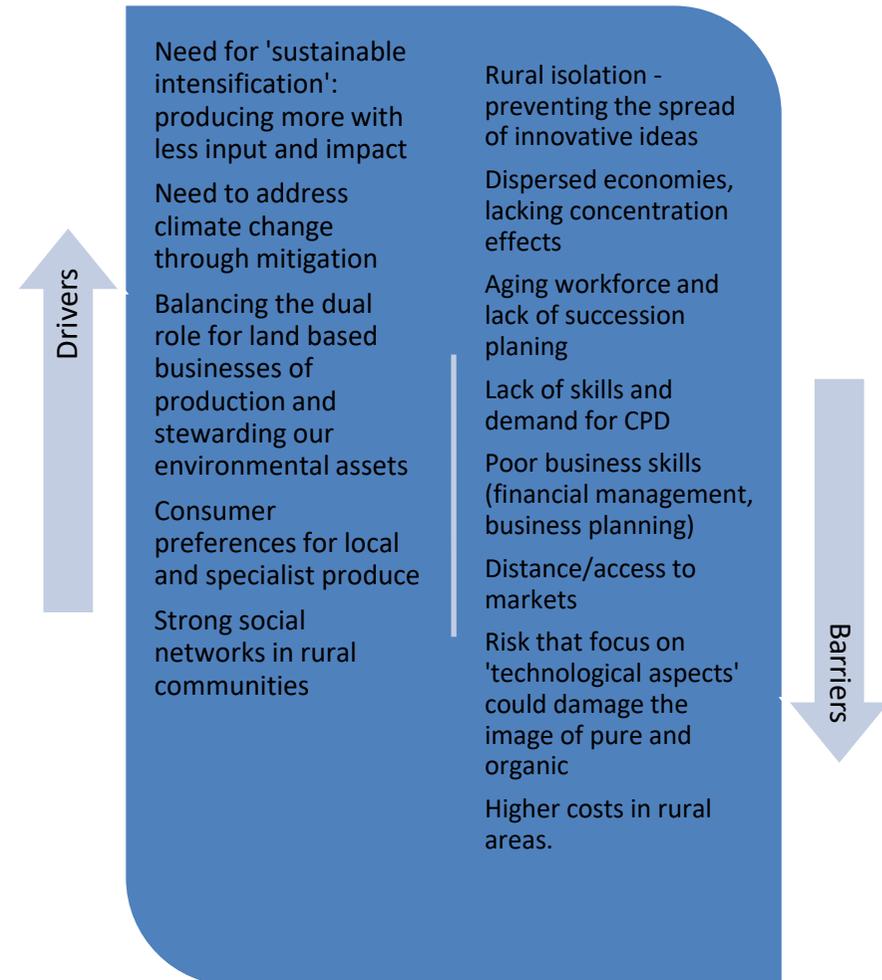
The Heart of the SW LEP is currently in discussions with the Cornwall and Isles of Scilly LEP about joining a pan-LEP initiative, which aims to bring together LEPS in the SW, with those in the East of England. The proposed initiative has been developed in consultation with the Agr-tech leadership council and the Agriculture and Horticulture Development Board, with a view to ensuring that EUSIF funded activity complements nationally funded research. By working collaboratively we aim to secure a stake in a wider initiative, allowing agri-food businesses in the Heart of the SW to benefit from a broader portfolio of investments/expertise.

It is proposed that the broader SW 'spoke' of this initiative, could cover a shared common focus of 'ruminant animals' and 'speciality crops'.

Connectedness and Relatedness

The agricultural science AEA has closely related to the Environmental Science AEA. In particular, climate and water science/management have a direct bearing on the issues of sustainable intensification (producing more with less) articulated previously.

Drivers and Barriers to Growth



Conclusion – Should this opportunity be an Area of Smart Specialisation?

Yes, the agri-food sector is an important sector in the Heart of the SW, contributing to the economy through direct outputs, as well as indirect benefits (such as environmental stewardship). Given the size of the sector, improving productivity through innovation could achieve a significant impact on our overall productivity. The agri-food sector is one of our strengths and an area where we currently show comparative advantage. We have, within the Heart of the SW, nationally recognised research and education assets, whose activities are already aligned with the national agenda of ‘sustainable intensification’.

The opportunity to collaborate on a pan-LEP initiative around agri-tech Smart Specialisation, could potentially provide an opportunity to achieve significant ‘added-value’ to the Heart of the SW, allowing our businesses to access a much broader range of support than would be possible with our resources alone.

Given the breadth of the agri-food sector and our similarities with Cornwall and the Isles of Scilly, it would be sensible to align our area of focus with theirs, namely: Ruminant animals and speciality crops.

It is recommended that the LEP continues discussions with Cornwall and the Isles of Scilly LEP and other partners in the East of England to explore this opportunity further.

Potential Actions (innovation action highlighted in blue)

Place

What facilities/infrastructure are needed to support growth in this area?

- Improving access to markets through improved broadband (through EUSIF -Digital activities)
- Encouraging rural entrepreneurship through enterprise facilities (through EUSIF- Enterprise activities)

Business

How can we support businesses to exploit this opportunity?

- Encourage collaborative working and engagement with research and knowledge organisations
- Encouraging innovation in the form of technology, land management, systems approaches in the Heart of the SW context
- Commercialisation/Application/translation of 'national/global' agri-tech research into a SW context
- Supporting Heart of the SW businesses and organisations to participate in national initiatives

People

What skills do we need to exploit this opportunity?

- Continue to incentivise businesses in the sector to develop their skills and plan for succession to open the way for an entrepreneurial workforce
- Leadership and management skills in a rural context (through EAFRD)

Smart Specialisation –Environmental Sciences

Introduction

There are a number of terms which are used to describe this sector, and the definition used to develop this template is outlined below:

- Environmental sciences, covering atmospheric, terrestrial, freshwater and marine, which covers pollution control and mitigation, meteorological sciences, climate change, ecology and environmental monitoring, impacts on ecosystem goods and services.

Consultation and Engagement

A wide range of partners were consulted in the development of this paper including:

- ✓ Upper tier local authorities
- ✓ Plymouth University
- ✓ Exeter University
- ✓ Met Office
- ✓ Landmark
- ✓ Atass Group
- ✓ Space for Success
- ✓ Exeter Chamber of Commerce
- ✓ Devon and Cornwall Business Council
- ✓ South Devon College
- ✓ UK Hydrographic Office
- ✓ Exeter City Council

¹⁰ Exeter, Knowledge Economy Strategy and Action Plan, October 2013, Exeter City Council.

- ✓ EXista Group members

Heart of the SW Business Context

The Environmental Sciences sector is not easily measured through standard SIC code techniques, therefore it is very difficult to estimate the number of businesses operating in this sector.

The Exeter Knowledge Economy Strategy and Action plan¹⁰ highlights:

- **The Met Office** – Employing 2,000 people, of which 500 are based in scientific and research activity, the Met Office provides an important differentiator in the Exeter knowledge economy. The Met Office provides services across defence and government, public weather service, climate change; health, transport and business. It also works closely with the water industry through the **flood forecasting centre**, which is jointly staffed by the Met Office and the Environment Agency. Another area of growth is Space Weather, where the Met Office is working in collaboration with the US Space Weather Prediction Centre and the National Oceanic and Atmospheric Administration. The Met Office has a supply chain of 1,598 companies, 225 are classified as SMEs, with a strong supply chain in Devon. The Met Office is currently awaiting a final decision from BIS on the approx. £100 million investment in its new supercomputer, but it is likely that Exeter will be the home to Europe's biggest environmental supercomputer over the next couple of years. Part of this supercomputing investment is likely to be based on the new Exeter Science Park, which will support collaborative business facing activities with the University of Exeter.

- **Environment Agency** – A regional office in Exeter employing 450 staff, including **Climate South West**, which has a remit to ascertain the effects and impacts of climate change in the region and develop adaption responses from industry.
- **South West Water** – South West Water is head-quartered in Exeter and employs 1,250 staff. Staff work in diverse areas including geotechnical, waste, water and infrastructure. It also has 50 staff employed in laboratories in Exeter. It has strong links with Exeter University and the Met Office. South West Water spends approximately £250m/year through its supply chain, with a strong focus on spend in the regional economy. It has a number of spin-outs including '**Aquatic Services**', who provide analytical services and surveys.
- The **Marine Biological Association (MBA)** aims to promote scientific research into all aspects of life in the sea, including the environment on which it depends, and to disseminate to the public the knowledge gained. The MBA was founded in 1884 and in 1888 opened the Plymouth laboratory at Citadel Hill. It has a Royal Charter and conducts research into key marine life processes with local, national and international collaborations. It is the primary advisor to Government on marine biological science. It is also involved with R&D companies such as Cairn Research Ltd., Leica and Nikon, as well as with the local shellfish industry.

Global/National Context

The Department for Business Innovation and Skills (BIS) 'Adaptation and Resilience Climate Change Report (2013) indicates that global Adaptation and Resilience for Climate Change sales in 2011/12 were worth £68.7bn. Globally, the UK has 3.1% of the market share, with £2.1bn sales.

Strategic Context

The Environmental Sciences 'sector' has not been identified as a UK key industrial sector or one of the eight great technologies within the industrial strategy. However, through the application of technologies, there is strong alignment with key industrial sectors such as Aerospace (e.g. through satellite and sensor technologies), Agri-tech (through environmental monitoring, pollution control, sensors etc.) and Professional Business Services (through consultancy and engineering).

Key Assets/Infrastructure

FE/HE

Exeter University

The University of Exeter has grown significantly in recent years with a 50% increase in research income since 2008/09. It is now in the Russell Group of research intensive universities and is a top 10 ranked university according to all four of the main higher education league tables. We believe the future of research lies in breaking down traditional barriers between academic disciplines and we have a number of **interdisciplinary research themes**, which focus on some of the most fundamental issues facing humankind today. Of particular relevance these key themes include climate change and sustainable futures, environment and sustainability and food security.

The University of Exeter has key research strengths relating to this AEA, key groups include:

- **Climate change and earth system science** - strengths in climate dynamics, the global (especially the land) carbon cycle, assessment of mitigation, adaptation and geoengineering options, vulnerability and resilience of individuals/societies, oceanographic observations and modelling and Quaternary paleo-research.

- **Sustainable water systems** – The [Centre for Water Systems](#) meets a real need for research into water systems engineering. Supporting, developing and operationalising sustainable water management is a key challenge for the future that is strongly addressed by the Centre’s activities.
- **Environmental bioscience** - strengths are freshwater and marine pollution and ecotoxicology, evolutionary biology and ecology, ecosystems and the goods and services they provide, impacts of people on ecosystems, and climate-ecosystem feedbacks. This group includes the [Centre for Ecology and Conservation](#), the [Environment and Sustainability Institute](#) and [Environmental Sciences](#).

Other related centres include:

- [The Energy Policy Group](#)
- [Responsible/eco-innovation](#)
- [The Social, Environmental and Organisational Research Group](#)
- [European Centre for Environment and Human Health](#)

The University of Exeter and the Met Office have a long-standing strategic partnership, and are working together to establish a **Global Environmental Futures Campus** on the new Exeter Science Park. Sitting alongside the Met Office’s proposed new supercomputer; this campus will act as a nucleus for world-leading business innovation and impact in the environmental sector, attracting specialist units from larger companies as well as high-growth SMEs. This will play into the combined world-leading expertise of the University of Exeter and the Met Office in the areas of climate change, environmental science and statistics.

These two organisations are already working together successfully on the **Centre for Business and Climate Solutions (CBCS)**, a £2 million European funded centre supporting South West SMEs to adapt and mitigate against

future climate change and extreme weather, support carbon reduction targets and take advantage of commercial opportunities from climate change, as well as supporting the innovation of climate change related technologies.

The announcement in July 2013 of the University of Exeter’s strategic partnership with IBM as the University’s first strategic corporate partner presents an opportunity for the water industry. The partnership aims to encourage collaboration in areas such as water management, smart metering and analytics.

[Plymouth University](#)

Plymouth's research centres in environment and sustainability work to provide a gateway to researchers who undertake a range of activities in key areas including: earth and environmental science; transport, climate change; globalisation; food security; sustainable business solutions, biogeochemistry; and pollution. Key specialisms include:

- The **Biogeochemistry Research Centre (BGC)** has an active research programme in understanding the environmental behaviour, fate and impact of nutrients, and metals in terrestrial, atmospheric and aquatic systems and the fate of pharmaceuticals and plastics in the environment.
- **Ecotoxicology** at Plymouth addresses fundamental questions about the mechanistic effects of substances on aquatic organisms and other wildlife, including a horizon scanning capability for new and emerging threats. The centre provides innovative practical solutions in areas such as animal health diagnostics, biomarkers for environmental monitoring, tests and analytical methods for ecotoxicology and chemical detection.
- The **Electron Microscopy Centre** has a comprehensive range of state-of-the-art microscopes and image processing/analysis

software to provide support for a wide range of applications within the university and for external research establishments and industry.

Delivery Capacity

Business Networks

No sector specific business networks have been identified to date.

Collaboration with Other LEPS

National centres of excellence for this AEA potentially include:

- The Centre for Ecology and Hydrology which is part of the National Environment Research Council and is the UK's Centre of Excellence for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere. It is located across 4 research sites in England, Wales and Scotland, including a base at the Lancaster Environment Centre at the University.

Connectedness and Relatedness

The Environmental Sciences have strong connections to other potential areas of Smart Specialisation, through over-lapping research, technology transfer etc. For instance:

- Environmental science has a very strong linkage with Big Data;
- Monitoring and sensor technology developed to monitor weather/environment could have applications in Aerospace; and
- Environmental sciences and in particular freshwater sciences are closely connected to agricultural sciences.

Conclusion – Should this opportunity be an Area of Smart Specialisation for the Heart of the SW?

Yes – The Heart of the SW has considerable commercial and research assets within the Environmental Sciences field, which could be further exploited to develop a world leading knowledge based cluster.

Key areas for specialisation include:

- Climate science and environmental futures, building on the Met Office asset and plans to develop an Environmental Futures Campus.
- Water Management – building on our existing commercial and research assets.

Potential Action (innovation action highlighted in blue)

Place

What facilities/infrastructure are needed to support the growth of this area?

- Secure Met Office supercomputer investment in Exeter to provide climate advice and ensure that there are additional/knock on research and benefits locally and nationally;
- Secure investment in the Global Environmental Futures Campus (through the 15/16 Growth Deal)

Business

How can we support businesses to exploit this opportunity?

- Build links between the academic institutions and local companies and investors - providing robust and dedicated intervention and brokerage support. Specialist translators are required to operate at the interface of business and academia to stimulate interaction, innovation and wealth creation
- Promote the areas expertise in adaption and resilience to climate change (A&RCC) as a national centre for expertise
- Support businesses/institutions to access national opportunities (e.g. through the Horizon 2020, TSB, etc.)
- Encourage spin-outs from universities, research establishments and FEs.
- Attract inward investment/exporting by working with UKTI
- Ensure appropriate business support, IP expertise and workspace is available for start-up and growing companies.

People

What skills do we need to exploit this opportunity?

- To be developed.

Smart Specialisation – Health and Social Care

Introduction

The Initial Review identified Health and Social Care as a potential area of Smart Specialisation, recognising the large employment footprint of the sector and key assets such as teaching and research hospitals. A key focus of the review was to explore and identify any niche areas/specialisms within this broader sector, where we have a comparative advantage. This recognises the competitive nature of the health sciences sector across the UK and therefore in order to succeed, it is important to have a clear rationale that leverages existing assets to differentiate the Heart of the SW.

For the purpose of this document, the term “health sector” is used to define both human health activities¹¹ and the life science sectors¹². This definition includes the following overarching market segments:

- **Medical technology:** businesses whose major activity involves the development, manufacture, or distribution of medical devices as defined by European Union Medical Devices Directive and companies who have significant activity in supplying specialist services to the medical technology sector.
- **Medical biotechnology:** businesses discovering or developing new therapeutics that achieve their principal action in or on the human body by pharmacological, immunological or metabolic means. This also includes companies who derive the majority of their revenue from

products and services that they supply to other companies in the sector (i.e. supply chain).

- **Pharmaceuticals:** businesses whose major activity is the research and development of therapeutic products irrespective of the underlying technology involved. This also includes companies who are contract manufacturers, contract service organisations, and pharmaceutical wholesalers are included in this sector.
- **Health care services:** Organisations involved in the provision of health care services, including general and specialist activities.

Consultation and Engagement

The document has been prepared based on the South West Academic Health Science Network’s (SW AHSN) engagement with key stakeholders across the region during the initial development of a health economic development strategy for the South West region.

Heart of the SW Business Context

The Medical and Healthcare sector represents a significant component of the Heart of the SW economy – 112,900 employees (14% of the labour force) and £2,727 GVA (10% of total output). According to forecasts from Oxford Economics the sector is expected to grow at a faster rate than the industry average between 2010 and 2030 with net 7,300 FTEs created across the LEP area. Examples of key players include:

- Actavis
- Perrigo
- Viva Bioscience
- Karomed Ltd

¹¹ UK Standard Industrial Classification (2007). Available at: <http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/standard-industrial-classification/index.html>

¹² Strength and opportunity 2013: the landscape of the medical technology, medical biotechnology, industrial biotechnology and pharmaceutical sectors in the UK: annual update - February 2014.

Available at: <https://www.gov.uk/government/publications/bioscience-and-health-technology-database-annual-report-2013>

- Cory Medical Ltd
- Protexin PROBIOTICS INTERNATIONAL LTD

Note: It is recognised that there is a relatively limited understanding of the size and structure of the health and life science industry in the South West region. For this reason, the SW AHSN intends to commission the development of a comprehensive database of health and life science businesses in the South West in collaboration with LEPs and local authorities- based on existing and new data sources.

The Global/National Context

During the last forty years the UK health and life science industry has been a global success. The industry has grown faster than the economy as a whole and now consists of around 4,500 firms employing 165,000 staff with a combined annual turnover in excess of £50bn. As a result, life science industries now account for 8% of UK total GVA¹³.

However, global health and life science sectors are undergoing significant and rapid change. The impact of ageing populations, changing lifestyle choices and the rise in chronic conditions will require a transformation of healthcare and health industries. These environmental changes, alongside fiscal pressures across the UK, suggest that NHS England alone will need to **create £30bn of productivity gains per year**¹⁴ in order to meet the anticipated funding gap between now and 2021.

In parallel, global restrictions on healthcare budgets, the end of patents for a number of major drugs and the development of new biological insights

have dramatically changed the landscape of discovery and development in the life science sector.

Strategic Context

National

Life science has been identified as a key sector within the UK government industrial strategy and forms one of eleven key sectors, mapping to a number of the ‘eight great technologies’ including big data, synthetic biology, advanced materials, robotics and regenerative medicine.

The three key principles of the Strategy for UK Life Sciences (2011) are underpinned by new and existing initiatives to position the UK as a global hub for life sciences. Alongside this overarching strategy for life sciences, “Innovation, Health and Wealth”¹⁵ defines NHS England’s commitment to supporting the life science sector to realise this opportunity by **creating a system for innovation that continually scans for new ideas, and takes them through to widespread use.**

Innovation, Health and Wealth represents a step-change in the way the NHS supports innovation and enterprise. Key commitments include increasing the accessibility to evidence and information in the NHS, the establishment of a systematic delivery mechanism to enable diffusion and adoption of innovation and improving procurement arrangements to enable innovation and drive up quality and value.

Recent research¹⁶, alongside consultation with the NHS and regional businesses highlights the need for the NHS to **create an innovation**

¹³ Strategy for UK Life Sciences, Department of Business, Innovation and Skills (2011). Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32457/11-1429-strategy-for-uk-life-sciences.pdf

¹⁴ Monitor (2014): *Closing the NHS funding gap: how to get better value healthcare for patients.*

¹⁵ Innovation, Health and Wealth (2011), NHS England. Available at: <http://www.england.nhs.uk/wp-content/uploads/2014/02/adopt-diff.pdf>

¹⁶ Strength and Opportunity 2013: the landscape of the medical technology, medical biotechnology, industrial biotechnology and pharmaceutical sectors in the UK: annual update - February 2014.

ecosystem focusing on “pulling innovations from industry into the NHS”, rather than the traditional “push approach” from industry into the NHS. This will require a fundamental shift in the way the NHS engages industry to enable businesses to focus innovation on ‘real’, tangible opportunities.

Local

At a regional level, the implementation of the principles of Innovation, Health and Wealth has resulted in the development of a number of functions to support the development of research in the region and realise the potential of the health and life sciences as a driver for regional economic growth. A core aim of these functions is to **realise the opportunity to leverage a regional health budget in excess of £2.7bn to catalyse the growth of health and life science sectors** through investments such as:

- A five year investment of approximately £10m through the **South West Academic Health Science Network**¹⁷ to accelerate the process of identifying, adopting and spreading innovation within the health system. The SW AHSN will act as a gateway to the NHS for the health and life science industries to support the rapid adoption of commercial innovations.
- A five year, £10m investment to support the continued development of the **NIHR CLAHRC SWP**¹⁸, a partnership between the two regional universities and the NHS in Devon, Somerset and Cornwall to fund research in the South West region focusing on five main themes: mental health & dementia, diagnostics and

Available at: <https://www.gov.uk/government/publications/bioscience-and-health-technology-database-annual-report-2013> | UK Life Science Strengths and Opportunities 2013. UK Dept BIS. Bain & Company (2013): Opportunities in Integrated for Pharma and Medtech- When, Where and How Should Manufacturers get involved? | Small Business Research Initiative- Healthcare: <http://www.sbrihealthcare.co.uk/> | Innovation, Health and Wealth (2011), NHS England. Available at: <http://www.england.nhs.uk/wp-content/uploads/2014/02/adopt-diff.pdf>

stratified medicine, healthy people, healthy environments, person-centred care, and evidence for policy and practice

- The ongoing development of **NIHR Clinical Research Network South West Peninsula** to improve the regions engagement in clinical research in the South West region.

The strategic engagement of these NHS activities presents a unique opportunity for industry to work in partnership with the key UK customer for the health and life science sectors.

Key Assets/Infrastructure

FE/HE

Key HE/ FE assets in the region include:

- University of Exeter medical school
- Plymouth University Peninsula Schools of Medicine and Dentistry
- National Institute for Health Research: Collaboration for Leadership in Applied Health Research and Care- South West Peninsula
- Research, Innovation, Learning and Development Centre in Exeter.
- The Horizon Centre in Torbay- an innovation, education and research facility.
- Tamar Science Park (spin-outs from Derriford Hospital and Plymouth University),
- Plymouth International Medical and Technology Park

¹⁷ <http://www.swahsn.com/>

¹⁸ National Institute for Health Research: Collaboration for Leadership in Applied Health Research and Care- South West Peninsula, Research Themes: <http://clahrc-peninsula.nihr.ac.uk/news/150-penclahrc-to-receive---10-million-in-funding-for-south-west-health-research-for-next-five-years.php>

Exeter University

- **Diabetes, Cardiovascular risk and Ageing:** Diabetes and associated metabolic conditions are among the most important medical challenges facing the world today. Exeter has a particular strength in this area with researchers focusing on the causes of diabetes and improved treatments for patients. The mechanisms of disease and the links between diabetes, accelerated aging and increased cardiovascular risk are also explored.
- **Environment and Human Health:** The research carried out by the European Centre for Environment and Human Health focuses on several key strands, which interweave to form an interdisciplinary research agenda. The centre specialises in a number of disciplines from Epidemiology and GIS to Health Economics and Horizon Scanning, and these methods are used across each of our core research themes: Active ageing; Climate & health; Emerging pollution risk; Healthy workplaces; Oceans & human health; Wellbeing & the environment.
- **Neuroscience and Mental Health:** The Neuroscience and Mental Health theme embraces neurology research across the whole translational spectrum from basic science to mental health research and is funded by MRC, Wellcome and NIHR. Exeter are building on Peninsula College of Medicine and Dentistry's strong track record in neurological clinical trials and outcome measures research.
- **Health Services Research:** Health Services Research consists of investigation of the ways in which health services are organised, delivered and experienced and how they could be made more effective. Health Services Research work is supported by a range of funding bodies and includes several HTA funded clinical trials, evidence syntheses to support NICE decision making, NIHR programme and project grants, and projects supported by several

charities as well as the Medical Research Council and other funding bodies.

Plymouth University

One of Plymouth University's five research institutes is the '**Institute for Translational and Stratified Medicine (ITSMED)**'. This new institute in the Plymouth University Peninsula Schools of Medicine and Dentistry is translational oriented and works across traditional boundaries. It will integrate strength of Plymouth University, the new medical school and Plymouth University Hospital. It builds on existing world class researchers at these institutions and will recruit the best scientist from around the world to further strengthen its research areas.

Part of the ITSMED will be biomedical staff from the **Centre for Research in translational biomedicine (CRTB)** and Plymouth University, which has strength in postgenomic medicine and is a corner stone for stratified medicine. ITSMED will have three core centres each led by experts in the field. ITSMED has three core centres each led by experts in the field:

- Centre for Clinical Trials and Health Research;
- Centre for Medical Statistics/Bioinformatics; and
- Centre for Biomedical Science.

In addition to ITSMED and its centres, Plymouth University also has the following research centres relating to health:

- **Health and Social Care Innovation**
- **Biostatistics, Bioinformatics and Biomarkers**
- **Translational Biomedicine**

Non HE/FE

There are a number of key assets that present opportunities for creating regional competitive advantage:

- **Distinctive Demographics:** The increasing, ageing population presents a significant opportunity to develop health and life science industries in the region. The Heart of the SW has a significant over-representation of older people with 49.5% of the population aged over 45 and 22% above the age of 65; 6% higher than the national average¹⁹. The 2012 report²⁰ commissioned by Torbay Council highlights the opportunities for economic regeneration arising from this elderly demographic and the resulting changing nature of healthcare provision, including an increased focus on prevention, early intervention and community-based service models. Further analysis of the report findings by the SW AHSN in 2014 suggests these *demographics, alongside the regions strength in leading the development of integrated care systems* (see below) presents an opportunity to catalyse innovation within the regional economy and stimulate economic growth. This work highlighted the opportunity to attract businesses to research, pilot and test innovations²¹ in the region, alongside catalysing the regions hi-tech SME cluster, emerging pharmaceutical cluster and the broader entrepreneurial community to respond to clearly defined challenges in the health system identified through the increased investment into health research.
- **Leaders in the transition to integrated care:** The region has built a reputation around leading the transition to integrated models of care in response to the changing demands of an increasingly elderly population with chronic health conditions. The Torbay region is one of only *fourteen pathfinder sites in England with “Integrated Care Pioneer Status”*²² and the Symphony project in Somerset holds some

of the most sophisticated analysis of the health economics of integrated care in the UK. Coupled with the region’s aging demographic, alongside advancements in the region’s health data and information management systems, this backdrop creates a compelling opportunity to develop commercial health research and innovation focused on integrated care systems.

- **Securing Quintiles “Prime Site” status:** Quintiles, the world’s largest biopharmaceutical service organisation, has recently selected the South West region as “Prime Site” for commercial clinical trials. This enhances the region’s opportunity to work in collaboration with industry to expand clinical research and foster relationships with academics and companies outside the region.
- **Laying the foundations for BIG Data:** The region has developed a coordinated approach to health information management and informatics. The coordination of NHS provider informatics strategies across the region- working in collaboration with the SW AHSN- has the potential to unlock new opportunities for advanced data analytics to support health research and innovation. This creates a range of new opportunities for businesses to optimise integrated health care through: a) personalised engagement of individuals in their own care, b) enhancing evidence-based care, c) ensuring the appropriate provision of care for the required clinical impact, d) enhancing service

¹⁹ ONS LEP Profiles (2012). Available online:

<http://www.neighbourhood.statistics.gov.uk/HTMLDocs/LEP/LEPD/atlas.html>

²⁰ The Old and the New: New opportunities for education, research and economic regeneration arising from the needs of older people (2012).

²¹ Bain & Company (2013): *Opportunities in Integrated for Pharma and Medtech- When, Where and How Should Manufacturers get involved?*

²² NHS England Integrated Care Pioneers: <http://www.england.nhs.uk/2013/11/01/interg-care-pioneers/>

productivity and e) focusing innovation on critical needs within the health system²³.

Delivery Capacity

Business Networks

Existing business networks include:

- SW AHSN
- ABPI regional presence
- ABHI regional presence
- Medi-links South West
- NHS Innovations South West

Collaboration

The existence of the AHSN across the SW, provides a vehicle to support collaborative cross-LEP working in this area.

Connectedness and Relatedness

The health and life science sectors also provides an opportunity to support investment into other regional smart specialisations such as Big Data, Environmental Science, Photonics and the broader development of Exeter's Knowledge Economy²⁴.

Barriers to Growth

Creating an effective ecosystem that enables the development and adoption of innovations originating from businesses in the health and life science industries is critical to ensuring the NHS addresses its productivity challenge.

²³ McKinsey & Company (2013): The 'Big Data' Revolution in Healthcare- Accelerate Value and Innovation.

²⁴ Exeter – Knowledge Economy Summary Report (2014).

Innovation, Health and Wealth²⁵ (2011) sets out a number of key barriers restricting innovation in the health system that must be overcome in order to address this productivity challenge and drive regional economic growth. These include:

- The lack of an effective and systematic architecture to support the identification and adoption of innovation from business.
- Poor access to evidence, data and metrics to catalyse and prove the value of innovations from business.
- The lack of tools, capacity and capability for commissioners and procurement teams to identify and adopt innovation from business.

Businesses attempting to innovate in the health system face a complex market structure with multiple customers²⁶ and significant variation in interpretation of innovation requirements. Even when businesses are successful in securing a single NHS customer, achieving replication into other NHS organisations requires lengthy dialogue and negotiation with each individual customers with a lack of access to appropriate data/evidence base.

The creation of the SW AHSN is an important first step in addressing these barriers. Established with the specific remit to support the identification and adoption of innovation from business to catalyse regional economic growth, the SW AHSN aims to address these barriers working in collaboration with its NHS commissioner, NHS provider and academic partners. The creation of the SW AHSN therefore presents a new and significant opportunity to catalyse the growth of the health and life science industries in the region. However, success is likely to require a collaborative

²⁵ Innovation, Health and Wealth (2011), NHS England. Available at: <http://www.england.nhs.uk/wp-content/uploads/2014/02/adopt-diff.pdf>

²⁶ There are 3 commissioning groups (CCGs) and 10 NHS Trusts in the HOTSUW region alone.

approach to developing the sector in the regional economy, developed in partnership with the SW AHSN, its members and the regional business community.

Conclusion – Should this opportunity be an Area of Smart Specialisation for the Heart of the SW?

The health and life science industry is a highly competitive market, with multiple LEPs focusing on these sectors within smart specialisation strategies. The UK already has a number of existing health and life science clusters in London, Oxford, Cambridge and Manchester.

Succeeding in developing the health AEA will therefore require a clearly defined regional strategy that leverages existing assets in the region and differentiates the region in the health and life science market to ensure regional competitive advantage.

Initial consultation with key stakeholders across the regional health system suggests Devon and Somerset's **distinctive demographics**, alongside the region's **leadership position developing integrated models of health care** could be brought together under the banner of '**healthy ageing**' to provide the foundation to a health smart specialisation strategy. These two interconnected themes have the potential to provide regional enterprise with a clearly defined innovation focus, thereby catalysing and accelerating innovation within the regional economy. Key 'problem areas' requiring new solutions are likely to include innovations that enable a) reductions in unplanned emergency and hospital admissions, b) reduce the length of stay in hospital settings and c) reduce the number of individuals requiring permanent residential care.

It is anticipated that these 'problem areas' are likely to create innovation opportunities in medical technology, high tech manufacturing, ICT Services and healthcare services. They also create opportunities to align the health specialisation with a number of other smart specialisation strategies including BIG Data and electronics/ photonics.

Potential Interventions

A successful intervention strategy will therefore require the development of a targeted programme focused on engaging existing expertise in the region and catalysing entrepreneurs to respond to clearly defined innovation challenges defined in partnership with the NHS. It is anticipated that key interventions are likely to include:

- **The development of an innovation ecosystem within the regional health sector:** supporting businesses and academia to understand specific challenges requiring innovative solutions, providing a mechanism for businesses to test, develop and evaluate innovations and ensuring businesses develop the appropriate evidence base to support regional adoption and growth outside the region/ UK. These activities are directly aligned to the remit of the SW AHSN and the network is already in the process of developing the foundations for this intervention area.
- **A programme of financial and business development support to enable the development, testing, incubation and growth of SME and entrepreneurial innovations** responding to defined challenges in the health system. A national example this type of approach is the health themed of the TSB²⁷ led SBRI²⁸ programme.

²⁷ Technology Strategy Board

²⁸ Small Business Research Initiative- Healthcare: <http://www.sbrihealthcare.co.uk/>

- **A programme of financial and business development support to enable the development, testing, incubation and growth of social enterprise** responding to defined challenges in the health system. This creates an opportunity to align ERDF and ESF programmes through the development of regional social investment funds to catalyse social innovation in the health sector.
- **A programme of financial and business development support to enable the commercialisation of university and NHS spin-outs focused on responding** defined challenges in the health system.

The overarching, long-term ambition for the health smart specialisation strategy is to use this programme of work to **position the Heart of the SW as a hub for integrated care research, development and innovation**. Achieving this ambition will provide the region with a platform to drive targeted inward-investment based on proven specialist capability in the health sector.

Smart Specialisation – ICT/Big Data

Introduction

The initial review concluded that the ICT sector per se did not exhibit a particularly strong comparative advantage, however, 'Big Data' warranted further investigation. Therefore this in-depth review is focused on the opportunity around Big Data, rather than the ICT sector more generally.

Consultation and Engagement

A wide range of partners were consulted in the development of this paper including:

- ✓ Upper tier local authorities
- ✓ Plymouth University
- ✓ Exeter University
- ✓ Met Office
- ✓ Landmark
- ✓ Atass Group
- ✓ Space for Success
- ✓ Exeter Chamber of Commerce
- ✓ Devon and Cornwall Business Council
- ✓ South Devon College
- ✓ UK Hydrographic Office
- ✓ Exeter City Council
- ✓ EXista Group members

²⁹ Exeter, Knowledge Economy Strategy and Action Plan, October 2013, Exeter City Council.

Heart of the SW Business Context

As 'Big Data' is an approach, rather than a sector, it is not possible to use standard industrial classification systems to identify companies that use this approach. Therefore, we have a limited understanding of the Heart of the SW business context.

The Exeter Knowledge Economy Strategy and Action plan²⁹ highlights:

The presence of the Met Office in Exeter, is an asset that provides a considerable differentiator in the field of Big Data, with a deep and concentrated pool of experienced employees with specialist experience of managing and analysing big data.

In addition, Exeter has a small existing base of statistical/analytics related companies. This includes ATASS group, Solent Statistics, Tangerine Bee, Select Statistical Services, First Databank and Blur Group.

Global/National Context

It is estimated that 90% of the world's data was created in the last 2 years³⁰, and each day 2.5 billion gigabytes of data is created, enough to fill over 27,000 i-pads per minute. As set out in the Information Economy Strategy, business sectors across the economy are being transformed by data, analytics and modelling. New and emerging technologies will fuel the growth of data, as access to computing and the internet become ever more mobile, data will be transmitted and analysed continuously; and the development of the Internet of Things could mean that by 2020 sensor data will be created by as many as 50 billion connected devices across the globe.

³⁰ Seizing the data opportunity. A strategy for UK data capability.

The Centre for Economics and Business Research estimates that the big data market place could create 58,000 new jobs in the UK between 2012 and 2017, whilst a recent report from Deloitte estimates that the direct value of public sector information alone to the UK economy is around £1.8bn per annum, with wider social and economic benefits bringing this up to around £5.8billion.

Strategic Context

Big Data is identified as one of the eight great technologies in the UK industrial strategy, recognising its potential to transform every business sector and scientific funding. As such, the field is receiving national support through:

- The Information Economy Council – A collaboration across business, academia and Government, will work to provide a strategic approach to data capability in the UK.
- £189m of funding announced in the Autumn statement (2013)
- Announcement of a competition to develop the Alan Turing Institute to lead the development of Big Data research specialisms in the UK.
- Seizing the Data Opportunity – A Strategy for UK Data capability

Key Assets/Infrastructure

FE/HE

University of Exeter

The University of Exeter's computer science research spans a number of relevant areas from nature inspired computing, to bioinformatics, machine learning and high performance computing and networking. Recent academic appointments in high performance computing have significantly extended capability and capacity in this critical area and

embedded the relationships with key industrial partners including **Hauwei Technologies** and **IBM**.

Big data is an emerging theme for the University of Exeter which focusses on cross-disciplinary methodical innovation with additional expertise in quantitative and algorithm development as well as the social implications of data science. The University's expertise on data science centres around health, environment and business innovation linking methodological innovation which intersect with existing University interdisciplinary investments (e.g. Living Systems, the Environment and Sustainability Institute).

The University of Exeter and the Met Office have a long-standing strategic partnership, and are working together to establish a **global environmental futures campus** on the new Exeter Science Park. Sitting alongside the Met Office's proposed new £100m supercomputer; this campus will act as a nucleus for world-leading business innovation and impact in the environmental sector, attracting specialist units from larger companies as well as high-growth SMEs. This will play into the combined world-leading expertise of the UoE and the Met Office in the areas of climate change, environmental science and statistics.

Plymouth University

- Plymouth University's **Faculty of Science & Environment**, has expertise spanning the Big Data agenda, including IT, computing, networks, data management and cyber security.
- Plymouth University – Plymouth's **Centre for Security, Communications and Network Research CSCAN** is an established research group, comprising staff from the School of Computing and Mathematics at Plymouth University. CSCAN has a proven research pedigree, including both collaborative work with industry and participation in European research initiatives.

Secure SW is a university-business-government research programme and associated annual conference which seeks to improve privacy and cyber security in Cornwall, Isles of Scilly and the region, led by CSCAN in partnership with business.

- Plymouth's iDAT **i-DAT (Institute of Digital Art & Technology)** works predominantly across the Networked Culture and Create Design themes, and brings an established relationship with IBM through the Smarter Planet Lab, as well as a range of tools and methods to harvest and visualise real-time data for scientific and cultural applications.

Non FE/HE

- **Met Office** – The Met Office is a nationally recognised 'Big Data' asset and an important part of our knowledge economy. Its relocation to Exeter in 2003 brought 2,000 employees, a quarter of which are employed in scientific and research activity. In 2012/13, its revenues were £204.9m, with commercial services representing 10%.
- The Met Office is due to replace its super-computer in 2015, the potential location of the supercomputer at Exeter Science Park, represents a significant opportunity to leverage wider commercial activity in the field of Big Data.

Delivery Capacity

Business Networks

- **ExISta (Exeter Initiative for Statistics and its Applications)**, based at Exeter University - a membership organisation which brings together statisticians within the University, the local public and

private sector to foster and promote inter-disciplinary statistical activity;

- South West Big Data
- Big Data Insight Groups

Collaboration with Other LEPs

As a national 'great technology', Big Data is likely to be featured within Smart Specialisation strategies of a number of LEPs.

Between 2008 and 2012, around 40% of the publications related to big data were from two UK universities – University of Leeds and Cardiff university, were in the top-cited 10% of publications globally in this area³¹. None of the Heart of the SW HE institutions are in the top 20 by publication.

There are a number of potential national centres of expertise including:

- Four ESRC funded Business and Local Government Data Research Centres which have been established at Essex, Glasgow, UCL and Leeds Universities.
- The University of Manchester
- University of Southampton CEDARR Centre
- Oxford University Li Ka Shing Centre for Health Information and Discovery

The location of the new Alan Turing Institute, recently announced, will be especially important to the consolidation of the UK's Big Data expertise.

³¹ Sir Andrew Witty Review, Encouraging a British invention revolution, 2013.

Connectedness and Relatedness

Within the Heart of the SW, Big Data is already an important analytical approach used within Environmental Science, Health and agricultural sciences.

However, it is recognised as one of the 8 great technologies for its ***potential to transform every sector of the economy and every scientific discipline.***

Conclusion – Should this opportunity be an Area of Smart Specialisation for the Heart of the SW?

Yes, Big Data is a growing global technology, with the potential to transform science and industry worldwide. We have a nationally recognised asset in the form of the Met Office and the opportunity to further capitalise on this through the development of a 'Global Environmental Futures Campus', associated with the location of the next Met Office super-computer at Exeter Science Park. It has a strong degree of relatedness and connectedness to other areas of Smart Specialisation and there is potential for cross-lep working. Given this, it is recommended that Big Data is considered an 'under-pinning technology'.

Potential Actions (innovation action highlighted in blue)

Place

What facilities/infrastructure are needed to support the growth of this area?

- Secure high levels of connectivity and good connection speeds through superfast broadband (EUSIF - Integrated Activity D - Digital)
- Secure Super computer investment at Exeter Science Park (15/16 Growth Deal)
- Secure investment in Global Environmental Futures Campus (15/16 Growth Deal)

Business

How can we support businesses to exploit this opportunity?

- Improve business/university collaboration in the field of big data (e.g. KTPs, innovation vouchers etc.)
- Establish business networks to bring together companies working with big data, including electronic products and monitoring devices
- Attract inward investment through leveraging high profile relationships
- Support businesses/institutions to access national opportunities (e.g. through the Connected Digital Economy Catapult, TSB, Information Economy Council)

People

What skills do we need to exploit this opportunity?

- Improve supply of under-graduate and postgraduate courses in data analysis/data science to meet the needs of employers
- Promoting careers in Big Data and uptake of relevant qualifications
- Encouraging Big Data employers to drive demand for skills

Smart Specialisation – Marine

Introduction

The initial review identified ‘marine’ as a specialism within the wider ‘Advanced Manufacturing’ sector. This review, therefore focuses on the following aspects of the marine sector:

- Marine and offshore R&D;
- Manufacturing and services –including ship-building (defence related and leisure);
- Marine renewables; and
- Marine biological research.

This is consistent with the definition utilised within the Plymouth and SW Peninsula City Deal, which had a marine sector focus.

Consultation and Engagement

Considerable consultation and engagement with the Marine sector was undertaken for the Plymouth and SW Peninsula City Deal. This paper builds on this consultation.

Heart of the SW Business Context

The Heart of the SW marine sector was worth £406m in terms of GVA in 2012 and supported 7,900 FTEs (7,000 in Plymouth). This represented 11% and 10% of HotSW manufacturing GVA and employment respectively.³² An employment **location quotient of 8.5** shows significant specialisation compared to nationally. The sector contributes around a fifth of UK marine sector output and jobs. It is also comparatively

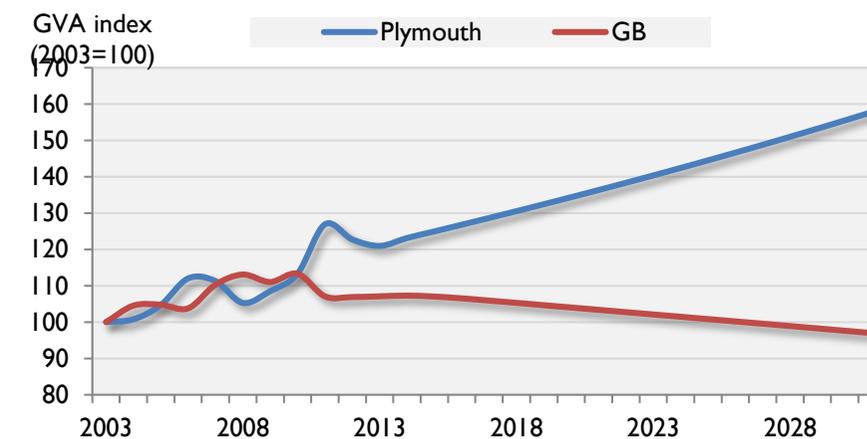
³² Oxford Economics 2014

productive, with GVA per FTE of £54,000 compared to a HotSW industry average of £41,300.

With Plymouth at its core, **marine sector productivity** is expected to increase faster than nationally to 2031 (1.7% pa vs. 0.8% pa) with output subsequently increasing at a greater rate and its share of the national sector growing significantly (5 percentage points).³³

Our estimates are that while the national marine sector will contract slightly between 2013-2031(-0.6% per annum), Plymouth’s will expand by 2.7% per annum. Baseline forecasts from the Plymouth University RED Group suggest strong GVA growth up to 2031 in Plymouth’s Marine Industries sector (see chart below). These are only forecasts but they do demonstrate underlying potential.

Figure 2: Baseline GVA forecasts Marine Industries 2003-2031, Plymouth vs. GB



Source: RED Group, Plymouth Business School

³³ RED Group, Plymouth Business School

The importance of the marine sector is unsurprising given the length of our coastline and reflects its historic role. High profile businesses in the Heart of the SW include:

- Princess Yachts International (PYI) a global leader in luxury yacht manufacturing who occupy part of the South Yard site. The company increased employment in Plymouth from 1800 to around 2200 FTEs with high average earnings (c.£35000 pa);
- Kawasaki, which has invested £25m in developing a state of the art production line to make hydraulics supplying leading companies such as Caterpillar and JCB. Over 20% of the company's production supplies the marine sector;
- Babcock Marine - one the UK's leading defence contractors and a ftse 100 company with over 4000 employees in Plymouth and North Devon, involved in the construction and refurbishment of naval vessels including specialist nuclear and composites capabilities;
- Pipex - a cutting edge composites company manufacturing components for marine and nuclear industries.

Global/National Context

The UK 'marine industries' manufacture and provide support services in the Leisure, Naval, Commercial, Offshore Renewable Energy and other smaller sectors. They:

- Include over 5,000 companies across the UK,
- Employ nearly 90,000 people,
- Generate over £10bn turnover, and
- Contribute nearly £3.5bn Gross Value Added to the nation's GDP (Marine industries, together with the maritime services sector

³⁴ UK Marine Industries Alliance, A strategy for growth for the UK Marine Industries

(shipping, ports and business services) directly contribute Gross Value Added (GVA) pa of over £17bn).³⁴

The UK Marine Industries Alliance, highlights the growth potential for each of the main sub-sectors:

- Commercial – exports to the global marine market (estimated at £3 trillion), especially with high value opportunities in Brazil and Russia.
- Offshore Renewables – manufacturing in high technology areas that will secure our energy supply and reduce CO₂ emissions.
- Naval – export of high tech systems and class-leading capability.
- Leisure – the rapid growth of middle classes in other countries, where the UK's reputation for quality can be appreciated.

In addition, the Maritime Forum Blue Growth Study, highlights the rapid expansion and opportunity around the **Blue Biotechnology** sector, identifying that the market for blue biotechnology products is forecast to reach a total of US\$4.1 billion by 2015³⁵.

Similarly, the Carbon Trust highlight the potential of the **offshore renewable energy** industry for huge expansion, building on the UK's early move and geographical advantage. The Carbon Trust has estimated that, if the UK can maintain its position at the centre of the industry, the ORE Sector could be worth over £70 billion to the UK economy by 2050 and create tens of thousands of jobs. UKTI estimates that the UK will invest up to £75bn in offshore wind farms by 2020, and the growth of our wave and tidal industry could attract up to £4bn per annum of investment by 2050.

³⁵ Maritime Forum, Blue Growth Study.
<https://webgate.ec.europa.eu/maritimeforum/content/2946>

Strategic Context

National

Nationally there has been a lack of a coherent strategy across industry and government for marine – partly due to the diverse nature of the industry ranging from artisan small boat builders to large and complex capital projects. However, the **UK Marine Industries Alliance's 'Strategy for growth in the UK Marine Industries'** is aiming to offer a national perspective on Marine Industries. Whilst marine is not recognised as a key sector in the industrial strategy, links can be drawn to the eight great technologies and the National Innovation and Research Strategies.

Local

The **Plymouth and SW Peninsula City Deal**, has at its core, the growth of the marine sector across the whole Peninsula (including Cornwall and the Isles of Scilly LEP). This includes:

- The development of a Marine Industries Production Campus (initially at South Yard, Plymouth, but with a long term vision for sites across the Peninsula);
- Specialist marine business support advice (through GAIN); and
- Offshore Marine Renewables Programme.

The marine sector has been identified as one of the 'transformational opportunities' within the Heart of the SW LEP **Strategic Economic Plan** (SEP), recognising the potential for the sector and the importance of the Plymouth and SW Peninsula City Deal.

The marine sector is also an important element of a number of Local Economic development strategies, including Plymouth and Torbay.

Key Assets/Infrastructure

HE/FE

There are significant collaborations and joint initiatives between many of the marine organisations across Plymouth and Exeter; PML has an MoU with Exeter University and the Plymouth Marine Cluster is vibrant. The success of the PRIMaRE has recently attracted more members, including PML and the Universities of Bristol, Bath and Southampton.

- **Peninsula Research Institute for Marine Renewable Energy (PRIMaRE)** - University of Exeter and Plymouth University are the founding members of PRIMaRE It is a centre of excellence delivering world-class research and technology transfer in marine energy. Its aims are to accelerate growth in the marine renewable energy industry and to help the South West to become a region of international significance by offering renewables testing, wave energy device arrays, marine renewable energy components and much more.

University of Exeter

- **Marine science - Ecology and Biodiversity** - The University's marine ecology and biodiversity research covers a wide range of topics to study how organisms interact with their surroundings and seeks to understand the mechanisms that allow them to adapt to stressful or changing conditions. Key research activities include ecotoxicology and environmental and evolutionary biology. Major interest is centred around the effects of environmental contaminants on wildlife populations, and their underlying mechanisms of action. Research extends internationally often in collaboration with corporate partners such as SHELL and Astrazeneca.
- **Aquarium** - £9million has been invested to provide state-of-the-art aquarium facilities, featuring 14 aquaria rooms housing 600 experimental tanks and seven preparative and analytical labs, to

maintain and observe a wide range of aquatic organisms, principally fish. These enhanced, modern facilities encourage a wide range of research spanning basic biology, how chemicals effect aquatic organisms and ocean acidification.

- **Renewable Energy** – Exeter established its Renewable Energy Group in 2005. This group has capabilities in engineering and marine science and has world leading infrastructure for marine renewables research including a start of the art power lab with simulation capabilities, supported by the university’s research vessel, remotely operated vehicle and dedicated operations team.
- Dedicated component testing on Exeter’s **Dynamic Marine Component test facility (DMaC)** with a capability to test large-full scale components and to replicate the forces and motions that components are subjected to in offshore applications.

Plymouth University

- **Marine Institute at Plymouth University** - The Marine Institute has 17 cross-cutting research centres and groups. It brings together scientists, business professionals, leading edge analytical facilities and collaborative research opportunities from the University’s Faculty of Science and Technology and the Plymouth Business School. Expertise in supporting emerging and existing technologies through its experience in a broad range of marine renewable energy activities as well as conducting engagements with local, regional, national and international stakeholder groups. Supported by over 400 project scientists, specialists and other university staff, this **institute has the broadest portfolio of marine expertise in Europe.**
- The **Marine Innovation Centre** (partially funded by the ERDF) operates across the SW, with offices in Plymouth, the Brixham Blue Environmental Hub and an outreach office at the Bristol & Bath Science Park. It operates across the region making intelligent connections

between SMEs and academia, to help increase the competitiveness of SW marine sector businesses.

- **Marine Sciences Building at Plymouth University** - A £19 million marine building, housing state-of-the-art research facilities, positioning Plymouth as a global centre for marine energy research. It houses the **most advanced wave tank and testing facilities in the country** including a hydrodynamic test facility with tidal and wave test basins, ship simulator and Electronic Chart Display and Information Systems labs.
- **Research Vessel** - Plymouth University operates a dedicated oceanographic research vessel, Falcon Spirit. This 13m vessel has capacity for 14 crew members, can work up to 60 miles from port and has experience conducting research at the Wave Hub site. It has significant underwater exploration capacity through its state-of-the-art Remotely Operated Vehicles which can explore, film in HD and conduct operations at depths in excess of 500m, it also operates its own dedicated diving and marine centre (DMC) in Plymouth Sound.
- The recent asset transfer of the AstraZeneca **Brixham Environmental Laboratory facility** to the University of Plymouth will see the introduction of the **Blue Environmental Hub in the Torbay area.** This innovation space will support environmental fate and effects Commercial Research Organisations, attract inward investment and house world class marine research.
- The **Electron Microscopy Centre** has a comprehensive range of state-of-the-art microscopes and image processing/analysis software to provide support for a wide range of applications within the university and for external research establishments and industry.

Colleges

- **City College Plymouth** – award winning accelerated modern apprenticeship with Babcock Marine and provision of apprenticeships

to foundation degrees in Engineering related subjects, including Marine Engineering, Electrical Engineering and Renewable Energy & Engineering.

- **Marine Academy Plymouth** (11-18 year old) – first of its kind in UK. It specialises in the marine environment, encompassing science and engineering and focuses on employment pathways which are integral to a marine environment
- **University Technical College Plymouth** - A well-resourced and best value University Technical College for 14-19 year olds which aims to deliver long term positive outcomes for students, employers and the community and specialises in marine engineering and advanced manufacturing sectors with strong focus on enterprise and innovation
- **South Devon College** is on the path to achieving UTC status.

Non HE/FE

- **South West Marine Energy Park** - First of its kind in the UK, a private-public sector partnership backed by Government, it brings together exceptional physical, commercial, supply chain and R&D assets to develop and grow marine energy sector (wave, wind and tidal). The aim is to create a positive business environment through encouraging commercialisation of the sector and attracting inward investment. The geographic scope of the SW MEP extends from Bristol to Cornwall and the Isles of Scilly, with a focus around the ports, research facilities and industrial clusters found in Cornwall, Plymouth and Bristol.
- **Plymouth Marine Laboratory (PML)** - PML is an independent marine research laboratory with a 35 year track record of innovative and world leading science. In 2011 PML was listed 8th in the world by Thomson Reuters of the top 30 Research Institutions in Oceanography. It provides capability for observing, modelling, understanding and forecasting marine ecosystems. Clients include

Research Councils UK, government departments and agencies, European Union, space agencies, industry and international agencies. PML's long term objective is the sustainability of the marine ecosystem as climate regulator; a source of food, water, renewable energy, and livelihoods; and a contributor to human health and prosperous human societies. The organisation is a National Capability Delivery Partner for the Natural Environment Research Council, providing a strategic research capability in marine science and Earth observation for the UK.

- **PML Applications Ltd** - Strives to develop applications from marine (& aquatic) science bringing to market the next generation of innovation and products. PML Applications' vision is to become a leading provider of relevant and excellent environmental science applications and solutions, in the UK and internationally. Customers vary at the R&D and commercialisation stage such as research councils, healthcare and pharmaceutical companies, environmental managers/bodies, the shipping and renewables industry. PML Applications Ltd was set up in 2002 and is a wholly owned trading subsidiary of Plymouth Marine Laboratory.
- The **Sir Alister Hardy Foundation for Ocean Science (SAHFOS)** is an international charity that operates the Continuous Plankton Recorder (CPR) survey. The Foundation has been collecting data from the North Atlantic and the North Sea on biogeography and ecology of plankton since 1931. More recently, as the Foundation has become more involved in international projects, work has been expanded to include other regions around the globe.
- The **Marine Biological Association (MBA)** aims to promote scientific research into all aspects of life in the sea, including the environment on which it depends, and to disseminate to the public the knowledge gained. The MBA was founded in 1884 and in 1888 opened the Plymouth laboratory at Citadel Hill. It has a Royal Charter and

conducts research into key marine life processes with local, national and international collaborations. It is the primary advisor to Government on marine biological science. It is also involved with R&D companies such as Cairn Research Ltd., Leica and Nikon, as well as with the local shellfish industry.

- **National Marine Aquarium** - The UK's largest aquarium attraction with over 70 sharks from more than ten different species. The National Marine Aquarium is a charity dedicated to conservation, research and education. Its mission is to drive marine conservation through engagement.
- **Infrastructure** - Relative to the rest of the UK, the South West has an extremely high concentration of infrastructure (ports, grid, demonstration sites and research facilities), knowledge base assets and supply-chain capability to support the growth of the Offshore Renewables sector, combined with strong government backing.

Assets outside, but connected to the Heart of SW area

- **Wave Hub**, off the north coast of Cornwall, a unique grid-connected offshore facility for the large scale testing of technologies.
- **Hayle Marine Renewables Business Park** due to open in September 2014 and able to support developers from full scale grid connection to certified array services.
- **South West Mooring Test Facility (SWMTF)** in Falmouth to install and assess mooring and/or umbilical configurations connected to floating structures in the field. The site is pre-consented and has extensive field instrumentation and data communication infrastructure.
- University of Exeter's **FaB Test facility** in Falmouth enabling wave energy device developers to test components, concepts or full scale devices in a moderate wave climate

Delivery Capacity

Business Networks

MARIC, the Marine Innovation Centre and SW Marine Energy Park have business network elements.

Collaborative Activity

Through the City Deal, a **collaboration** with Cornwall and Isles of Scilly LEP has already been established. Potential collaborations with other LEPs could include: West of England LEP, Portsmouth and Solent LEP, Humber LEP, Dorset LEP, Greater Lincolnshire LEP and NE Scotland, Orkney and Shetland.

Scotland too has a very strong focus in the marine renewables area; with significant wave and tidal resources, it is also home to the UK's second Marine Energy Park. The Pentland Firth and Orkney Waters Marine Energy Park and the SWMEP recently signed a Memorandum of Understanding (MOU) providing a basis for working together to build relationships, address common issues affecting the industry and to encourage business and research collaboration.

Plymouth University and partners, will, through the Interreg programme, develop a **trans-Channel technology transfer platform** with the Station Biologique de Roscoff in Brittany, France. This aims to improve the uptake of marine biotechnology, creating a **blue biotechnology push in the Channel region**.

European Marine Biological Resource Centre (EMBRC)

Research partners in Plymouth are involved in the establishment of the EMBRC. The **European Marine Biological Resource Centre** will provide key scientific services and infrastructure support for five cross-cutting priority sectors including (1) blue energy, (2) aquaculture, (3) maritime, coastal and cruise tourism (linked to clean/pristine environment), (4) marine mineral

resources, and (5) blue biotechnology (Blue Growth Agenda). It will provide a comprehensive platform connecting marine biological researchers and industry. For every sector in the marine knowledge-based bio-economy, companies will be able to quickly explore the entire EMBRC community and access the available knowledge in EMBRC. This will attract companies that have not previously considered the use of marine resources to expand their businesses.

Connectedness and Relatedness

The marine sector has strong linkages to engineering and advanced manufacturing more broadly – especially nuclear and aerospace – and potentially environmental sciences and blue biotechnology application within agri-tech and health sciences (e.g. seafood, health supplements, pharmaceutical products etc.).

Conclusion – Should this opportunity be an Area of Smart Specialisation for the Heart of the SW?

Yes, there is a clear existing comparative advantage, a strong foundation of research assets (within HE and private sector) and an opportunity to derive transformational growth.

Potential Actions (innovation actions highlighted in Blue)

Place

What facilities/infrastructure are needed to support the growth of this area?

- Delivery of the Marine Industries Production Campus at South Yard and wider sites across the Heart of the SW by establishing a public/private task and finish group under the LEP's Place leadership group to develop a strategic delivery plan for the MIPC.
- Investment and support for building EMBRC and the local marine science infrastructure to stimulate blue biotechnology sector.
- Explore, with wider stakeholders, opportunities for marine energy generation from tidal lagoons.
- Secure node statuses for offshore renewables catapult centre.

Business

How can we support businesses to exploit this opportunity?

- Support the work of the SWMEP (through the Plymouth and SW Peninsula City Deal)
- Supporting businesses to access and collaborate with the knowledge base in the Heart of the SW and more widely (through the City Deal and EUSIF.)
- Activities to promote commercialisation of research and diversification of technology, including spin-outs (e.g. using wave technology to power commercial vessels)
- Attract inward investment/exporting by working with UKTI
- Ensure appropriate business support, IP expertise and workspace is available for start-up and growing companies.

People

What skills do we need to exploit this opportunity?

- to be developed.

Smart Specialisation – Nuclear

Introduction

The Area of Economic Activity (AEA) explored here is the Heart of the South West's (HotSW's) civil nuclear sector and supply chain, encompassing new build, plant operation and life extension as well as decommissioning-related activity.

The AEA is centred on Hinkley Point Nuclear Power Station in Somerset. This site currently encompasses: Hinkley Point A which operated from 1965 to 2000 and is now in its decommissioning phase; and Hinkley Point B which commenced generation in 1976 and has an estimated decommissioning date of 2023. The current Heart of the SW nuclear AEA is, therefore, dominated by current reactor operation, life extension and decommissioning activity.

However, the site is set to support significant new generation, with EDF Energy seeking to develop two new reactors at Hinkley Point C (HPC). As outlined later in this review, HPC will be the UK's first new nuclear power station in 25 years and offers the HotSW a unique opportunity to be at the forefront of the creation of an expert new nuclear supply chain in the UK which can go on to serve wider new-build projects.

The 'Hinkey Impact Area' defines the geographic centre of the HPC's socio-economic impact. It includes the entirety of the County of Somerset and the Unitary Authority area of North Somerset and, as such, cuts across two LEP areas - the Heart of the SW and West of England (WoE). Furthermore, it is recognised that economic opportunities will inevitably ripple out beyond this core Hinkley Impact Area into the wider Heart of the SW and WoE geographies and beyond.

Consultation and Engagement

The development of this Smart Specialisation template drew heavily from existing consultation and engagement activity to inform the development of the Hinkley programme. In addition, the following stakeholders provided feedback on the draft template: EDF, Bridgwater College and the National Skills Academy for Nuclear. The Nuclear Industry Association and the University of Bristol were also invited to comment.

Heart of the SW Business Context

Based on 2012 IDBR data, Somerset has 45 businesses active in the nuclear sector with direct employment of 660. A number of leading global civil nuclear companies have a presence and interest in Somerset, **including EDF Energy, AREVA and Magnox Ltd.**

Furthermore, the **£16 billion Hinkley Point C** (HPC) development is set to drive major growth in the sector. Led by EDF Energy, HPC will be the UK's first new nuclear power station in 25 years, Europe's largest construction scheme and the UK's largest inward investment project. It will employ **5,600 individuals at peak** and provide in the region of £100m per annum of additional GVA activity into the local economy during the construction process. In operation, it is estimated that the station will employ 900 individuals, provide direct and indirect economic benefits for the local economy of around £40 million per annum and provide electricity to around 6 million homes over a 60 year life cycle.

The development offers the Heart of the SW a unique opportunity to be at the forefront of the creation of an expert and knowledge-intensive new nuclear supply chain in the UK, which can go on to serve wider new-build projects in the UK and overseas.

Somerset has a strong, manufacturing base with the potential to supply the nuclear sector. Indeed, the Heart of the SW LEP's economic model³⁶ shows that the manufacturing sector generated more than £1.5 billion in 2011 (equivalent to 17% of the County's GVA), directly employs 31,800 (equivalent to 12% of all jobs in Somerset) and has a Location Quotient of 1.5.

The Somerset Chamber of Commerce has been appointed by EDF Energy as the primary point of contact for Somerset businesses wishing to engage in the HPC supply chain and has developed an associated web portal. In June 2013, 1,400 local businesses were registered on the portal of which around 250 are considered to potentially have the capability of engaging in the high-value parts of the HPC supply chain.

In addition, there are significant decommissioning market opportunities in the area and beyond, including in relation to Hinkley Point B.

The Global/National Context

The Nuclear Industrial Strategy, 'The UK's Nuclear Future', provides the following context:

The nuclear sector in the UK employs around 40,000 people with a total commercial turnover estimated at approximately £4 billion. It is currently dominated by the operation, life extension, decommissioning and clean-up of stations. Commercial exports in 2010/11 were approximately £240 million, mainly within the sub-sectors of plant operation, decommissioning of nuclear sites and nuclear safety engineering services.

In the UK, industry has set out plans to deliver around 16 GW of new nuclear capacity by 2030. This broadly translates into at least 12 new nuclear reactors at five sites currently earmarked for development: Hinkley Point in Somerset, Sizewell in Suffolk, Wylfa on Anglesey, Oldbury in South Gloucestershire and Moorside in Cumbria. Recent analysis by Oxford

Economics and Atkins suggests that with policy interventions and actions taken by organisations and firms involved in new build, the UK supply chain has the potential to capture around 60% of the overall investment in a 16 GW programme over the period to 2030. This would be equivalent to 41,000 jobs at the peak of activity, around £35 billion in gross output and over £15 billion in GVA. Combined with indirect and induced effects, gross UK output and GVA are estimated at over £80 billion and £37 billion respectively. The Government sees this domestic new build and wider nuclear market as an essential platform to further enhance the UK nuclear commercial base and to grow global market share. Indeed, the nuclear industry is set for a global expansion over the coming decades and opportunities for UK companies are considerable. ***Around £930 billion of investment is planned globally to build new reactors, with significant international procurement expected to be around £25 billion a year to 2025.*** Analysis suggests that, with current capability, significant market share could be captured by UK firms in markets around the world, totalling £8 billion by 2025. In addition, the global decommissioning market will grow in significance as increasing numbers of older reactors come off line and is estimated to be worth £50 billion per annum by 2020, with between 82 and 145 reactors retired by 2030, mostly in Europe. Added to this is a significant potential market of extending the life of existing nuclear reactors and enhancing their efficiency.

Strategic Context

National

Nuclear is one of the eleven national Industrial Strategy sectors. The Nuclear Industrial Strategy, 'The UK's Nuclear Future', seeks to provide industry with the confidence to further invest in a nuclear future by:

- Recognising the challenges and capturing opportunities in the home market;
- Enhancing the UK's innovation and R&D landscape;

³⁶ Cited in the Somerset Economic Assessment 2013, pp. 44-51.

- Government engagement to attract domestic and inward investment in nuclear projects and assistance to help firms penetrate overseas markets; and
- Ensuring the UK has the necessary skills for the future.

In addition, there are significant linkages between the nuclear AEA and the Government's identified Eight Great Technologies.

Local

The Heart of the South West's Strategic Economic Plan and Growth Deal identify Hinkley Point C and the nuclear sector as a 'transformational opportunity' for the area. Unsurprisingly, given its importance to the county, the AEA is also featured in the Somerset Growth Plan, as a core part of the vision and a priority for investment. Similarly, energy/nuclear/Hinkley are also cited as key sectors within four of Somerset's five district level economic development strategies.

Key Assets/Infrastructure

FE/HE

Exeter University

The University has a number of key areas of research and application relevant to the local nuclear economy. The **Vibration Engineering Group** is a centre of excellence in vibration engineering from serviceability and structural health monitoring through to active vibration control. The team has worked on almost 200 commercial research and consultancy projects including civil structures. The **Centre for Systems, Dynamics and Control** is also highly relevant with their expertise in dynamical systems and control theory. Finally the University has significant expertise in **energy policy** and runs the IGov project on energy systems.

FE Colleges in the Heart of the SW

Skills training in support of the nuclear industry has been delivered in our region since the construction of Hinkley Point A circa 1950. Our training

provision is ideally placed to meet the challenges presented by the UK's nuclear renaissance and support the first nuclear new build at Hinkley Point C.

One of the first priorities of the skills workstream of the DECC sponsored **Hinkley Strategic Delivery Forum (HSDF)** was to identify and understand challenges within the skills system that may become a barrier to meeting demand. The workstream identified the need for a strategic link between the HPC project, key stakeholders (including government) and regional skills providers and proposed the formation of a **Hinkley Point Training Agency (HPTA)**. A key element of the HPTA is the Provider Coalition. This has been formed and now comprises of 60 FE Colleges and private training providers, primarily within the 90 minute commute zone from Hinkley Point. The intention is to develop a comprehensive and local response to the skills requirements of Hinkley Point C project.

The region has some outstanding training facilities including; **Bridgwater College's Energy Skills Centre** which is **one of only four new flagship National Skills Academy for Nuclear (NSAN)** training delivery centres. It acts as the NSAN's South West hub and leads the regional network of NSAN-approved training providers. The Centre offers leading engineering, science, low carbon and nuclear related education, training and facilities. This is complemented by the College's (EDF Energy funded) purpose-built **Construction Skills and Innovation Centre** offering training in Hinkley Point C related disciplines (such as excavation, groundworks, steel fixing and concrete pouring) and industry-standard facilities and equipment. EDF Energy has also chosen to established it's **£20m national 'Campus' centre for EDF Energy employees** on a shared Bridgwater College site in Cannington.

West Somerset College has also benefited from investment into its facilities and is currently offering 'Hinkley Enterprise' and 'Hinkley Ready' programmes.

Research Assets outside of the Heart of the SW

- **University of the West of England (partnering with Bridgwater College)**
 - Whilst located outside the LEP area, the University of the West of England has strong strategic linkages with the HotSW and is within a 90-minute journey time from Hinkley Point. Bridgwater College and UWE are working together to explore a number of areas for collaboration. Building on the existing relationship through the UWE validated Engineering Foundation Degree that the College delivers to Rolls Royce and their supply chain.
- **University of Bristol** - Whilst located outside the LEP area, the University of Bristol has strong strategic linkages with the HotSW, is within a 90-minute journey time from Hinkley Point and offers leading civil nuclear expertise. Key strengths include:
 - Ranked 1st by citation for nuclear in Sir Andrew Witty's review.
 - Nuclear research and development is a recognised priority at the University of Bristol and the **total nuclear research portfolio is around £10-15 million per annum**. The equivalent of 50 full-time academics and PhDs are working on the following nuclear areas: fuel fabrication (4), reactors (20), spent fuel handling (5), waste (10), other (11)
 - Lead partner in the **Bristol-Oxford Nuclear Research Centre**, a collaborative venture between the Universities of Bristol and Oxford to provide and build expertise in nuclear research to support the UK nuclear industry
 - A strategic relationship with EDF with whom they are developing **the South West Nuclear Research Hub** providing a platform to develop research and enterprise opportunities
 - The University also has strategic relationships with AWE and Sellafield Ltd as well as good working relationships with many other companies across the nuclear sector including Rolls-Royce, NNL, NDA, BNFL, SERCO, BAE Systems and HSE.
 - The final year undergraduate course 'Power Generation for the 22nd Century' devotes a significant proportion of available time to nuclear power and the University is a

member of NSA-Nuclear's high quality training provider network.

The Nuclear Industrial Strategy, 'The UK's Nuclear Future', lists the following existing and emerging world-leading public R&D facilities (complementing other university and private sector facilities) for the nuclear sector which are located in the UK or to which the UK has access:

- The **Nuclear Advanced Manufacturing Research Centre**, which is part of the Technology Strategy Board's High-Value Manufacturing catapult and is led by the University of Sheffield and University of Manchester. Members include companies with a presence and interest in Somerset, such as AREVA and Magnox.
- The emerging **Nuclear Fuel Centre of Excellence** (NFCE) which will provide shared equipment at the University of Manchester's Dalton Nuclear Institute and at National Nuclear Laboratory's facilities in Preston and Cumbria to support critical nuclear R&D.
- The **National Nuclear Laboratory's** (NNL's) Central Laboratory at Sellafield in Cumbria. Local to the Heart of the SW, the NNL's Stonehouse Laboratory is based in Gloucestershire and covers station chemistry and corrosion as well as graphite technology.
- The **Dalton Cumbrian Facility** (DCF) which is a state-of-the-art research base of The University of Manchester's Dalton Nuclear Institute, specifically designed as a national user facility
- The **National Nuclear User Facility** (NNUF) which will have three complementary hubs at NNL's facilities on the Sellafield site, the Culham Centre for Fusion Energy in Oxfordshire and The University of Manchester's Dalton Cumbrian Facility
- Nuclear computing including the **Daresbury High Performance Computing facility in Cheshire**
- The **Jules Horowitz Reactor** research project in France in which the NNL is a partner
- The Halden research project in Norway in which the UK is a partner

Non FE/HE Assets

- **Geographical proximity** to Hinkley Point and Oldbury nuclear power stations which offer new build, plant operation and life extension as well as decommissioning opportunities
- The first new nuclear development in the UK, Hinkley Point C, which provides Somerset and the Heart of the SW with a unique opportunity to be at the forefront of the creation of an expert new nuclear supply chain in the UK which can go on to serve wider new-build projects in the UK and overseas
- An emerging **Low Carbon Energy Innovation and Collaboration Programme**, part-funded by the 2007-2013 SW Competitiveness Programme, including:
 - an innovation centre in the Bridgwater area providing high-quality and flexible office accommodation for businesses in the supply chain, inward investors, joint ventures and collaborative “spin out” projects commercialising solutions to challenges identified in the HPC build process. The centre will also act as a hub for support to a variety of business clusters in the nuclear and low carbon sectors
 - Provision and brokerage of business support services, fostering innovation, collaboration and knowledge transfer in the supply chain
- Strong participation in national civil nuclear networks and partnerships as well as active and dedicated local fora
- People - Our region has a wealth of nuclear industry experience. Local colleges and training providers have been able to tap into this talent pool and source people with appropriate skills and experience.
- Facilities – The region benefits from some outstanding training facilities, for example Bridgwater College has worked with industry partners to develop a number of purpose built facilities. These include the £8m Energy Skills Centre, £1.5m Construction Skills and Innovation Centre and 2000sqm Riverside House facility.

Delivery Capacity

Business Networks

National

- The **UK Nuclear Industry Council (NIC)** is the leading partnership forum between the UK nuclear industry and Government and is designed to maximise the economic success of the UK's Nuclear Industry. The Council oversees the implementation of the Nuclear Industrial Strategy and provides coherent strategic coordination and vision that help to direct Government and business. Industry representatives on the NIC includes AREVA and EDF Energy who have a Heart of the SW presence.
- The **Nuclear Industry Association (NIA)** is the trade association for the UK's civil nuclear industry and represents more than 260 member companies across the supply chain. Members include a number of companies with a presence/interest in Somerset, such as AREVA, EDF Energy and Magnox.
- The Nuclear Group of the Technology Strategy Board's (TSB's) **Energy Generation and Supply Knowledge Transfer Network (KTN)** currently has around 450 members and seeks to create an integrated and dynamic network of business, academic and policy stakeholders delivering strategic and effective knowledge exchange to advance the sector.
- Membership of the **Nuclear Advanced Manufacturing Research Centre**, which is part of the Technology Strategy Board's High-Value Manufacturing catapult, is open to companies currently operating in, or serious about joining, the civil nuclear supply chain.
- The **Nuclear Industry Skills Alliance** is a group of the UK's Sector Skills Councils which have a collective interest in representing the UK Industry skills requirement for New Build, future operation and decommissioning of the UK's Civil Nuclear Fleet. Members include CITB, ECITB, NSAN, COGENT, and ProSkills and they have a strong linkage to the delivery of the actions and needs coming from the NIC's Skills Workstream.
- The **National Skills Academy for Nuclear (NSA-Nuclear)** is an employer led membership organisation established to ensure that the UK Nuclear Industry and its Supply Chain has the skilled, competent and safe workforce it needs to deal with the current and future UK nuclear

programme, including all sub sectors. Its current membership includes over 80% of the UK Nuclear Workforce and a network of High Quality Training Providers. Its South West Flagship centre is based at Bridgwater College which is the hub for the South West network.

Local

- The **Hinkley Strategic Delivery Forum** brings together Government departments, EDF Energy and key local stakeholders (including business, educational, LEP and Local Authority representatives) with the aim of maximising the local employment and growth opportunities associated with Hinkley Point C.
- The **Hinkley Point C Local Business Engagement Forum** brings together EDF, businesses representative organisations, business support providers and Local Authorities to maximise local business engagement in and benefits from the development.
- The **Somerset Chamber of Commerce** has been appointed by EDF Energy as the **primary point of contact for Somerset businesses** wishing to engage in the HPC supply chain and has developed an associated web portal. In June 2013, 1,400 local businesses were registered on the portal of which around 250 are considered to potentially have the capability of engaging in the high-value parts of the HPC supply chain.
- The **Hinkley Point Training Agency (HPTA)** coalition consisting of 60 regional FE colleges and training providers have coalesced, in advance of the formal establishment of the proposed HPTA. The coalition has formed a number of sector specific working groups and has begun to develop pathways to employment, new qualifications and pilot training interventions.

Collaboration with Other LEPS

The following table identifies LEP areas, in addition to the HotSW, where current nuclear activity is particularly concentrated (as identified in the Government-commissioned ERC Research Paper No.15 'Localisation of Industrial Activity across England's LEPS') and /or new nuclear developments are proposed. It then explores their priorities for the nuclear sector.

This suggests that there is potential for:

- collaboration across the HotSW, Gloucestershire and West of England LEP areas, given shared SW geography, opportunities and priorities and the potential to increase critical mass
- The development of complementary low carbon / nuclear clusters in the North West (notably Cumbria, Lancashire and Cheshire and Warrington) and South West of the UK
- Collaboration between the HotSW / the South West and New Anglia LEP, given Sizewell C will be a sister station to HPC

LEP Area	Location Quotient	Proposed New Nuclear Developments	LEP Priorities for Nuclear
Gloucestershire	2 to 3	Adjacent to Oldbury site (see below)	Nuclear energy is identified as a priority sector in the ESIF Strategy and SEP. The flagship 'Gloucestershire Renewable Energy, Engineering and Nuclear Centre' (GREEN) project seeks to support innovation and skills development in the energy sector.
West of England	Below 1	At least two Advanced Boiling Water Reactors at Oldbury with capacity of up to 4 GW	The SEP identifies low carbon as a priority sector and the proposed Oldbury new nuclear development as an opportunity and asset. It also details existing and planned cross-boundary new nuclear collaboration between the HotSW and West of England LEPs, supported by the SEP. This includes research, supply chain development, employment and skills initiatives.
Cumbria	4 and Higher	Capacity of up to 3.6 GW at Moorisde (Sellafield)	'Nuclear and energy excellence' is identified as one of four priority themes in the SEP with supporting nuclear sector activities of: a Nuclear Technology Innovation Gateway; business growth assistance, with a focus on supporting commercialisation of innovations and spin-out businesses; specialist skills development; nuclear and energy supply chain development ; and Infrastructure, connectivity and employment sites to realise the economic potential of West Cumbria
Lancashire	3 to 4	N/A	The SEP lists energy (including nuclear) as a growth sector and includes associated innovation, skills and supply chain interventions. The strategy identifies nuclear collaboration opportunities in the north of England, notably with Cumbria, Manchester, Cheshire and Sheffield
Cheshire and Warrington	2 to 3	N/A	The ESIF Strategy identifies 'engineering and technical consultancy with key strengths in nuclear and energy-related industries' as a potential area of Smart Specialisation. In addition, the SEP features a priority to support the Atlantic Gateway in Cheshire and Warrington, including Warrington's nuclear cluster focused on Birchwood Park
Derby, Derbyshire, Nottingham and Nottinghamshire	4 and Higher	N/A	Whilst low carbon is identified as a priority sector, there is no specific reference to the nuclear priorities / initiatives in the Derby, Derbyshire, Nottingham and Nottinghamshire SEP and ESIF Strategy documentation.
New Anglia	Below 1	Two new European Pressurised Reactors at Sizewell with capacity of 3.2 GW	The ESIF and SEP identify energy (including nuclear) as a priority sector. The SEP recognises the proposed development of Sizewell C as an opportunity which will require supporting enterprise, skills, housing and transport activity.

Connectedness and Relatedness

The nuclear, aerospace and marine AEAs are all underpinned by advanced engineering and manufacturing and, as a result, share a number of technology, production and skills requirements. This presents opportunities for collaboration and diversification across these AEAs in the HotSW.

The Government's exploration of the interfaces between the national Industrial Strategy sectors and the Eight Great Technologies reveals the following linkages across nuclear, aerospace and offshore wind (used here as a proxy for the wider marine AEA)³⁷:

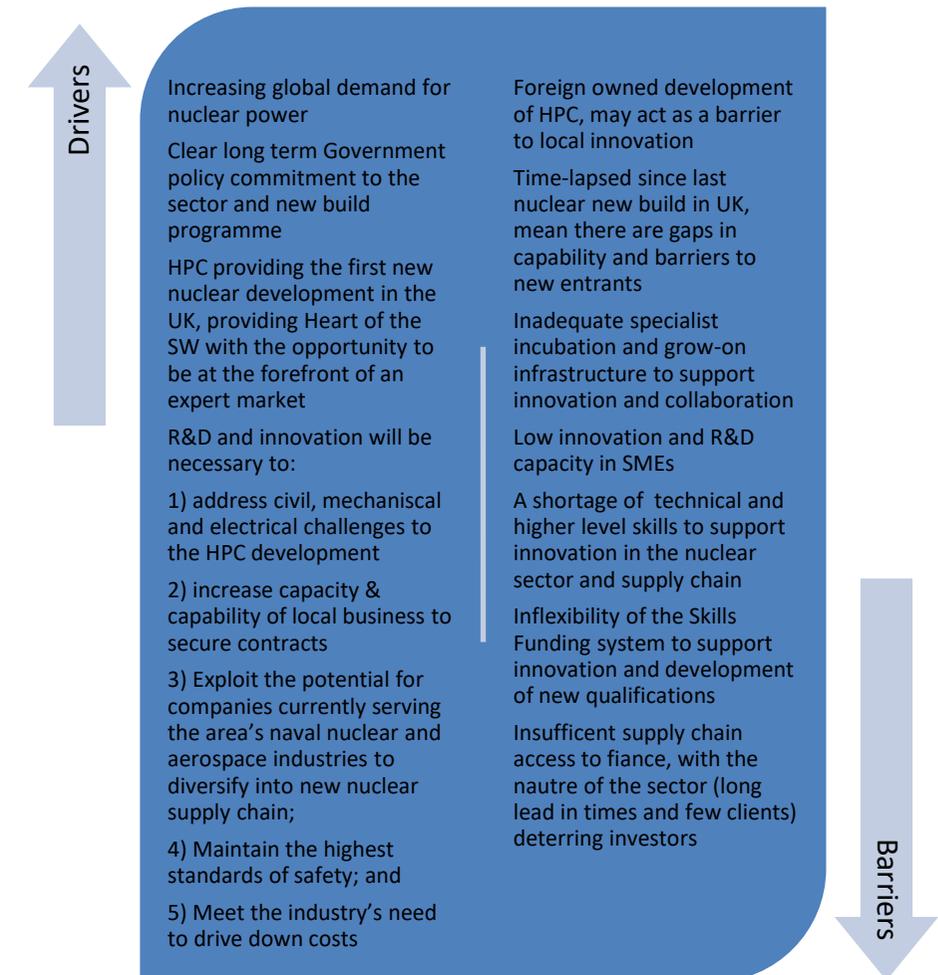
Sector	Big data	Advanced materials and nano-technologies	Robotics
Aerospace	High	High	Medium
Nuclear	Medium	High	High
Offshore Wind	Medium	High	High

This analysis also highlights the importance of big data to the aerospace, nuclear and marine AEAs.

In addition, the Government's Nuclear Supply Chain Action Plan acknowledges that companies currently serving the **defence and aerospace industries** may have many of the necessary characteristics to supply the nuclear sector given that they are used to working to exacting specifications with a strong focus on quality and reliability. There is significant potential for the Heart of the SW to exploit this relatedness in light of the area's existing **aerospace and naval nuclear strengths**.

³⁷ Drat Smart Specialisation Strategy for England

Barriers and Drivers to Innovation



Potential Action (innovation actions highlighted in Blue)

Place

What facilities/infrastructure are needed to support the growth of this area?

- Develop flexible grow-on space, tailored to the needs of the nuclear supply chain and acting as a 'catapult-lite' with strong links to the National High Value Manufacturing Catapult;
- Addressing housing and development land constraints
- Addressing transport bottlenecks

Business

How can we support businesses to exploit this opportunity?

- Supporting SMEs to reach the standards needed to engage in nuclear supply chains (e.g. through facilitating access to specialist nuclear innovation support)
- Enabling collaboration in the nuclear supply chain across upper tier suppliers, SMEs, HE and FE and supporting spin-outs/commercialisation e.g. knowledge and technology transfer, joint ventures, product and process innovation to address technical challenges, innovation vouchers etc.
- Facilitating diversification into the nuclear supply chain from aerospace/marine AEs
- Enhancing business start-up provision to support supply chain capacity, capability and competitiveness
- Supporting high growth businesses in the sector to ensure they reach maximum potential
- Facilitating access to finance, supporting SMEs to develop the necessary capabilities and capacity to engage in the nuclear supply chain
- Attracting high-value inward investment into Somerset to develop supply chain capacity, capability and competitiveness
- Enhancing the sector and supply chain's awareness of and access to export opportunities

People

What skills do we need to exploit this opportunity?

- Increasing the number of young people with the necessary educational background (STEM skills) to pursue a career in the nuclear sector, e.g. through strengthening links between education/business, work placements, careers advice and high profile events/challenges
- Improved pre-employment provision focusing on basic skills, IAG and work readiness to meet the workforce needs of HPC
- Removing barriers to employment (including access to transport) and enhancing employability provision to meet the workforce needs of HPC
- Establishing and delivering the Hinkley Point Training Agency to connect the HPC project to regional skills provision
- Supporting traineeships and apprenticeships in the sector and supply chain
- Development and delivery of new qualifications specific to new nuclear in line with demand (including Level 4 +)
- Further developing specialist facilities and resources to support training and development related to HPC (e.g. steel fixing, form work, crane operations)
- Increasing SMEs skills in leadership and management in order to build the necessary capacity, capability and competitiveness to supply the nuclear sector

Smart Specialisation – Photonics

Introduction

The initial review highlighted photonics as a specialised niche area within advanced manufacturing which warranted further investigation.

The electronics/photonics industry centres around the generation, transmission and modulation of light, for example through lasers and fibre optics. The industry has a strong history and skills base in the Heart of the South West, particularly in South Devon and plays an important role both as a standalone sector and in supporting a number of other key sectors including:

- Aerospace
- Telecoms
- Biomedical

More broadly the electronics sector supports the photonics industry, producing components and packaging which make the photonics technology usable.

Consultation and Engagement

The following individuals and organisations were consulted in the development of this template:

- University of Plymouth
- Exeter University
- Industry specialist – John Harlin and Bob Musk.

Heart of the SW Business Context

Location Quotients show strengths in a number of SIC codes in areas across the Heart of the SW related to electronics/photonics. Overall, the Heart of the SW has LQs of above one, demonstrating specialisms in the

manufacture of computer, electronic and optical products and the manufacture of electrical components. When broken down further there are strengths in elements of these sectors in the South Hams, South Somerset, Torbay and Torridge in particular with pockets of specialism elsewhere in the LEP.

Within Torbay, the sector has grown out of the rapid boom and then contraction of the telecoms industry in the 90's which left a legacy of skills in the area. This has resulted in a vibrant sector built on strong high tech engineering and design, predominantly in photonics and electronics, which is strongly embedded in the local area. In the wider LEP area there is a vibrant optical coatings industry including Artemis Optical (Plymouth), Orion Photonics and Wordentec (Shebbear) and Exotec Precision (Taunton) who have many decades of experience in supplying precision optics and optical coatings to defence, aerospace and medical applications.

Key companies include:

- Artemis Optical - optical coatings for medical, defence, security and analytical applications
- Alpha Contract Engineering – a specialist microelectronics and photonics company
- Cambium Networks - leading global provider of wireless broadband solutions
- Elektron Technology – manufacturer of fast-moving engineered products
- Eltek Semiconductors – suppliers of certified and qualified semiconductor components to the aerospace and defence, industrial, communication and automotive markets.

- Gooch & Housego – manufacturers of high quality fibre optic components and optical modules and specialists in custom packaging of semiconductor devices for a variety of applications.
- Hymid Multi-Shot – specialists in Single and Two Shot plastic Injection Moulding, supported by UK and overseas mould tool manufacture. Serving Medical and Electronics sectors.
- Moortec Semiconductors (www.moortec.com) – Plymouth
- Oclaro - provider of innovative optical and laser components and solutions for a broad range of diverse markets, including telecommunications, industrial, consumer electronics, medical and scientific applications
- OpTek Systems – provider of laser processing equipment and manufacturing services for the fibre optic and micromachining markets
- Spirent Communications – the world’s leading communications companies rely on Spirent to help design, develop and deliver world-class network, devices and services. Spirent’s lab test solutions are used to evaluate performance of the latest technologies.
- Sub 10 Systems - design, develop and sell class leading Millimetre Wave (MMW) wireless Ethernet bridges
- STL – one of the most experienced Contract Electronic Manufacturers in the UK, specialising in RF, Wireless, and digital electronic and test

Elsewhere in the LEP other key players and users of the technology include:

- Orion Photonics (Torrige) – providers of high performance optical thin film coatings that are used in a wide variety of critical applications from avionic cockpit displays, aerospace and defence

to analytical diagnostics, sensors, laser rejection and instrumentation.

- Augusta Westland and a number of other aerospace and related companies – Centrax, Honeywell Aerospace UK, Aerosystems International, Babcock, Alcoa Howmet, Eaton Aerospace, Fine Tubes, UTC Aerospace Systems, Hymec Aerospace and The Barden Corporation.
- Wordentec - global supplier of instruments and systems to the high vacuum and thin film coatings industry
- LEW Technologies in Taunton <http://www.lewtec.co.uk/> who are major supplier of critical components into the optoelectronic and microelectronic sector and
- DC Holne <http://www.dce-holne-rd.com/> based in Kingsbridge, a precision engineering company supplying the optoelectronics industry and
- TWM Technology http://www.twmtech.co.uk/service_overview.htm in Honiton who also supply parts for the microelectronic and optoelectronic industry. Mantra Court Electronics (www.mantracourt.co.uk) – Exeter
- Goonvean Fibres (www.goonveanfibres.co.uk) – Honiton
- Eurotech (www.eurotech-group.co.uk) – Exmouth
- GM Optics (www.gmopticsftx.com)

The existing knowledge base, a legacy of previous investment in the late 1990’s has been key to the sector’s development to date. The knowledge base remains in the area and is a key strength, however this will be eroded unless we encourage younger workers into the sector. All the companies described above have unique SW based capability and have invested substantially in both development and manufacturing infrastructure that is considered to be world leading. In many cases the

performance of products manufactured in the SW in the photonics/electronics cannot be matched by suppliers anywhere else in the world. Many are frequently approached by leading international brands to supply key components and system, reflected in the high export percentage (>80%) of many of the companies.

The Global/National Context

The AEA is growing, with more uses for electronics/photonics in different industries. A 2011 study for the European commission showed photonics keeps 20% of European industry competitive and this will grow further to 2020 and beyond. In addition to the manufacture of components there is a growing market in packaging – making the individual components useable and ready to integrate into high level systems and in the local design and production of those high level system.

Businesses within the industry locally also have links around the world:

- OpTek has manufacturing facilities in the US and the UK, and sales offices in the UK (SW), North America, Europe, and Asia.
- Eltek – France
- Oclaro – Locations in the US, Germany, Italy, Japan, China and Northampton
- Spirent – Offices around the globe and also West Sussex. US HQ
- G&H – Multiple Global locations, head quartered in Illminster
- Exotec Precision- GSI group head quartered in USA with global offices

Strategic Context

National

Electronics and photonics form a key part of the Torbay and wider South Devon economy. Strategically, developing this sector meets a number of objectives set out in the following documents -

Industrial Strategy and 11 Sector Strategies – Development of the electronics/photonics industries in the HOSW will contribute to the sector strategies being set out by government as many of the components required are manufactured by companies in this cluster.

Eight Great Technologies – Electronics/photonics will be an enabling technology for all of the eight great technologies especially the advanced material and nano technology sector, life sciences, big data and energy efficiency computing, satellites and space and autonomous systems. For example Gooch and Housego’s advanced systems group in Torbay is a key supplier to the satellite and medical imaging industry.

Witty Review – The planned sector development of the photonics and electronics industries in the Heart of the SW area includes links to higher education. Some of our businesses have already benefited from links to HE institutions through programmes such as FP7 and investment under the 2014-20 EU programme (including development of Plymouth University’s Electron Microscopy Centre) will develop this further.

Local

Local Strategies – The electronics/photonics AEA fits with a number of local strategies within the LEP area, in particular supporting the creation of higher value jobs. Within the Torbay Economic Strategy nurturing the knowledge economy is set out as a priority and supporting innovation by growing the electronics/photonics industry is a key part of this.

The enabling role the technology plays in a number of other sectors including aerospace means the electronics/photonics AEA plays an important role in the delivery of strategies across the wider LEP area.

Key Assets/Infrastructure

FE/HE

University of Exeter

The University of Exeter has a well-established and strong track record of relevant research in photonics, led by the internationally renowned **Photonics Research Group**, headed by Prof. J. Roy Sambles. This covers photonics materials from microwave photonics, terahertz photonics through to natural photonics. Exeter acts as a hub for international collaborations and has deep industrial relationships in these critical areas. It is also a national leader in research into **Graphene**, the world's thinnest, lightest and most conductive material which is driving innovation in electronics.

The **Centre for Graphene Science** is a partnership between the University of Exeter and the University of Bath. The high-quality research environments and state-of-the-art equipment are bridging the gap between the scientific development and industrial application of this revolutionary new technology. Among recent breakthroughs has been the discovery of **GraphExeter** a novel highly transparent conductive material with the promise to transform the display industry. The Centre provides access to an array of world leading research facilities including: lithography, etching, dicing and deposition systems for nanofabrication as well as extensive low temperature measurement systems and excellent computing facilities for theoretical and modelling work.

The University of Exeter has recently established an **EPSRC Centre for Doctoral Training in Metamaterials**, a £10m investment focussed on training cohorts of doctoral scientists and engineers for industry and academia with the relevant skills and knowledge to transform and exploit electromagnetic metamaterials, which include photonic materials.

In addition to the EPSRC Centre for Doctoral Training in Metamaterials, the University of Exeter has established collaborations across a range of photonics research, from the joint venture project, ARkiris, with Qinetiq to the Quest collaboration with University of Oxford and Queen Mary college focussed on spatial transformations which are at the heart of exciting concepts such as invisibility and cloaking and applicable to a range of markets.

The **Centre for Additive Layer Manufacturing (CALM)** at the University of Exeter is a £2.6M ERDF investment in innovative manufacturing for the benefit of businesses in the South West and across the rest of the UK. Additive Layer Manufacturing is a method of fabricating complex componentry and assemblies in a single process that would be difficult or impossible to achieve using conventional manufacturing techniques. The state of the art equipment at the University of Exeter includes facilities for additive manufacturing of high performance polymers which are unique in the UK.

The above centres are all closely aligned to the future technology, knowledge and skills need of the hi-tech sector and in particular electronics and photonics and have been established in partnership with industry, including many of those listed above.

Plymouth University

Plymouth University hosts the **Electron Microscopy Centre** which has provided practical support for business for the past 30 years. It has recently enabled to provide free support for SMEs through the ERDF Competiveness programme, which has enabled the EMC to become the electron microscopy resource in the south west. The EMC provides a platform upon which business and HE can effectively interact, to benefit economic growth through solving business problems and providing students with real-life business issues.

Non FE/HE

Other assets include the **Horizon Centre at Torbay Hospital**. The aim of the Centre is to provide a state of the art environment where people can explore new ideas, learn new techniques and observe and reflect on clinical practice together. It can also be used for testing prototype equipment for SMEs.

Delivery Capacity

Business Networks

There are a number of existing networks supporting development of the electronics photonics sectors. These include the **Torbay Hi Tech Forum** which brings together businesses in the sector to support creation of a world class environment for innovative, collaborative and technology driven businesses in Torbay & South Devon. In addition to this specialist forum there is EXIST, the **Exeter initiative for Science & Technology** and the networks surrounding the Centre for Additive Layer Manufacturing (Exeter) and the Electron Microscopy Centre in Plymouth. **SEPNET (South of England Photonics Network)** includes members from the HOSW area and aims to increase awareness of local photonics capability, help leverage collective knowledge and uncover more applications making it easier for organisations to develop new products and access this key enabling technology.

Collaboration with Other LEPs

There is a significant cluster of electronics/photonics expertise in the Southampton (Solent LEP) with the University of Southampton and Eastleigh College regarded as leaders in the field. The University of **Southampton is home to the Centre for Innovative Manufacturing** in Photonics. Exeter University's partnership with Southampton through Set Squared offers an opportunity for collaboration. The **National Composite Centre in Bristol** also has relevance to the electronics/photonics sector.

Connectedness and Relatedness

The electronics/photonics AEA already has links into the medical technology and aerospace AEAs. There is potential to grow these links and further develop electronics/photonics as part of the supply chain.

Barriers to Growth

There are a number of barriers to innovation in the electronics/photonics AEA including:

- Cost of equipment
- Access to facilities (eg clean rooms)
- Lack of suitable space for start ups
- Lack of linkages between start up and existing businesses
- A challenge in recruiting younger staff
- Commercialisation of academic research

A shortage of specialist incubation space is cited by the sector as a barrier to company creation. Technology companies looking to manufacture physical products are often characterised by needing a combination of office and quality manufacturing /laboratory space. Serviced office solutions are normally not appropriate, as they lack space to develop test and manufacture early stage product.

Whilst there is a legacy of experienced staff, particularly within South Devon, there is a concern within the industry about attracting technically orientated younger people at the beginning of their careers. The inability to attract younger, entrepreneurial employees is a barrier to both innovation and growth.

Conclusion – Should this opportunity be an Area of Smart Specialisation for the Heart of the SW?

Yes, there is evidence of a strong business cluster in South Devon, as well as nationally recognised research assets. The sector has a strong degree of relatedness and connectedness to other potential areas of Smart Specialisation and as such, could be considered an ‘underpinning technology’ for some of our transformational opportunities.

Potential Actions

Place

What facilities/infrastructure are needed to support the growth of this area?

- Development of *pre-market pilot production facilities*, offering the combination of expensive specialist equipment (needed by both existing and new start businesses) and access to experts to support aspects of design, testing and packaging. Potentially, a standalone regional centre, providing businesses and SMEs with key equipment and infrastructure required for: innovation driven product and process development, collaborative research, proto-typing and training development. Linking to other national facilities and specialist incubation space.
- Specialist incubation space, providing a combination of office and quality manufacturing/laboratory space, enabling testing and manufacturing of early stage products.

Business

How can we support businesses to exploit this opportunity?

- Supporting businesses to access the knowledge base in the Heart of the SW and more widely.

People

What skills do we need to exploit this opportunity?

- Actions to encourage young people into the industry, to address aging workforce and stimulate innovation.

