

Local Industrial Strategy

Heart of the South West LEP & Partners

The Dynamic Heart: Areas for Future Emphasis

January 2019

SUMMARY

Foundations

Over the last decade, UK productivity has performed relatively poorly compared with its international competitors¹. Moreover, the Heart of the South West (HotSW) Local Enterprise Partnership (covering the upper tier/unitary areas of Devon, Somerset, Plymouth and Torbay) is low in the league of productive performance amongst English LEP areas². The local/regional economy's modest performance constrains current and future living standards.

The HotSW Productivity Strategy³ analyses this 'productivity gap' and identifies broad policies and actions to reverse it. It identifies five 'opportunities' and 13 'programmes'. This document deepens this process, providing a thread to some specific areas for future investment through a Local Industrial Strategy (LIS).

It is based on three givens and/or needs for HotSW:

- Strong priorities that satisfy government that it has something distinct, long-term and productivity-led to support.
- An aim to double its economy over the next two decades, from a position of virtually full employment. (Its LIS, therefore, must focus on high productivity activities/potential.)
- A choice of priorities that offer a high productivity, high growth LIS for the LEP's (and partners') ambitious, yet achievable, aspirations.

Framework

The Development Framework used in this document presents a mode of thinking about how to establish LIS priorities and how to address the impact

¹ UK c10% below its main competitors as defined by OECD 10 December 2018

² See relevant ONS data sources as described in the HotSW evidence base

³ "Stepping up to the challenge: productivity strategy 2018"

of future interventions. It identifies local strengths in terms of sectors and places and those networks and technologies worthy of future investment.

No sector or place is isolated in the modern (and particularly the future) economy. Growing and intensifying linkages between technologies, sectors and places will be key drivers of outcomes from LIS interventions.

The aim is to establish a “**Dynamic Heart**” for local industrial progress against the background of government regional policy and funding plans after Brexit⁴. The HotSW LEP and its partners should focus investment on accelerating productivity growth through the promotion of:

- Supply chain stickiness and clustering
- Enabling technologies and networks
- Dynamic products and markets, including higher exports

This approach should be framed with reference to several crossover considerations about environmental capital and service value, business scale-up and innovation, wealth distribution and demographics⁵.

Process

The first stage of deriving key areas of prioritisation is to review:

- Quantitative evidence for HotSW’s economy from official sources and local model data on scale, impact and context
- The evidence base (extant) for the HotSW Productivity Strategy in terms of the many reports that cover key sectors and places, strengths and opportunities, and other development issues
- Additional evidence provided during this work by local parties and experts (often referred to in the many footnotes throughout this document).

⁴ Throughout the document we assume a neutral stance on Brexit in terms of local economic impact for a 20-year horizon, broadly in line with the approach to forecasting by the Bank of England and HM Treasury (see detailed analysis 7)

⁵ Associated LEP activity will support the LIS through housing, transport and skills policies and actions. Nothing presented here excludes other activity, sectors or places from future development. Economic development is not a ‘zero sum game’. The whole point of co-ordinated action through a LIS is to spread the synergies of prioritisation as wide as possible. Increasing connectedness and removing barriers to entry across place and sector is key, especially in an era of major technological, demographic and environmental change.

The second stage is to:

- Use all this information to classify key variables (technologies, sectors, places, businesses) according to an ABCD (anchors, beacons, catalysts and drifters model⁶)
- Judge those activities that are likely to yield desired outcomes in terms of productivity-led growth, skilled employment, robust incomes, and market and technological competitiveness.
- Contribute to cultural change and conservation, as demanded by residents and other actors, in order to address wider issues of demographic ageing and environmental (climate) change.

Recommendations

The approach adopted here derives three leading areas of local activity that are likely to be innovative, entrepreneurial and competitive and also distinct, long-term and productive. It identifies core areas for special investment, across the Dynamic Heart of the South West under the LIS⁷.

The choices are:

- **Digital futures:** big data, environmental and health technologies and services, with key assets, such as the Met Office, the Universities and colleges, and NHS facilities in Exeter, East Devon, Teignbridge, Torbay, Plymouth, Taunton, Bridgwater, Yeovil and their hinterlands.
- **High-Tech engineering:** mainly advanced marine and aerospace manufacturing, photonics and defence. There are strategic defence assets in South Somerset and Plymouth. The marine cluster covers businesses along the coasts and inland. Aerospace supply chains run across the LEP area. Photonics is centred on Torbay. There are also areas of high-tech foods, such as agri-tech, across the patch.
- **Clean energy:** associated with technical development for nuclear and offshore renewables, with a hub at the power station site in West Somerset but with wider links (such as defence, construction, medicine and decommissioning for skills, technology and potential export services elsewhere) in chains from Bridgwater to Plymouth and Yeovil

⁶ See detailed analysis 3 for a full explanation of the criteria used.

⁷ Importantly, "Dynamic" is not necessarily talking about specific businesses, locations or markets. Potentially, any firm, place or service can contribute to these priorities if they benefit supply chains, enabling technologies and emerging markets.

to Barnstaple. Offshore renewables provide a link to the coastal and other marine activity centres mentioned in the previous paragraph across South and North Devon.

All three of these choices have extensive and vital local supply chains. Importantly, these areas of suggested concentration overlap a range of innovative technology and product markets that offer high returns, albeit with risks that need to be mitigated.⁸ In terms of potential returns, they offer high skill and value possibilities with relatively robust net additionality through strong multipliers - across sectors and places.

Moreover, they offer potential for inclusive networking across the HotSW geography and to spread connective benefits to a wide range of HotSW communities. Links and work with the series of local Enterprise Zones and academic and other research centres will play a vital role here.

Complemented by other actions to provide housing, real/virtual connectivity, and STEM/smart skills provision, these main LIS priorities are at the Dynamic Heart of the local economic future. They suggest a strong prospect for productivity-led growth that is distinct, long-term and potentially consistent with the LEP's macro economy targets.

⁸ The LEP and its partners need to consider their appetite for risk before accepting these recommendations – see detailed analysis 4 for an alternative approach.

INDEX

Summary	1-4
Index & Introduction	5-6
Evidence overview	7-8
Framework to assess future focus	9
Priority recommendations	10-15
<u>Detailed analysis:</u>	16-43
1. Evidence Conclusions	16-26
2. ABCD Framework	27-29
3. ABCD Criteria	30-32
4. Risks & Alternatives	33-35
5. Using the Command Paper	36 -37
6. Macro Targets	38-39
7. Assumptions & Judgement	40-43

INTRODUCTION

HotSW LEP and its partners aim to “drive productivity and prosperity for all”⁹. A Productivity Strategy with ambitious but achievable targets for future growth has been adopted, with a target to double the size of the economy over the next twenty years.

This report builds on that strategy, recommending specific areas for future economic development. Consistent with the national industrial strategy¹⁰, this paper also forms part of the dialogue with government about future

⁹ HotSW productivity strategy – op cit

¹⁰ UK Industrial Strategy, HM Government, 2018

funding for HotSW growth. It is an important input to the emerging HotSW Local Industrial Strategy (LIS): part of the wider Productivity Strategy and related activities.

It considers industrial and technology enablers that have the potential to support faster growth in the years ahead because they match expected trends in national and global economies. It aims to provide a Dynamic Heart for industrial prioritisation that is:

- Distinct to Devon, Somerset, Plymouth and Torbay and their parts
- Productivity-driven, raising GVA per FTE/hour faster over time
- Able to yield long-term, positive impact from future interventions

All aspects of the productivity strategy are not covered here. Specifically, housing and transport will be approached through other strands of HotSW work. The emerging Skills Advisory Panel has cross cutting responsibility to support and drive realisation of local potential. The HotSW skills challenge goes wider than the aspects identified here.

The LIS, therefore, addresses drivers of economic change and how they relate to business and economic activities in which HotSW's strengths and opportunities are, and/or can be, productively competitive and inclusive.

The analysis is forward looking into the 2030s. It is based on quantitative and qualitative evidence, scenario judgement, and objective expectations. It does not promote spurious quantitative precision but it does incorporate current estimates and expectations about key variables.

EVIDENCE OVERVIEW¹¹

Mainstream economic story

In absolute and relative terms, HotSW economic performance could improve. Within the local area, there are wide differentials in outcomes. The HotSW economy has a small 'head' of high productivity firms and a long 'tail' of low productivity activities, especially compared with national averages. To raise its game and attain its targets, HotSW needs to transform its performance, achieving faster productivity growth in new and emerging technologies and selling into more markets.

Local sector intelligence

Local intelligence reveals HotSW strengths and potential in the following industries:

- Nuclear and related (supply chain) technologies and skills, including new build, decommissioning and defence
- Photonics and related micro-electronics
- Certain marine sectors in defence, boatbuilding and renewables
- Other engineering (such as aerospace and agritech) with innovative supply chains
- Health and environmental technologies that support an ageing population with changing service needs

Crossover issues

A number of other issues are relevant, although they may be 'outcome' rather than 'intervention' priorities from a LIS perspective:

- Spreading the benefits of development through social inclusion
- Connectivity of rural communities and coastal towns
- Preserving/providing economic benefit/wellbeing from natural capital
- Promotion of more/better scale ups for competitive firms/markets
- Access to new and replacement skills

Headline views of partners

The evidence from partners was extensive, with the following highlights:

¹¹ Here, we summarise the main findings of a thorough analysis of the existing evidence base and other submitted sources. It is recommended strongly that those wishing to interrogate the sources and understanding closely read the 'detailed analysis 1' section below.

- There is a key economic ‘cross’ running east/west and north/south. It follows the main transport and trading routes through the bigger population centres. Key assets and businesses are spread along these geographical ‘spines’, running from Plymouth-Torbay-Exeter-Taunton-Bridgwater and Yeovil-Bideford & Barnstaple. Enabling technologies reinforce this dynamic heart with many innovative businesses.
- Membership of the South Coast Marine cluster, with its links to defence assets, offers distinct possibilities for productivity-led growth and global competitiveness
- West Somerset is central for the rest of SW England and the United Kingdom in nuclear power development, construction and use, with opportunities in supply chain development and demand creation and decommissioning. Plymouth is the centre of the Navy’s nuclear submarine maintenance and decommissioning programme.
- The UK’s only rotary wing facility - a sovereign capability – is a prime asset in south Somerset.
- There are important synergies and benefits to be developed across the borders to Cornwall, Dorset and Wiltshire, and especially, into the West of England and its important M4 and M5 corridors.

Summary

This review of the evidence¹² highlights some key elements for a HotSW LIS:

- A mainstream story of overall relative underperformance set against some local success, expertise and potential
- The complexity of development processes and crossover issues are profound by sector and place
- Several key areas (sector, market, place and technology) have productive potential that can be improved, given existing and evolving corporate and wider assets¹³

¹² See detailed analysis 1 for full detail

¹³ One example (among several) of an impressive list of such assets and leading firms/their opportunities and challenges was provided in “LIS Devon Sectors and Analysis – Devon County Council 2019”

FRAMEWORK TO ASSESS FUTURE FOCUS

The ABCD Approach

Intervention for economic development is warranted when the market growth process is imperfect: when market or government failures derived from inequalities in information or market power (adverse distributional effects) and externalities (non-monetised issues) are identified. With limited resources, such 'failures' mean careful development choices are required.

The ABCD approach can be used to relate cluster specialities and/or spatial factors to business strengths and weaknesses and to compare productivity drivers to HotSW/government priorities. It reflects competitive specialisms and possible development interventions. It allows development professionals to consider investment and impact more manageably across a complex local economy, especially where analysis is forward looking and, thereby, necessarily reflects probabilistic judgement.

Development Matrices offer consensual, objective assessments to be made about how future investment plans might develop a more productive economy. When a specific investment is considered, the ABCD approach helps to identify which priority 'clusters' are likely to be affected and to what extent (net additional value). It also considers how outcomes are likely to impact government requirements (foundations and challenges¹⁴).

It is important that the criteria for ABCD conclusions¹⁵ are clear. In this case, a range of factors have been used:

- Official data from ONS (et al)
- Derived data from local modelling of scale and supply chains
- Local business intelligence on place, sector and specialisation
- Demographic, technological and market 'futures'
- Expert input from, and experience of, local analysts

As the LIS is enacted, HotSW LEP could usefully identify and develop direct contact on future investment measures with key ABCD companies, business and other agency assets and research in the recommended areas of prioritisation. Engagement with business will help to consider investment and impact issues for commercialisation and access to finance.

¹⁴ UK Industrial Strategy – op cit

¹⁵ The ABCD criteria are reviewed fully in detailed analysis 3.

PRIORITY RECOMMENDATIONS

The priority recommendations drawn out here are based on the statistical analysis and the ABCD approach set out elsewhere to suggest leading areas of focus for the LIS.

The HotSW Productivity Strategy aims to provide capacity and capability, allowing businesses to develop growth potential.

Its main themes include the promotion of **leadership and ideas** in business, people's **work and learning** and housing, **infrastructure and connectivity**. HotSW is keen that **future growth is inclusive**, with all parts of the area becoming more prosperous.

The LEP's approach is ambitious, focussed, shared and evidence based – driven by **new technology** in order to improve asset quality and quantity. **Enabling technologies** and the promotion and preservation of **natural capital** are the basis of these recommendations for future focus.

The evidence base for the Productivity Strategy suggests potential for concentration on five '**golden opportunities**' (supply and demand integration), with effort concentrated along the M5-A38 spine.

These five are:

- Advanced manufacturing (aerospace, photonics, & engineering with hubs in, for example, Yeovil, Torbay & Plymouth);
- Nuclear services (building, decommissioning & operating power stations centred on the Hinkley Point C project in West Somerset) and other applications, such as medical diagnostics;
- Marine engineering and services (including build and repair, components development and leisure/other services – both east & north of Plymouth);
- Environment (climate & other data services driven across the whole patch with concentrations in Exeter & Taunton);
- Health & social (such as care, genetics & medical trials based in & around Exeter, Plymouth & Torbay, other small towns and rural communities).

Traditional strengths (albeit with relatively low productivity) in the visitor economy (tourism, business and leisure) and agriculture, food and drink are

recognised, particularly in respect to sustaining natural capital and community inclusion¹⁶.

Importantly, the process of demographic ageing, already relatively advanced in parts of HotSW, creates demand-side imperatives for change across technologies, business and markets.

The key to addressing productivity deficiencies lies in the HotSW indication that 13 **programmes** need to be pursued¹⁷. These are set out as: business innovation – management excellence – export opportunities and markets – start up and business growth support – inward investment – connectivity and resilience – housing and business land – digital infrastructure and usage – clean energy infrastructure – education and retention of a skilled workforce – success pathways for all – skills for transformational sectors (golden opportunities above) – support to prosper in a changing economy.

Given funding and personnel constraints, this list is too broad a range for a productivity-based LIS delivery function. Nevertheless, a tightly focused LIS should expect to be integrated with and accompany many of these development programmes.

From the analysis undertaken here (after consultation with local experts and partners), it is suggested that the recommended areas for emphasis should have:

- High future relevance for communities, given likely trends in technology, markets, skills and demographics
- Significant potential for net additionality from investments
- Strong relationships with the area's crossovers to environment and culture

The LEP should support:

- **The Beacon characteristics (exhibiting best practice) of marine/offshore engineering and research, aerospace and nuclear power**
- **The Anchor characteristics (significant activity/employer) of defence, energy, health and environmental services**
- **The Catalytic (productive transformation) potential of the digital (data and AI), photonic and component processes**

With an ultimate aim of encouraging higher capital investment per head, aerospace and marine engineering, for example, should be helped to build more robust (sticky) supply chains based on technological expertise, mutual understanding of market requirements and opportunities, and moving businesses (especially SMEs) up the value chain.

¹⁶ see detailed analysis 4 "alternative approach"

¹⁷ see Productivity Strategy – op cit

Similarly, high-tech sectors, such as photonics, will benefit from interventions to encourage cross-sector collaboration on new techniques and applications: catalytic invention and innovation. Moreover, new environmental services can work with educational improvements to drive competitiveness benefits.

If HotSW decides to invest in these technological enablers, it is likely to involve an appreciation of its:

- ABCD characteristics in specific economic locations (infrastructure/assets)
- Links with university and sector research (innovation),
- High-tech crossovers and apprenticeships (ideas and people),
- Promoting local supply chains, spin-outs and scale ups (entrepreneurship),
- Entry into wider markets (product and market competitiveness, especially beyond the region and overseas)

The complex raft of productivity factors exposed by the ABCD approach focuses minds on the benefits of specific proposals: in basic terms, identifying which and how many boxes are chosen and then moving on to consider detailed investments in terms of potential resource use, net additional impacts, monitoring and evaluation.

Intervention by the LEP (et al) under a LIS should be driven by support for:

- Supply chain stickiness and SME movement to higher tier innovation
- Enabling technologies and their dispersion across sectors
- Dynamic elements of market and business practices
with crossover considerations of demographics, environment, business scale-up, income distribution, housing and transport, and skills¹⁸

Priorities

The impact of potential investments has been covered¹⁹. For example, by studying location quotients, relative strengths are identified and, by reference to derived multipliers, potential impacts are considered. When the LIS is implemented, looking at ABCD conclusions this way can improve impact assessment, monitoring and evaluation.

Three areas for specialisation and prioritisation across the dynamic heart of the HotSW area seem pre-eminent²⁰ (see diagram below):

¹⁸ The multi Enterprise Zone structure in HotSW would appear to be one of several useful levers for the kind of inter-spatial developments suggested.

¹⁹ See detailed analysis 1 et al for relevant data and indicators

²⁰ Important to acknowledge/build on the overlaps between these categories. Part of the distinctiveness of HotSW's offer is the interrelation of its specialities/potential. Photonics links with all 3 choices and the grand challenges is just one case in point.

- **Digital futures:** big data, environmental and health technologies and services, with key assets, such as the Met Office, the Universities and colleges, and NHS facilities in Exeter, East Devon, Teignbridge, Torbay, Plymouth, Taunton, Bridgwater, Yeovil and their hinterlands. This includes the range of enterprise zones, science parks and other innovation centres²¹. This suggests catalytic (C) and beacon (B) potential to create future anchors (A). It means strong synergies with the National Industrial Strategy's (NIS) challenges, especially AI/data, clean growth, and ageing society

- **High-tech engineering:** marine and aerospace manufacturing, photonics and defence with strong interests in Plymouth, North Devon, South Somerset, Torbay and Exeter. These are anchors (A) with catalytic (C) and beacon (B) potential and with direct relevance to the NIS challenges of future of mobility and clean growth.

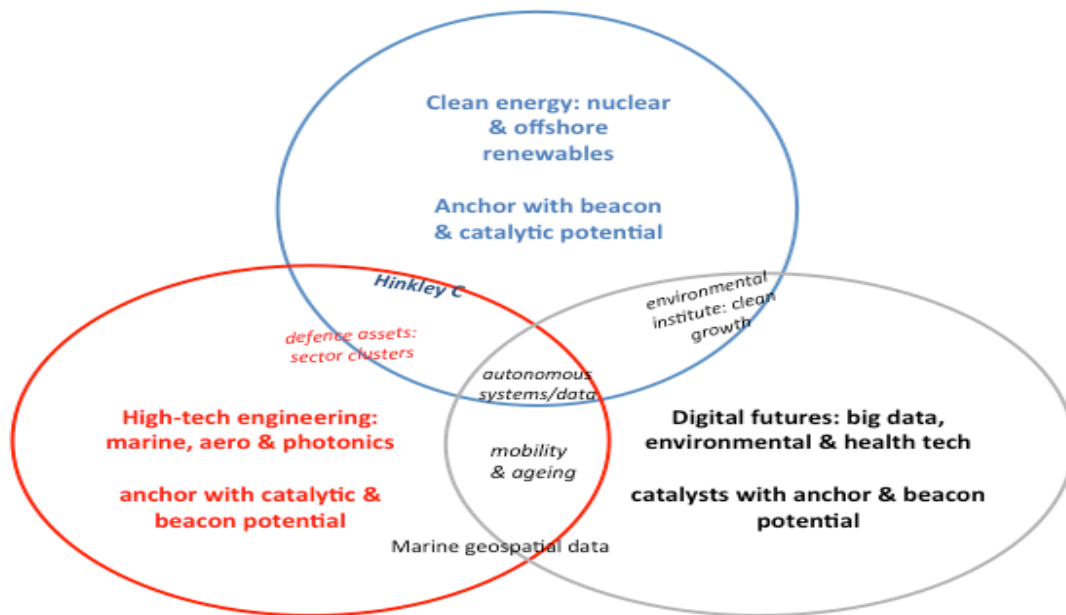
- **Clean energy:** associated with technical development for nuclear and offshore renewables, with an important hub at the Hinkley C power station site in West Somerset but with wider links (such as defence, construction, medicine and decommissioning) for skills, technology and potential export services elsewhere: from Bridgwater to Plymouth and Yeovil to Barnstaple. This is another anchor (A) with beacon (B) and catalytic (C) potential and impact on the challenges of clean growth and AI/data.

The diagram below highlights these choices, how they overlap with other considerations and how they begin to lead to a choice of potential interventions, such as

- Investing in the development of local capacity in autonomous systems
- Capitalising on the marine geospatial data opportunity from UKHO
- Leveraging the HotSW defence assets.

Such a focus enables a comprehensive and complementary range of activity to contribute to the delivery of a LIS. The chart indicates the potential range of increased connectivity at the Dynamic Heart of the LEP economy.

²¹ The Gravity (Huntspill) enterprise zone area is an example, with its inward investment plans for AI/EV and robotics and close/vital links outside HotSW (upper M5 corridor).



Opportunity & challenge: connect other places and sectors to these transformational opportunities to grow total productivity, e.g. better use of enabling technologies by leisure/tourism & agriculture/food & drink and better mobility for ageing residents and rural/coastal communities

Relationships

The three broad areas centred on here relate closely to the **government's Grand Challenges** of Artificial Intelligence, Clean Growth & Future of Mobility. The demographic challenge within HotSW and the identified strength in digital futures and advanced manufacturing also offers an opportunity to address the Ageing Society Challenge.

The **Industrial Strategy** identifies five foundations of productivity: Ideas, People, Infrastructure, Business Environment, and Places. Different blends of intervention across these foundations will be needed to realise the potential of the Dynamic Heart.

It is recommended that through development of the LIS (and beyond), HotSW and partners engage closely with the relevant government departments to ensure the appropriate policy levers can be pulled.

At a minimum, this would include:

- BEIS: Industrial Strategy Grand Challenge teams and foundations of productivity
- DCMS: digital connectivity needed to realise the Digital Futures opportunity, but also relates to the other two choices

- DfE: skills policies needed to support the Dynamic Heart potential. (Given the ageing population and near-full employment, re-skilling the existing workforce will be a priority.)

Considering the coastal and rural nature of the LEP area, it may also be beneficial to work with Defra to ensure that rural/coastal policies are similarly developed to help realise this distinct potential. This is especially important for seeing that the benefits of the productivity growth are shared across the area's places, businesses and people.

DETAILED ANALYSIS

1: Evidence Conclusions

This section considers the accumulated HotSW evidence base and what it means for growth and productivity in an era of dynamic change. The aim is to narrow prioritisation to a few key sectors, with strong productive potential.

This section recognises that local businesses, workers and residents face a period of upheaval through expected waves of technological innovation and with respect to demographics and occupations, natural environment and functional economic geography.

Mainstream economic story

Normally, the HotSW area performs modestly in terms of growth and productivity²². Despite a range of strengths, Devon, Somerset Torbay and Plymouth have areas of relatively moderate economic activity, placing HotSW low in the rankings for LEPs overall and specifically for key development elements, such as:

- Export engagement and competitiveness
- Research, development and innovation
- Advanced skills and leadership.

The first table (below) points to local value strengths and weaknesses at a macro level. Compared with the England average gross value added (GVA) for 2017, HotSW sector shares are relatively and significantly high in resource-based sectors (including agriculture and energy), public sectors (including defence and health) and manufacturing. They are relatively low in finance and business services, and information and communications. This partly explains the LEP area's modest growth patterns.

Within the HotSW area, there are wide differentials in terms of productive output and resulting earnings with, for example, output per hour twice as high in Exeter as it is in Torridge. This reflects urban/rural concentration in key industries and sectors as well as the degree of connectivity or agglomeration: networking between different communities. It relates to service distribution and commuting patterns, relative housing costs and education facilities, and transport and communication infrastructure.

²² Confirmed by latest GVA evidence released by ONS on 12th December 2018

Table 1: Broad Sector Shares (GVA, %); HotSW vs England (2017)

	HotSW	England		HotSW	England
ABDE	6.2	3.3	J	3.2	6.9
C	12.0	9.8	KMN	10.7	20.5
F	7.6	6.2	O	6.4	4.2
GH	14.2	15.0	PQ	16.1	12.8
I	4.2	3.0	RST	3.9	4.3

Source: ONS and author's calculations ABDE = agric (+other land/sea based) & utilities (incl. energy). C = manufacturing. F = construction. GH = distribution (e.g. retail & transport). I = accomm & food services. J = info & comms. KMN = finance & business services. O = public admin & defence. PQ = health & education. RST = other services (incl. leisure).

Summary statistics for the productivity of local sectors are displayed in table 2 (below)²³. The first column (i) shows where average HotSW productive growth has been relatively 'good' (above 2% per annum growth) or not. These confirm the results of previous prioritisation exercises²⁴ and evidence base documents: e.g. HotSW outperforms in digital, marine, and photonics.

Table 2: Real GVA/FTE at 2015 prices

(i) average % changes over time 1998-2016 (ii) differentials of HotSW-to-GB average growth (iii) levels £'000, 2016 (iv) ranked average of 3 variables

	Average (i)	Differentials (ii)	Levels (iii) (£'000)	Ranks (iv)
Advanced manuf & engin	+2.9	+0.7	55.4	5
Food & drink	-0.2	-1.6	38.8	11
Digital technologies	+4.3	+2.1	56.7	2
Creative industries	+1.2	+1.1	50.1	6=
Tourist industries	-0.1	+0.1	29.7	10
Agri-tech industries	+2.2	+0.5	56.1	6=
Marine	+3.8	+2.8	50.5	4
Defence	+0.2	-0.3	68.4	9
Med, health & life sciences	+8.4	+6.1	143.9	1
Environmental services	-0.2	-0.3	112.8	8
Photonics & electronics	+3.5	+1.2	57.5	3

Source: AMORE/Plymouth Council/University model data, & author's calculations.

The table's other columns show:

- Where local sectors outperform on growth differentials (ii) with the GB average (especially health sciences, marine and digital)
- The relative scale (money GVA/FTE levels) showing how sector productivities (iii) compare with the average (£49,700, 2016)
- A simple, non-weighted, average comparative rank (iv) of the 3 variables combined.

²³ Based on input-output data provided by Plymouth City Council

²⁴ Over the last 15 years, many academic, consultancy and public agency studies have confirmed such conclusions at regional and sub-regional levels for the LEP area.

This data provides summary criteria²⁵ for analysis of local intelligence that supports and informs ABCD classification and, therefore, aids prioritisation. Table 3 summarises derived multipliers from the local input-output model. In combination with the other tables' findings, its results suggest LEP support, from a macro perspective, could be focused on health sciences, digital technologies, photonics and electronics, and marine and other selected engineering²⁶.

Derived local GVA multipliers

Adv manufac/engineering	1.60	Creative industries	1.48
Energy	1.33	Food & drink	2.25*
Digital technology	1.38	Agricultural technology	1.54
Marine	1.57	Medical, health & life Sciences	1.32
Defence	1.54	Environmental industries	1.38
Photonics & electronics	1.51	Tourism	c1.4

Source: Plymouth Council calculations * over-high because of an unhelpful (from a productivity perspective) reflection of local supply chains (primary-tertiary)

Evidence from elsewhere²⁷

At home and abroad, most development bodies have found, in no particular order) the following factors to be important for successful regional economic development:

- Education standards/facilities & skills retention/replacement/renewal
- Market proximity (physical/virtual and technological/supply chain stickiness)
- Transport/connective infrastructure for productive clusters/smart specialisation with respect to health, clean growth and place
- Access to finance/commercialisation, natural capital and talent, especially entrepreneurship
- Technological/process innovation, including the sharing of best practice and catalytic change in digital & related knowledge transfer
- Devolved business and local authority co-operation on focused investments and interventions

These elements are reflected in the HotSW Productivity Strategy that sits over this document.

²⁵ See detailed analysis 2 for the ABCD framework and detailed analysis 3 for the criteria.

²⁶ This is largely where HotSW is rather than where it is going: the issue of potential 'futures' caused by dynamic technological and other advances must be/is also considered.

²⁷ Various data, reports and academic research on regional economic development have been reviewed including Developing Effective LIS – What Works Centre; Greater Manchester Baseline Evidence Report; Cambridge & Peterborough Independent Economic Review; Black Country LEP LIS Evidence Base; Econ Stats Centre of Excellence – Regional Nowcasting.

Local sector intelligence²⁸

In summary, local intelligence identifies some industrial strengths (current and potential):

A) Nuclear SW

Focused on the building and operation of Hinkley Point C in Somerset and its potential for skills (Bridgwater national college for nuclear), trade (future construction, operation and decommissioning elsewhere in the UK and overseas), together with supply chain development.

The potential is wider than power generation, since it includes aspects of defence, construction, medicine, geo-disposal and 'clean' energy. For example, a centre for innovation and 'best practice' has been mooted, with a focus on fusion and fission research (with universities), facility operation and construction (with companies). Some of these offer the prospect of major catalytic change. Addressing the clean growth challenge, the LIS might seek to support such activity, which offers highly productive and considerable value. There is, however, significant risk, especially from the perspectives of business/fiscal viability and public policy.

B) Photonics and related micro-electronics

With a strong 'cluster' in and around Torbay (and links elsewhere in the wider sub-region), photonics represents an enabling technology that will be important for the fourth industrial revolution (principally around the digital/AI challenge but also with the other challenges). HotSW capacity is arguably one of the 'top 4' in the relevant output/employment leagues. It offers high value and productive jobs for future growth²⁹.

Photonics has links into a wide range of significant industries, (including clean growth, AI/robots, satellites/space, health/medicine, manufacturing processes/materials, bio-science/technology, quantum technologies, digital/data technologies and creative services). Photonics will probably be used to address social and business 'failure intolerant' challenges, linked to demographic and transport services, and horizontal/ vertical integration of industries. It will need intra and inter HotSW collaboration with other key sectors (aerospace, marine, nuclear and health), services and academic research.

²⁸ HotSW LIS evidence base – op cit and specific information and reports from other partners.

²⁹ High Potential Activity – Photonics, Investment in GB & NI, January 2019

C) Marine

The local marine cluster brings together a wide range of economic activities, with many businesses and workers making a contribution to wider UK activity. Defining this complicated sector is problematic because it includes elements of manufacturing, fishing, travel, renewables, leisure, professional services, and environmental technologies.

There are a range of innovative initiatives in the marine sector that can support future development of component technologies with centres linked to the Devonport defence facilities, key private firms and the area's universities.³⁰ If the HotSW LEP is to prioritise marine investment, it will have to specialise on those aspects that offer strong productivity growth. These are likely to be the more technical aspects of marine engineering and offshore renewables with strong links with higher education, research institutions and defence.

D) Aerospace

HotSW contributes to the world-class and world-selling UK aerospace supply chains, (military and civilian), with notable expertise in aircraft rotors (Yeovil) and composites (elsewhere across the LEP area). Links to the centre of UK aerospace industry in the West of England are valuable and vital. There are vulnerabilities, however, not least reflecting potential shifts in global investment patterns after Brexit.

Most HotSW firms will follow rather than lead the aero supply chain but the balance here can shift. For example, the LIS might support wider technological and process innovation that will increase the stickiness of local manufactures supply chains, preserving and expanding vital, high value jobs with strong productivity.

Crossover issues are also relevant:

A) Inclusion (spreading the benefits of development).

There is a link from growth and productivity through prosperity to social inclusion (via jobs and earnings). But, the link is imperfect and imprecise, because of barriers to re-distribution. Economic choices and changes imply 'losers' as well as 'winners'. The question is how overall gains can be shared.

Some re-allocation of "profits" through re-investment (rather than distribution to shareholders) may be warranted to raise economic efficiency.

³⁰ Marine Sector Technical Centre Survey 2018 (Hants Council EBIS). SCMS Evidence Base. 'Oceangate' enterprise zone in Plymouth.

There are related issues about new and affordable housing, and local retention of wealth, skills and spending. Most of these, however, require fiscal measures after/as an improvement in economic performance has been/is achieved. Essentially, they should be addressed outwith the LIS. Inclusion is not an input for a LIS based on productivity-led growth, but it is a vital outcome to be monitored and an important goal for complementary policy and action.

B) Rural areas and coastal towns

Rural and coastal issues are crucial for HotSW, and are related to competitive and linked capacity, economic scale and scope. Aspects of comparison between residence and work place are important, reflecting commuting, small business predominance, full/under employment and ageing communities. For example, weaker competitive pressures in these areas can allow 'zombie' companies to persist³¹, meaning less sector diversification and integration, a predominance of low productivity activities (such as parts of the visitor economy), and more skills gaps/mismatches.

There can be close association of rural/coastal issues and inclusion issues, linked to peripherality, such as weak connectivity to city-region hubs and broader access to services and markets. Intervention by local and national government to promote further rural proofing is desirable. It is not, however, likely to be a central part of a LEP-driven/productivity-based LIS. As above, this is an outcome rather than a productivity driver for the LIS.

C) Natural capital

The environment and its resources provide economic benefit through attracting visitors, amenity values to residents, and flows of services (e.g. air and water quality) and products (e.g. minerals and energy). These goods and services are captured poorly by current economic statistics. Although significant progress in valuing nature is being made³², environmental market failures are still not well addressed by modern economic development.

In future, however, environmental scarcity and use can only get more important for economic development, value creation and local wellbeing. Because the HotSW region has particular strengths in natural capital and is valued highly by local residents, the LIS should acknowledge a productive nature strand related (particularly) to innovation in local data expertise and

³¹ The Bank of England and others discuss the effects of monetary policies after the 'Great Recession' in allowing low-productivity companies to persist, embedding low efficiency use of resources in activities that might 'normally fail'.

³² See the expanding work of the Valuing Nature Network

new environmental services. This will probably include support for, and collaboration with, expert data and research centres, and catalytic firms and potential new markets.

D) Business demographics

The HotSW business population is not dissimilar to national averages on most measures, but there is both a greater preponderance of smaller firms and relatively few multinational and/or large-scale facilities/headquarters³³. This reflects the comparatively less urban nature of the HotSW area, lower positive agglomeration effects, and distance from major centres elsewhere.

Barriers to growth exist for the local economy in terms of market size: growth and change on the demand side and management/technical skills and physical capital on the supply side. These reflect comparatively low investment and innovation rates over the historical long term.

There is a case for the LIS to consider support for start-ups, scale-ups and leadership skills. In particular, for a productivity-led approach, help for scale-ups to grow dynamic businesses would be advisable. This is likely to include addressing a sub-optimal provision of information on markets, access to finance, and other processes. It is also, however, about building aspiration, sharing experience, encouraging entrepreneurship, promoting partnership and enhancing links with foreign owners/decision makers.

E) Skills

Access to new and replacement skills are important for future business development. With an ageing population (supply) and a changing workforce (demand), having the right skills base is likely to be a crucial component of local success. The data³⁴ shows skills levels in the HotSW population are reasonably strong in terms of formal educational qualifications. There is a significant diversification of achievement, however, across the area.

Less formally, but perhaps more important to the LIS, the issue is about business/corporate access to in-work skills:

- a) foundational STEM skills
- b) cutting-edge technical skills
- c) management and leadership skills

³³ The HotSW area has some structural/asset vulnerability because of high foreign ownership and control in future investment decision making.

³⁴ LIS evidence base op cit.

In recent years, most local and national business surveys in SW England have highlighted skills acquisition and retention as a key restraint on growth. Future LEP activity will have a skills element, if not in within the LIS itself (i.e. as an industrial priority), through other strategic/delivery mechanisms.

Evidence from partners on 'place'³⁵

A) Exeter, its hinterland and partners³⁶ are important drivers and test-beds for growth in HotSW, with connective links to a significant part of the whole economic area. Greater Exeter is important for business/financial services, innovative industries, community resources and education, as well as transport and housing.

Greater Exeter has key aspects of innovation and investment for future development³⁷. Bringing together assets and expertise from various institutions³⁸ gives the City and its hinterland the potential to prosper in emerging, world-class activities to do with digital/big data, environmental/climate technologies and health services. For example, there are proposals for creating or expanding a range of capacity building measures, including an Environmental Intelligence Institute and Accelerator, a Digital Data Hub/Analytics Cluster, and a SW Institute of Technology.

Facilities, knowledge and specialisation abound in areas of innovation and commercialisation for big data and related technologies and services. These offer the likelihood of distinct, productive and long-term growth and can support applications relevant to healthy ageing through an emerging health and life sciences cluster. Also, there are local assets in research, innovation and practice covering, amongst others, aspects of bio-medical engineering and pharma-toxicology³⁹, which correlate with the health and life science cluster in Plymouth.

In addition, supporting the skills base, (through schools, business training, apprenticeships and higher education/research) for environmental science and big data could promote a global centre of excellence that will boost knowledge intensive productivity, increasing value and employment. The

³⁵ This section summarises the input provided by several knowledgeable local partners from the academic, local authority and wider development community.

³⁶ Greater Exeter: the engine for regional growth, 2018

³⁷ Science & Innovation Audit – SW England and SE Wales 2017

³⁸ Relevant IT business catalysts, Exeter Maths School, Exeter Science Park, Met Office, Royal Devon and Exeter Hospital, University of Exeter, Peninsula Medical School

³⁹ Plymouth Health and Life Sciences Sector: Research and Innovation Cluster Analysis, Chimera Consulting 2018– confidential to commissioning Plymouth partners

key will be turning talent and knowledge into strong innovation and, vitally, bold commercialisation.

Other positive angles relate to photonics development (based in and around Torbay⁴⁰) and other convergent technologies. The photonics cluster is a world-class hub highly relevant to future productive investment. It is:

- Operating from 'lasers to lighting' through design, manufacture and communications at the forefront of digitisation,
- Offering durable and pioneering components to a range of defence, aerospace, and communications activities, and
- Collaborating with intra/inter regional partners from a high skills-base.

B) Plymouth, Torbay and neighbours (extending the dynamic heart to Yeovil and Bideford-Barnstaple) complement the above with current activity and future potential, especially in the productive parts of the marine products industries.

As part of the wider South Coast Marine Cluster⁴¹, the HotSW LEP area has important assets and engagement across key sectors with good productivity levels that are prominent in UK/international leagues. Linking education, defence and research with private activities (over 2,200 businesses including some key primes, such as Babcock and QinetQ) in marine manufacturing (57% of SCMC employment) and offshore renewable energy/environmental services, suggests making an intensive definition of future marine economic potential could well be important. These activities offer high value, employment, more exports, and supply chain potential through manufactures, autonomous systems, cyber-security et al.⁴²

Such activities are technology, skills and export-led and offer scope for new markets, products and performance with connections, amongst others, to the Plymouth Marine Hub, the Met Office, and other aqua/aero nautical research and innovation capacities across the patch. Another important centre is the UKHO/Geospatial Innovation Centre a global leader on marine data in Taunton – a critical asset for innovation and collaboration with industry et al, such as Thales. (Thales is said to be planning to collaborate with Babcock on autonomous marine testing facilities.)

⁴⁰ HotSW Microelectronics and Photonics Cluster (Harlin Ltd 2017 for Torbay Development Agency and HotSW LEP)

⁴¹ South Coast Marine Cluster: Marine Inward Investment – Wavehill 2017

⁴² Marine sector evidence supplied by Plymouth Council

Strong productive marine activities relate to defence, including the location of type 26 frigates and nuclear submarine maintenance at Devonport, and to high value leisure, such as the export-orientated Princess Yachts. The Plymouth marine cluster can be a self-sustaining and reinforcing centre for innovation, skills and investment through robust higher education engagement.

The sea and coast are likely to be central⁴³ to future development of resources, growth, AI/big data and climate change for an environmental sustainable economy engaged in key aspects of marine science and technology. The prioritisation of marine manufacturing and offshore renewables/services offer distinct and long-term possibilities for productivity-led growth and global competitiveness.

There are risks, however, especially over a 20-year horizon, linked to government defence and international policy changes, financial/treasury constraints, defence spending reviews, global shocks and local events, and company ownership and strategic changes.

C) Somerset is central for the rest of SW England and the United Kingdom⁴⁴ in nuclear power: the development, construction and use of Hinkley Point C – the first (and last?) of a new wave of UK power stations. There are links from this to construction and site operation and a range of other activities with future potential⁴⁵. Already about 75% of the businesses registered under the Hinkley Supply Chain Portal are HotSW based. Some reports suggest 60-65% of build content can be local. The question is how to enhance that for supply chain diversification into site operation and the development of new products and services.

There are opportunities in supply chain development, through inward and indigenous investment, and in demand creation, through export initiatives (beyond SW and UK) and broader market, skills and technical engagement⁴⁶. Importantly, nuclear provides opportunities in defence (linked to submarine maintenance in Devonport) and medicine (diagnostic tools) and domestic substitution of imports. Longer term, there are potential advantages in involvement in fusion research and development of Advanced Modular Reactor (AMR) technologies and facilities.

⁴³ Future of the Sea: Government Chief Scientific adviser 2018

⁴⁴ Nuclear Activity Report: Oxford Economics for NIA 2017 suggests SW is second largest nuclear region (behind NW) contributing £1.6bn GVA with each worker adding over £96,600.

⁴⁵ Somerset Local Authority (2019) Evidence for the Local Industrial Strategy (LIS)

⁴⁶ Nuclear Sector Capability of SW England – Frazer Nash for NSW (2018)

Significant productivity value creation can arise from HotSW support for nuclear. It is inherently a high return sector:

- Creating jobs and paying high wages for vital and transferable skills,
- Undertaking major infrastructure investments,
- Pursuing inventive and future-focused research and business activities,
- Having positive direct, indirect and induced, productivity-led impacts on the wider regional economy.

There are, however, significant risks, (notably after the recent corporate decisions not to pursue other new power stations in Anglesey and Gloucestershire):

- Policy/exchequer uncertainty over funding and price/cost overruns from being first in the next 'new build' wave,
- Supply chain dislocation and benefit leakage– linked to the dependence on French and Chinese primes/ownership,
- Need to collaborate closely with other UK regions (especially with West of England universities and forthcoming projects, e.g. Bristol's Nucleate initiative),
- Difficult and uncertain cost-benefit assessments on a range of related environmental issues (low carbon emissions versus accident/disposal).

The economic prize of HotSW specialisation in civil and defence-related nuclear research and operation is potentially immense over the 20-year period of the LIS. Technological futures in fusion, AMR et al could be very rewarding but also very risky. The question is whether the aspiration, ability and finance for capturing future returns to development exist or can be brought to bear, especially for progressive Tier 2-4 companies in supplying Hinkley, Devonport and other potential sites, at home and abroad (and extending also into medical diagnostics and treatment, and other markets). There is a possible role for the LEP in facilitating the accumulation of workforce skills and innovation in decommissioning and new technologies (invention and supply)⁴⁷.

⁴⁷ Realising the socio-economic benefits of Hinkley Point C (EDF)

2. ABCD Framework

The ABCD approach is a framework for thinking about economic development. It is flexible and analytical and based on experienced judgement, statistical rankings and local knowledge. Importantly, sectors firms and/or locations can fall into more than one category. Indeed, it is preferable that they do. Over time, a positive path (of drifters turning into beacons and anchors with catalytic characteristics) is desirable.

In the ABCD structure, based on the criteria set out in the next detailed analysis and adapted here specifically for HotSW's LIS:

- A is for '**anchors**' – activities that are vital for output and employment (now and/or in the future). These may be 'prime' companies in supply chains (e.g. aerospace in Somerset), major local employers (e.g. public and health services in most areas), or key sectors (business services in Exeter and defence in Plymouth) that contribute significantly to the scale and growth of local value across industries. The key judgement is whether these anchors are reliable for future growth or whether different anchors can be foreseen and/or secured.
- B is for '**beacons**' – economic actors that demonstrate and disseminate 'best practice'. These may include sectors such as photonics in Torbay, rotors in Yeovil, boat building in Plymouth and various research/education establishments across the HotSW patch, including Exeter and Taunton. They offer learning directly or indirectly to other businesses and activities about effective and efficient ways to achieve productivity growth. The strategy needs to promote and support today and tomorrow's beacons to encourage new catalysts and build future anchors.
- C is for '**catalysts**' – businesses or markets making constructive (supporting existing businesses) and/or destructive (replacing existing businesses) change, raising future development potential. In the coming period, many of these dynamic changes will reflect digitalisation of products and services, processes and markets (as in some creative, environmental/energy and health services). More competitive systems with higher growth potential will be generated through novel sector crossovers that stimulate demand and remove uncompetitive alternatives on the supply side.
- D is for '**drifters**' – economic actors that may be important (for jobs and communities, such as some elements of tourism and social services)

but could learn, embody and generate more economic benefit per unit of effort. Consistent 'wins' in productivity might be difficult in these areas but, over the long term, cumulative effects of such changes could be significant, turning 'drifters' into ABCs.

The example of an ABCD matrix⁴⁸ (below) relates these characteristics to HotSW's key clusters: its transformational or golden opportunities as defined by the Productivity Strategy and supply chain modes.

Marrying the ABCD matrix with productivity factors that consider local development priorities against the productivity foundations⁴⁹ (from the UK industrial strategy) allows a consistent assessment to be made dynamically of proposed investment actions.

Consideration of how the ABCD conclusions fit the government's four productivity (nine) challenges⁵⁰ can help to narrow the prioritisation process.

The ABCD approach is a quantitative and qualitative narrative about growth realities, potential and prospects. Importantly, the process of debate about, and assessment of, relative evidence can be an important decision and impact tool, whatever the outcome in terms of points on the matrix.

The ABCD framework can be adapted for 9 (nine) potential parameters:

- Sectors, places or businesses/ workforces
- Current, medium or long-term dynamics
- Technology, demographic or environmental themes

Summary HotSW LIS Priority Matrixes

ABCD Matrices

Places	Somerset	Exeter	Torbay	Plymouth
Clusters				
Marine/aerospace	A/B			A/B/C
Photonics/data	B/C	B/C	A/C	
Nuclear/energy	A			
Health/environment		A/B/C		A/C

The summary ABCD matrix (above) considers sectors (related to, but not defined by, specific SICs as in HotSW's evidence base) and places (meaning broad, functional economic hinterland – not necessarily administrative borders).

⁴⁸ This is just one of dozens of examples worked through for this prioritisation exercise

⁴⁹ Ideas, people, place, business, infrastructure (Indus Strategy: the 5 foundations Nov 2017)

⁵⁰ AI/data, clean growth, ageing society, mobile futures (Grand Challenges update, Dec 2018)

Comparative study of a range of criteria (see next detailed analysis), in terms of performance, asset bases and productivity potential reveals the following elements as rising to the top for priority selection:

- Marine/aerospace anchors in Plymouth and Somerset, photonics anchor in Torbay, nuclear anchor in West Somerset, health anchors in Exeter and Plymouth
- Aerospace beacon in Yeovil, marine in Plymouth, data beacons in Exeter and (Taunton), health and environment beacons in Exeter
- Marine catalysts in Plymouth, photonics catalysts in Torbay, data catalysts in Exeter and Taunton, nuclear catalyst in Somerset, health and environment catalysts in Exeter & Plymouth

These categorisations are illustrative rather than exclusive. In all cases, the spatial and technology/sector designations are shorthand for connected links in supply chains or co-operative innovation and application. They point to final conclusions about productivity reality and potential after a raft of technology, business, numerical and other factors (including 'futures') have been analysed, compared, assessed and judged.

They indicate potential to:

- Strengthen supply chains; boost enabling technologies; and match dynamic market futures.
- Meet the UK industrial strategy requirements for the HotSW LIS by being distinct, long-term and productivity-driven,
- Address issues related to the government's four challenges

3. ABCD Criteria

The criteria for ABCD analysis incorporate a range of factors:

- **Official data** from ONS and official forecasters. This quantitative (and qualitative) aspect considers a range of macro variables and trends, including growth of output and employment, trade and market statistics, industrial and spatial specialisation, and measures of business and personal demographics.

First Steps:

- 1) Compile and study ONS annual (December 2018 latest) release for regional and sub-regional output (GVA), employment (FTEs) and productivity (GVA/FTE) by place and major industry (e.g. see first table in the evidence detailed analysis 1).
- 2) Derive rankings of scale/importance, with reference to both snapshot and trend (absolute and relative) performance.
- 3) Identify leading centres and sectors in terms of ABCD characteristics.

For example, UK, SW and HotSW GVA shares, GVA/FTE growth and sector breakdowns all suggest elements of manufacturing as potential choices for beacons and catalysts, particularly as select engineering will contribute to several of the key challenges.

Second Steps:

- 1) Consider long-term 'futures' forecasts on growth, population and other macro factors from OBR, Bank of England, ONS and other reputable forecasters (where appropriate).
- 2) Interrogate approaches in other LEP areas.

For example, the OBR's near term forecast is that the UK's underlying growth potential is about 1.5% per annum real GDP and 2% inflation, implying productivity is expected to remain low at about 1% per annum. The nation and HotSW need to improve on this performance markedly.

- **Derived data** from the local input-output modelling. This considers the absolute and relative levels and changes over time of factors such as ratios of specialisation (e.g. location quotients - LQs), productivity indicators (such as GVA/FTE) across sectors and places.

Third Steps:

- 1) Compile and study the data from the University of Plymouth AMORE model as specified for Plymouth City Council for GVA/FTEs, LQs and derived multipliers.
- 2) Rank and identify leading centres and sectors with activities with high productivity records and strong multipliers.
- 3) Integrate within the emerging ABCD assessment.

For example, Tables 2 and 3 in the evidence section point, amongst others, to marine and digital as potential choices because they are already, and are likely to continue to be, high productivity sectors based on exportable technologies of relevance to all four of the government's 'challenges'

- **Local business intelligence** on place and sector based technical specialisation and potential is obtained from existing sources, including input (referenced as appropriate throughout the document) from academic, business, local authority and LEP experts.

Fourth Steps:

- 1) Interrogate the HotSW evidence base, expert submissions and local opinions to get the reality and flavour of developmental potential by place, sector, technology and market.
- 2) Synthesize leading contenders for productivity driven growth and relate them to the ABCD categories and the government's challenge factors.

For example, photonics is identified as an anchor for Torbay, a beacon for research and other activity more widely, and as a catalyst for future development of health, defence and other sectors. These are relevant for the AI/data and future mobility challenges.

Fifth Steps:

- 1) There is much theoretical and applied debate about where the economy is moving with respect to dynamic change (demographic, technological and market 'futures'). No one can claim predictive accuracy on these issues.
- 2) Nevertheless, based on local and national population trends, local infrastructure needs and the government's own future challenges, it is possible to make broad assumptions that influence objective ABCD judgements, based on the steps above and aspects of forecasting trends.

For example, consideration of consensus 'futures' on environmental and demographic trends point to the potential for beacons and catalysts for innovation linked to

- a) Anchor health services in the community (ageing challenge) and

b) New environmental services through energy beacons (clean growth).

These factors are all weighed in the balance to derive a detailed picture of a range of priority options. On this basis, drifter sectors and places tend to be set aside, affecting some parts of HotSW's economy close to local hearts (tourism, some food services, more rural/small town places). In order to come to an assessment of a small number of specific, leading areas of growth potential that are distinct, long-term and productivity driven, the choice process has to be fairly ruthless for a LEP seeking a future with productivity-led growth tied to the government's challenges (see assumptions and judgement detailed analysis below).

With a 20-year horizon, this process requires an element of judgement about possible 'futures' but the criteria listed in this detailed analysis are robust and allow a vibrant and informed consensus to emerge. The choices made reflect an understanding of where positive movement within the ABCD categories can be projected in the envisaged time period.

When the LIS is implemented, the ABCD approach can be re-used to assess potential impact and to monitor actual impact. It would be useful to augment the criteria and steps outlined here by identifying and having direct contact on future investment measures with key ABCD companies and researchers. In particular, close links with real players in the recommended areas of prioritisation will be essential, especially when considering commercialisation and finance, private investment and diversification, and other matters for a range of prospective interventions.

4. Risks & Alternatives

Risk Factors

The forward-looking risks associated with this report's recommendations are profound, particularly over a 20-year horizon. The LEP and its partners need to decide what the **local appetite for risk** is and how aspects of it might be mitigated. Here, some of the most important risks are identified over and above any project risks.

Political risk. Most of HotSW's current and future competitive and productive strengths (e.g. health, environment, marine, defence and nuclear) will be affected by UK government changes and international business development. The LIS needs to factor these in to specific project planning. (Brexit is an obvious example: it is assumed that the economic effects of Brexit are largely neutral, at least over the long term.⁵¹)

Policy risk. HotSW is highly dependent on public sector procurement, defence policies and energy capacity decisions. Radical change in these would be significant in affecting LIS investment and impact. Moreover, other policies with respect to social and health issues, spending and taxation, international trade, regional development and planning are likely to be important. A steer on these matters from DBEIS and other departments would be useful.

Market risk. At times of rapid and far-reaching industrial, product and service, and workforce innovation, predicting which markets will prosper, transform, stagnate or disappear is not straightforward. Expectations of a 'fourth industrial revolution' based on AI/digital-driven technology suggest many demand and supply elements (sectors, places and markets) will change profoundly and possibly in largely unforeseeable ways. For example, it is possible to paint a wide range of 'futures' for health care technology and delivery. Finally, it is difficult to forecast ownership and behavioural developments for many businesses. Hence, this report makes emphasis of the need for supply chain stickiness in securing future growth and development. Producing networks of supportive businesses and workers is a key foundation of sustainability for any LIS.

⁵¹ This is in line with common practice by the forecasting community. Because the current level of uncertainty is so high, it may be a heroic assumption.

Local risk. Nowhere stands still. Despite best efforts, sound strategy and good interventions, there is a risk that other areas, at home and/or abroad, increase their performance better or faster than HotSW. (Using a sporting analogy, not all teams can win the league or finish in the top few places⁵².) In specific areas, it will be important to identify external partners/places for collaboration, (where feasible and mutually beneficial), to boost competitive chances. Productivity-led growth is more than technology and talent, it is also market and entrepreneurial diversification and competitiveness

Other risks. All industrial investment strategies carry commercial, financial and wider resource risks. Road access to funding is key. Also, particularly for HotSW, there is a strong desire to protect natural and human capital by striving for a LIS that is environmentally sound and people inclusive. These elements need to be built in to future evaluation processes to ensure a distinct, long-term, productivity-led, and business-focussed LIS that is aware and bounded by vital, wider outcomes.

Alternative Approach to Prioritisation

This report's recommendations are driven by HotSW's desire to grow the economy significantly, doubling its size by 2038.

Given that reasonably full employment has already been achieved, areas for investment are identified that are likely to achieve that target efficiently and effectively, with the focus on productivity growth rather than employment growth. The latter needs to be a natural, correlated result of the former.

This means the LIS will tend to favour sectors, firms and workforces (and places) with established (anchors) and/or predicted (beacons and catalysts) productivity growth and strong net additionality. The LIS should seek to promote beacons and catalysts that are, or can be, robust, sustainable anchors for future growth. It tends not to favour drifters for whom significant status and performance change is more difficult.

An alternative approach would be to consider what is important to the communities of HotSW on a wider basis, such as the value over and above that accounted for in terms of the economic statistics of development. These are more likely to be current drifters and anchors than beacons or catalysts – always remembering that none of these categorisations are mutually exclusive.

⁵² Although, the Exeter Chiefs have shown it is possible to break into the top flight and perform well. Sound strategic and tactical investment can yield transformative success.

For example, it can be argued that environmental resources and amenities, and the associated industries of environmental services, tourism and leisure, food and drink, and some creative industries, are what characterises and distinguishes the LEP's geographical area for many residents and visitors.

Given growing concerns about environmental and demographic issues, it may be the preservation, conservation and enhancement of the living environment, natural capital and related community and business issues that are considered priorities for future technological innovation and investment. These may not have the potential productivity performance of other choices but they have important wellbeing characteristics. They will relate to the 4 'challenges' in very different ways.

The LEP and its partners might wish to consider the values and risks involved in such an alternative approach to future emphasis. On such a basis, the LIS will probably need to set less aspirational macro targets (see detailed analysis 6 below). In other words, it would be a legitimate, different approach to prioritisation for the development community to make. But, it will be a tougher ask to meet a) the productivity aims envisaged by the HotSW Productivity Strategy and b) the government's requirements in terms of economic challenges, development outcomes and central funding.

5. Using the Command Paper

Ideally, a LIS would want precise forecasts of how a monetary amount of LIS investment in a particular innovation or capacity build can yield a higher monetary amount of (direct, indirect and induced) impact.

It would be useful to turn this into net additional output and employment benefits that could be assessed in terms of productivity (levels and growth) via robust and detailed sector multipliers and forecasts.

This is not really possible, however, especially over a 20-year horizon without adopting brave assumptions and using uncertain estimates. There is no econometric or other model of growth and development at such geographies that is suitably robust.

Reliable forecasting is problematic, requiring difficult-to-defend assumptions about future technologies, consumption and household characteristics (structures and tastes) as well as new product and service processes and markets. That is why the pragmatic ABCD approach has been adopted here.

Having derived a prioritisation recommendation that establishes areas for productive investment, it would be appropriate to require any future proposal for intervention to show (in bidding, monitoring and evaluation) how it:

- Fits with the (3) priority categories in precise detail
- Maximises agglomeration effects and builds supply chains
- Drives enabling technologies into dynamic new markets
- Has identifiable spatial impacts, supporting greater connectivity
- Will sustain or move the ABCD characteristics positively
- Intervenes through the government's (5) productivity foundations
- Addresses the (4) national productivity grand challenges
- Provides quantifiable impact (for GVA and FTEs and other less tangible outputs): net additionality

- Can be monitored and evaluated through the life of the project (conception, creation and operation) quantitatively and qualitatively.
- Relates to, and complements, the wider development aims and criteria of the HotSW productivity strategy

The finalised LIS needs to be accompanied by detailed Guidance for Applicants and Officers on how to establish, record and test the Economic Case for specific investments through each of the checklist of these 10 requirements.

Such steps should help to justify and reward projects that yield:

- Distinct net financial and economic impact
- Other valued effects on local crossover issues
- Productivity growth that attains and sustains development towards HotSW's long-term macro targets

6. Macro Targets

The LIS rests on high-level macro-economic targets. These targets focus attention, frame discussion, support decisions and monitor impact. They are, however, only one aspect of success, especially over a 20-year future horizon.

HotSW's macro targets suggest uplifts of 0.3-0.5% per annum in productivity growth. If current projections⁵³ (real UK productivity growth accelerating to 1.7% per annum) are accepted, this implies HOTSW real productivity growth of 2.0-2.2% per annum with GVA/FTE attaining around £60,000 by the end of the period, up from about £45,000 today⁵⁴. The HotSW economy potentially produces over £60bn of nominal value per annum by the end of the next decade and doubling (from today's c£35bn) to over £70bn by 2038.

Growth Target Scenarios per annum 2018-2038

% ch p.a.	inflation	workforce	productivity	nominal	real
current	2.0	0.5	1.0	3.5	1.5
target	2.0	0.8	2.2	5.0	3.0

Source: author's calculations based on official predictions (OBR, Bank of England)

The table above summarises the broad macro scenarios taken into account for this exercise.⁵⁵ Current expectations double the economy in 22 years (nominal) & 48 years in real terms. The target doubles the nominal economy in 16 years (nominal) and 25 years real. (Inflation represents a significant part of the nominal doubling.)

To achieve such a step change will require a) a favourable macro-economic (UK and international) environment and b), locally, a combination of dynamic improvements. Given Brexit, the outcome of the former (a) is highly uncertain at the time of writing. The latter (b) is a sought after LIS process and outcome.

The required step change means a shift in the supply curve, arising from technological, organisational and other changes. This shift needs to reduce cost per unit of production, increase profitability, and stimulate investment in new products, processes and markets.

⁵³ From previous HotSW impact modeling exercises

⁵⁴ See Evidence Base – Economic modeling technical report 2017

⁵⁵ Importantly, the broad figures/rates shown are not extreme from an historical perspective although the target implies a 'raising' of performance from current/recent trends/forecasts.

Productivity will need to be stimulated through the innovation (ideas) and skills (people) drivers, and by boosts to entrepreneurship (business) and competitiveness (place). Moreover, infrastructure will have to support the LIS. Thereby, labour resources can be released, reallocated and rewarded to/for high value, supply side growth opportunities.

Higher productivity means job creation at higher wages, (pushing average local wages from about 90% of the UK average towards parity or better). In turn, this will stimulate the demand side of the economy, creating a virtuous circle of growth and development.

The LIS should explain which places and sectors it is going to compare itself with in terms of future monitoring and evaluation. A step-change in HotSW productivity is not a unique target: nowhere is standing still.

Indeed, HotSW and partners need to consider where they might reasonably expect to move to, sustainably, in the LEP performance league. For example, can a move of GVA/head (or per FTE, or per hour) be envisaged from the current lowest quartile of the 38 LEPs' performance to a ranking closer to half way ... or higher? On that hangs the success of the LIS for the 2030s.

7. Assumptions & Judgement

Sector Justification

A balance has had to be struck between macro generalisation and micro detail. For example, advanced engineering is an important, relatively high productivity, HotSW sector. It is too broad, however, to be one of the main LIS priorities. Elements of it have been chosen, under the High Tech Engineering option, covering aspects of marine, aerospace, photonics and defence. Within these, there are particular technological innovations, such as specific components and transformational systems, worthy of prioritisation (as explained in the various references provided by local experts and accepted through the framework).

At this point, however, it is difficult to be too prescriptive as to what deserves active support. It is for HotSW and its partners to determine this when it is considering the final LIS and specific investments. For this document, the evidence supplied, quantitative and qualitative, has been weighed and those elements chosen that offer a reasonable possibility of success: distinct, long-term, and productivity-led. It is not a case of excluding anything. It is a case of focussing on specific areas of strength, opportunity and potential, particularly those that overlap and offer spill over benefits to the wider economy and its communities.

Brexit Uncertainty

Economics (theory and evidence) is clear that higher trade barriers, whatever their scale or timespan, mean adverse effects on economic growth, inflation, jobs and trade compared with what otherwise would have been the case.

At the time of writing, a wide range of 'futures' is possible from the Brexit process: it may yet not happen; there could be many forms of a deal; or there could be exit with no deal. Moreover, exit is only the first stage of setting new trade relationships with and beyond the EU and the process of supply chain adjustment. It is difficult, for example, to forecast how Airbus will react to Brexit and its likely impacts on SW supply chains. It may be 'bad' (a withdrawal from UK activity and suppliers and a diversion of investment into the EU or 'cheaper' locations elsewhere) or it may be 'good' (exchange rate effects improving local cost competitiveness and allowing more business with other primes in the Americas/Asia).

With a 20-year horizon, it is to be hoped that Brexit is resolved, adverse effects overcome, and new patterns of exchange embedded. Here, however,

the analysis has endeavoured to remain neutral. Brexit effects have been considered, influencing the ABCD analysis, but not commented on directly or weighted highly.

Local distinctiveness

There are aspects of the HotSW area that are perceived locally as distinct, not least the rural/coastal nature of many communities and the strong environmental and cultural heritage. These are important USPs. But, for the industrial economy, they are mostly aspects of desired outcomes rather than productivity drivers.

The LIS must not lose sight of these variables but its focus has to be on distinctiveness arising from productive and competitive potential – that's where future jobs and living standards will come from. In some ways, spatial distinctions are not relevant to a productivity-driven policy. It is not where things are done but what is done that matters. Indeed, location decisions by firms are private responses to a range of factors beyond the remit of the LIS.

Nevertheless, all the evidence is that agglomeration around urban hubs is the predominant competitive and residential trend. Productivity is higher in towns and cities because of the closer proximity of workforce skills, housing and transport, as well as eider connectivity and integration. Whilst the broader Productivity Strategy needs to consider rural/coastal issues of connectivity and inclusion, and how the benefits of growth are distributed amongst all communities, the LIS is about a narrower focus on industrial productivity. For the foreseeable future, this will be driven by technological and social elements that will favour concentration of effort in urban centres.

Supply Chains

The stickiness of supply chains, (the degree to which local firms are part of sustained investment and sustainable markets) is a vital ingredient in economic development. Some of these chains are international, indeed global, in nature (especially for local operations that are part of multinational companies). Others are very local, (including some aspects of the food chain from field to plate). One of the ways the rural/urban mix can be improved is to enhance and diversify local supply chain stickiness.

Importantly, two key assumptions underpin this prioritisation exercise:

- The places highlighted do not imply any exclusivity. It is recognised that the main local hubs, such as Exeter, Plymouth, and Torbay are

multi-faceted centres for many economic activities in the LEP area. But, the spatial economic structure is more diverse, both broader and deeper, than that. Proposing that development effort might focus in and around urban centres (especially when attracting central funding for a government business function focussed on “city regions”) offers more interconnectedness, R&D and export effort. It does not, however, exclude activities physically in other places. Indeed, it supports a desire to spread the investment and the benefits of development across the whole area.

- The clinching judgement behind the choice of digital futures, high-tech engineering, and clean energy as the three sector specialities to adopt is that these offer the prospect of wide benefits between each other and across many supply chains, and employment and local spending patterns. They offer the prospect of robust multiplier effects.

In the end, promotion of the activity priorities set here, should be outward as well as inward looking, contributing to the national effort to raise productive and competitive performance and to establish in HotSW as a ‘go to’ centre for key technologies, components and wealth generation, particularly those related to defence, photonics, energy and other engineering.

‘Futures’ Analysis

Demographic, environmental and technological change is a fundamental assumption of this paper. In particular, reference is made to how these might link with the government’s 4 challenges. Even if these aspects are not presented in detail (because they are clouded in some predictive uncertainty), the thinking behind this is a prime constituent of the rationale and criteria for specialisation. These factors are evidenced in the documents referred to, especially through the approach to extant evidence (see previous detailed analysis).

Skills and infrastructure

The LIS is part of a wider Productivity Strategy, which has been approved and published by the LEP and all its partners. HotSW intends to address aspects of transport, housing and skills in forums/initiatives alongside and consistent with, both outside and inside, the LIS directly.

Specific skills for the LIS priorities, and how to connect communities and providers with emerging demand for new and replacement skills, are highly relevant for future interventions. Evaluation evidence suggests successful

skills development can contribute high and persistent impact from public or private intervention. The wider approach to skills should help the LIS enormously.

Future work

This prioritisation exercise is one important step towards a full LIS. Other matters that will need to be considered include clear links to:

- Funding sources based on the relationship between the prioritised activities and the government's challenges and the expected Shared Prosperity Fund (post-Brexit)
- Crossover issues of place and activity, especially with regard to the catalytic effects of digital, human and environmental change and improvements in the skills, transport and housing infrastructure
- As with sector prioritisation, the approach to skills in any associated investment programme needs to consider how to spread beacon and catalytic school and FE/HE attributes across the education community
- Close links with the businesses that will deliver productivity gains and enhanced competitiveness is vital to the success of the LIS and the wider Productivity Strategy, especially if HotSW is to climb up the leagues of economic performance and social wellbeing.