

ECONOMIC
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PART OF THE EVIDENCE BASE
UNDERPINNING THE HEART OF THE
SOUTH WEST
LOCAL INDUSTRIAL STRATEGY

Document 010

Productivity Strategy: Economic Modelling

Heart of the South West LEP & Partners

September 2017

EXECUTIVE SUMMARY

The Heart of the South West (HOTSW) area is low down in the UK regional league of productivity performance. Over the last decade, the UK as a whole has performed relatively poorly on productivity in international terms. Moreover, in many countries, real investment rates have been low and productivity growth has waned.

The local position in SW England reflects a range of factors to do with the dispersion of activity by place and sector. It is also to do with the adequacy of transport, housing and other infrastructure. Moreover, agglomeration and connectivity characteristics are comparatively modest, reflecting mixed aspirations for growth and wider market engagement.

The local business sector has low investment and innovation ratios, exhibits some resource misallocation (inputs not being applied to their best possible uses), particularly on skills, and modest entrepreneurship and competitiveness. Furthermore, there are dislocations for productivity in measurement, finance and trade.

Currently, raising relative performance on productivity is difficult because there are some structural barriers as well as uncertainty about future trading relationships. Moreover, nowhere and no one is standing still and real results from policy interventions can only be observed over the long run.

Nevertheless, an ambitious but not unreasonable macro target would be to steadily increase local productivity growth to an average of between 0.3%-0.5% per annum above the national performance over the period to 2030 (see table 1). This could raise economic outcomes (total value added) by 5-8% above the currently expected benchmark. By the mid-2030s, economic output in the HOTSW area could be double its mid-2010s size.

These prospects do not necessarily imply a particular distribution of productivity differentials between HOTSW places on the basis of extant urban-rural and east-west differences and between sectors in terms of high value business technical and professional services versus consumer services. The policy imperative is twofold: raising productivity and spreading the

prosperity this produces across the patch. The key to capturing spatial and industrial synergies and positive spill overs on a wider front is to develop knowledge sharing networks of co-operation across the economic area, spreading 'best practice' across spatial and industrial boundaries.

Table 1: HOTSW Summary: Productivity Central Growth Projections

%ch p.a.	baseline	significant	ambitious
Productivity	+1.7	+2.0	+2.2
Employment	+0.6	+0.8	+0.8
Real Growth	+2.3	+2.8	+3.0
Total GVA	+4.3	+4.8	+5.0

Source: Strategic Economics based on HOTSW's Oxford Economics Model

We envisage a planning framework with a matrix of factors that

- Matches corporate and local characteristics (anchors, beacons, catalysts, and drifters) to key sectors and technologies
- Relates productivity drivers (investment, innovation, skills, entrepreneurship and competitiveness) to place, business and people

To achieve a shift in performance requires higher investment and R&D ratios (closer to G7 averages). This will need to be achieved, if at all, by private businesses. The development community, as assembled under the Productivity Strategy, is an enabler, providing incentives and interventions that

- Create supportive infrastructure to build connectivity in its widest sense - real, virtual and psychological
- Encourage collaborative acquisition and dissemination of knowledge
- Promote other favourable business and community conditions, especially competitive aspiration and market engagement.

There are a myriad of factors involved in raising productivity performance and many are beyond local control or influence. There are no clear, objective and easily quantifiable linkages between action and effect. Nevertheless, an enabling approach, based on a sound framework that understands current deficiencies and provides a robust appraisal of potential interventions and investments, offers the prospect of achieving a better productivity performance within and across HOTSW.

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INTRODUCTION

The Heart of the South West Local Enterprise Partnership (HOTSW LEP) and its partners aim to “drive productivity and prosperity for all”. They are creating a Productivity Strategy to focus and co-ordinate local economic development.

To this end, HOTSW has commissioned research on the economics of its drive for productivity growth, within the context of the current trends and policies. The resulting framework (herein) will support the setting of realistic macro targets and the monitoring of future micro interventions.

The following economics principles underpin HOTSW’s emerging Productivity Strategy:

- Economic growth supports a growing population, incorporates technological change and process innovation, and meets personal, household and community aspirations.
- Productivity growth is the main sustainable source of dynamic, growing businesses and higher average living standards over time.
- Relative productivity growth is a key driver of an area’s comparative economic performance against other sub-national areas.

This report considers macro-economic and local conditions, using a framework for regional economic development to assess potential ‘futures’ through the 2020s.

It uses HOTSW’s evidence base, including the LEP’s Oxford Economics Model for forecasting and impact assessment, together with established strategic priorities. It marries these with public sources and a matrix framework of regional economic development.

Productivity and Growth

Productivity is the prime source of sustained higher living standards over time. The economy creates value by businesses (and others) producing ‘output’, generating ‘incomes’ and enabling ‘spending’ on that output. This circle from production, through earnings to expenditure is measured nationally, albeit imperfectly, by gross domestic product (GDP) and locally by gross value added (GVA) in a given time period – usually a quarter or a year.

The economic circle is dynamic. Economic growth provides the potential to add more value each year and to distribute this to businesses and households (and thereby governments) as money to spend on current consumption and to accumulate assets/wealth. Essentially, aggregate growth determines the size of the economic 'cake' that residents have to share. We are also concerned, however, with the make-up/the ingredients of that 'cake' and how it is cooked: how good it tastes. Over time, economic growth driven by productivity raises current living standards by improving resource allocation - making a bigger and better 'cake' to be shared across the local population.

Economic growth is not the only aspect of the economy that needs to be considered for sustaining living standards. But, there are three reasons why it deserves attention.

- First, with the population increasing, if the economic 'cake' does not grow, on average, people get poorer year-by-year. Growth in output has to match the growth in the population for living standards just to stand still. This is driven largely by the size/scale, engagement and performance of the workforce. Over the last decade, UK growth has been mostly employment driven. Adding labour to the economy (jobs/employment) has increased output (grown the cake). But, with output per worker/effort largely unchanged, average, real household incomes have barely moved (the cake does not taste any better).
- Second, people innovate over time - learning to do things better and to do better things. Learning allows more output to be produced with the same inputs as before and/or the same output with fewer inputs. If the total 'cake' does not grow, innovation means fewer workers are needed – unemployment rises and social gaps widen – a recipe for a nastier tasting cake. More positively, *doing things better* releases resources that, in a growing economy, allow us to *do better things*. Productivity growth releases resources for allocation to further 'progress' and to build more potential for economic growth.
- Third, human beings have aspirations. Most expect to earn more as their careers develop and hope their children will be better off than they are. If some are to earn more and the 'cake' does not grow (a zero-sum game), they can only do so by making others worse off. We can only be paid more as a community if more value is produced. For the individual, experience and skills increase over time and he/she can, therefore, add more value and aspire to more income. This only works for society as a whole, however, if the total 'cake' is growing, among and between generations.

This is where productivity is vital. Over time, growth comes from producing more with available resources in order to grow the 'cake' in a way that creates more and, indeed, 'better tasting' value. Productivity drives profit in the widest sense and profit is what can be redistributed for 'community' benefit. The problem is that, recently, this has not been the case: many people do not feel any better off than they did ten years ago. The 'Great Recession' (2008/9) and its aftermath have shown that low productivity growth (and the austerity it commands) will generate economic and political tensions.

Historically, the impact of productivity growth and resource reallocation was observed in the agrarian revolution of productivity and distribution that released labour for industrialisation and led to growth in living standards. In the last few decades, the same effects have occurred in manufacturing: factory employment levels have dropped and released labour resources for services. Remaining manufacturing capacity is highly productive - the issue now is whether there is enough manufacturing capacity left to preserve trading competitiveness.

For this century, the question is whether the same productivity 'trick' can be pulled off with services, which now employ most of the workforce. The digital revolution is increasing productivity in many services, raising growth potential and releasing people for 'new' activities. Just as people in the early nineteenth century could not forecast where the industrial revolution was heading, it is hard to predict where digital change will take us now. But, if it boosts productivity permanently, there is no reason for the impact to be any less profound or less positive for economic, environmental and social sustainability in the long run.

Productivity - Technical Issues

Productivity is comprised of three key components:

- 1) Capital deepening – the application of more capital per unit of labour,
- 2) The quality (skills) of that labour and the intensity of its utilisation, and
- 3) Multi-factor productivity – the element of productivity attributable to factors beyond capital and labour, such as changes in technology and knowledge.

In studying the UK's recent poor record on productivity, the Bank of England¹ considered three explanatory factors:

¹ The UK productivity puzzle: Bank of England Quarterly Bulletin 2014 Q2

- Measurement – the poor capture of capital investment/intensity in many digital production industries and services and the effects of the rise in self-employment on the statistics
- Cyclical factors – weak demand and underlying spare capacity
- Structural factors – the preservation of ‘zombie’ companies, the breakdown of the trust and real investment between banking and other business sectors, and the run-down of North Sea oil

Broadly, the structural factors were found to be more important than the measurement issues and the cyclical factors were considered the least important of the three.

Behind these factors are:

- Labour hoarding related to employers’ fears of skills shortages and to workers’ acceptance of greater wage flexibility
- Increased labour supply, reflecting net inward migration, higher domestic uncertainty and lower access to finance, and leading to a smaller capital stock per worker
- Full capacity pressures generating a need to work harder to maintain sales at lower returns
- A decline in product and process innovation (of 30-40%) in the decade from the early 2000s to the early 2010s
- A drop in creative destruction, marring the process of resource reallocation because ‘zombie’ companies are maintained by bank and HMRC forbearance (not calling in loans and taxes) and persistent low interest rates
- Wider differentials in and dispersion of productive learning across sectors, again reflecting higher uncertainty, lower access to finance for real investment, capital misallocation and sub-optimal creative destruction.

In addition, there are aspects of:

- 1) Hysteresis i.e. the persistence of negative productive effects from the “Great Recession”,

- 2) Measures to restore banking capital and their negative effects on lending behaviour for real investment,
- 3) Longer lags in learning from technological change,
- 4) Slower trade growth, and
- 5) Population ageing.

Geographical differentials in productivity reflect spatial differences in sector coverage and between firms within sectors. Spatial differences between HOTSW locations can be caused by:

- 1) Internal trade barriers to do with business culture,
- 2) Aspiration and local market competitiveness,
- 3) The informal economy and state interference, and
- 4) Less effective scale of urban centres through agglomeration, the housing stock, transport and other infrastructure weaknesses.

These factors widen differentials in the costs of capital and labour, adversely affecting investment across some firms.

Such elements become evident when the process of business innovation is considered. For example, UK business expenditure on R&D as a percentage of GDP barely exceeds 1% compared with 2% plus in Germany and the United States. **It would be a useful HOTSW target to get such R&D intensity towards and above 2% per annum and the overall business investment/GDP ratio above 10%.**

At a firm level, productivity is about:

- Economies of scale, scope and specialisation
- Efficient and effective resource allocation
- Development of embedded (unrealised potential already in the workforce and capital stock) and disembodied (potential to be acquired externally) technological change.

Ideally, future productivity gains along these lines need to be spread across more sectors and places. For example, whilst it is good to support all local industries to reach global standards of productivity, it may be more rewarding to focus on areas, (such as construction), where gains to minimising 'market failures' may be more attainable than in other areas, (such as high value manufacturing). The latter may already be at the cutting edge of productivity and there may be an argument that such activities can look after themselves whereas other SW construction is known to be less productive than average national equivalents.

SECTION 1: OVERALL PERSPECTIVES & BENCHMARKS

This section considers growth and productivity performance in relation to where HOTSW is, where it has come from, and where it might be headed. It concludes with a summary recommendation of the macro productivity potential for the HOTSW economy.

Productivity Benchmarks

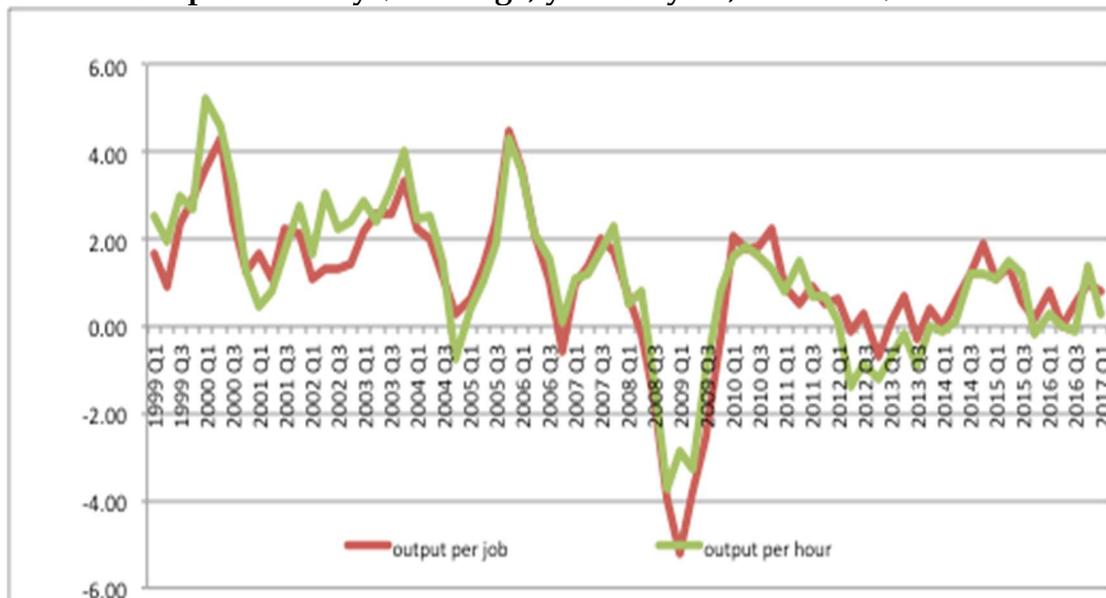
Productivity is a measure of the surplus of value created by economic activity: the difference between outputs and inputs. It is usually counted in terms of output relative to labour inputs, because policy is interested largely in the value available for distribution amongst residents, workers and owners.

UK labour productivity languishes below most comparators in the developed world and its relative score has receded in recent years. In 2014, for example, UK GDP per hour was 18% below the G7 average, including over 30% below the ratios achieved in Germany, France and the United States. In manufacturing, over the 2010-14 period, US output per hour was 45% higher, Germany 24% and France 18% than in the United Kingdom.

These are significant differentials. Unaddressed, they will impact negatively on competitiveness and living standards as the UK navigates the period of transition to non-EU membership and tries to build a raft of new global trading relationships.

UK productivity has hardly budged for a decade. In the first half of 2017, output per hour was still below the peak set in the fourth quarter of 2007. As chart 2 shows, productivity growth has largely failed to exceed 2% per annum since the “Great Recession”. This is a poor rate of performance compared with historical trends and is not enough to maintain, let alone gain, competitiveness and higher living standards over time.

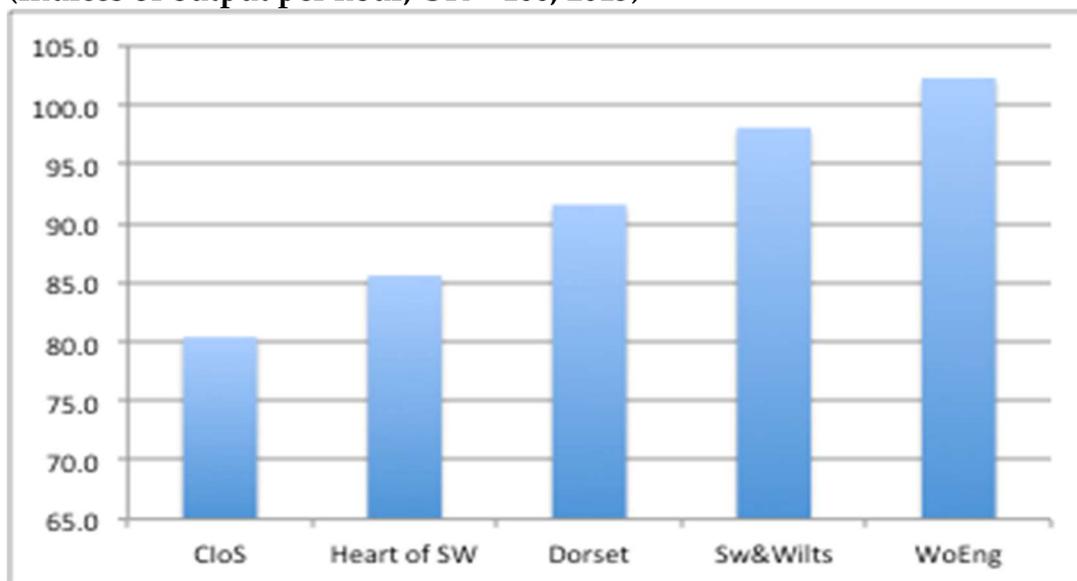
Chart 2: UK productivity (% change, year-on-year, 1999-2017)



Source: ONS

Beneath the national totals, regional productivity varies markedly, reflecting differences in industrial structure, spatial connectivity and workforce characteristics. In 2015, output per hour varied across the LEPs from 31 percentage points above average in London to 21 points below average in Stoke-on-Trent and Staffordshire. In 2015, Heart of the South West (HOTSW) ranked 7th lowest amongst the LEPs. Chart 3 shows relative indices of productivity for HOTSW and its neighbours, putting the target area only ahead of Cornwall.

Chart 3: LEP productivity in SW England (Indices of output per hour, UK = 100, 2015)



Source: ONS

Given this background, it is not surprising that analysts and policy makers, across the spectrum of UK spatial and industrial economic development, are concentrating on the productivity 'gap' as an area in need of attention. For HOTSW, in particular, this underpins the "Productivity Strategy" currently under development and towards which this report is directed.

Growth Benchmarks

From 1971-2006, UK real GDP growth averaged about 2.6% per annum and, outside periods of recession, often exceeded 3% per annum. Since 2007, the UK economy has averaged real growth of barely more than 1% per annum. It peaked at 3.5% briefly in 2014 and has eased to less than 2% again in 2017.

The consensus forecast is that real growth of less than 2% per annum will persist in the next few years. Longer-term prescriptions vary widely, especially given the different assumptions made about UK growth potential after BREXIT and related uncertainties, but the 'average view' is only just above 2% real growth.

From 1971- 2006, UK employment growth averaged about 0.5% per annum and (outside slowdowns/recessions) often trended at above 1% per annum. Since 2007, jobs growth has averaged over 0.8% per annum. In the first half of 2017, the rate exceeded 1%. Such strong growth, however, is not likely to persist without support from higher productivity.

The contrast between real output growth of less than 2% and employment growth of about 1% exposes the recent squeeze on productivity growth. In broad terms, productivity growth has dropped from historical rates of about 2.5% per annum to barely 1% per annum.

Most leading forecasting groups, including the Office for Budget Responsibility (OBR), the Bank of England, the OECD and the IMF base their predictive models on a concept and measure of the UK's underlying growth and productive potential. The assumptions adopted can vary widely but, essentially, the 'future' is driven by demographic and technological change, and active labour and trade engagement, and is measured as productivity and employment growth. Most agree an ageing population and a less open trading regime threaten to dampen expectations of future productivity and overall growth.

At present, UK real growth potential tends to be calculated in a range of 2.0%-2.5% per annum – a rate lower than the historical average, with employment growth of 0.5-1.0% per annum and productivity growth of 1%-2% per annum.

The current convention is to assume deflators in line with the official inflation target of 2% per annum, suggesting nominal growth of 4%-4.5% per annum.

For current purposes, this report adopts the consensus baseline forecasts of UK real growth of 2.3% per annum through the 2020s, made up of 0.6% average employment growth and 1.7% productivity growth and a deflator at 2% per annum. (N.B. Such point forecasts should always be considered as central to a wider probability distribution.)

Local Benchmarks

The HOTSW uses a dedicated Oxford Economics model (2016) of its economy. This records average growth, employment and productivity levels and rates for the whole area and breaks this down by sector and place. In aggregate, its current baseline projection is for real GVA growth (regional equivalent of output) of about 2% per annum constituted of 0.4% employment (FTEs) and 1.6% productivity (GVA/FTE) for the period up to 2030.

Given differences in model timings, definitions, structures, and assumptions, these predicted HOTSW rates are not directly comparable to the UK ones exposed in the previous paragraph. Nevertheless, they are broadly consistent, with output and employment growth in lower end of the expected UK range and productivity in the middle of most expectations.

These benchmark projections suggest HOTSW's productivity problem is broadly similar to the national one, viz. overall productivity-led growth is too low. This under-performance partly reflects historical structure. It is the relative characteristics of the economy, by sector and place that hold HOTSW in the lower end of the productivity league.

The Productivity Strategy, therefore, needs not only to **address how to 'do better' than UK average growth overall but also how to change local performance and capacity by sector, workforce and place.**

HOTSW by Place

To this end, first, we briefly consider HOTSW characteristics by place. The 14 local authority areas within HOTSW are very different in terms of economic structure and performance.

From the LEP's Oxford Model, table 4 shows the history and projected rates of productivity (GVA/FTE) levels at the 2013 baseline and productivity growth for 2000-2030. It indicates a wide range of performance, with

productivity ranging from £39,000 in mid Devon to £60,000 in Exeter and from growth of less than 1% per annum in South Hams to over 2% per annum in Sedgemoor.² The base projections in the model broadly assume a productivity growth average projection of c1.6-7% per annum applies to most areas over the next 12 years or so and, accordingly, historical differentials are largely but not always maintained.

**Table 4: HOTSW productivity by place
(average GVA/FTE, 2013 base and 2000-30 average change)**

	£'000	% ch		£'000	% ch
Total HotSW	45.7	1.4	<i>Somerset Co</i>	44.9	1.5
<i>Devon Co</i>	46.2	1.4	Mendip	42.7	1.2
Exeter	60.2	1.8	Sedgemoor	42.0	2.2
East Devon	43.5	1.0	South Somerset	45.3	1.6
Mid Devon	39.4	1.3	Taunton Deane	45.7	1.5
North Devon	42.9	1.5	West Somerset	56.2	1.3
South Hams	41.6	0.9	Plymouth	47.0	1.4
Teignbridge	40.8	1.2	Torbay	42.9	1.2
Torridge	38.3	1.7	SW	49.7	1.4
West Devon	41.1	1.8	UK	45.3	1.5

Source: Heart of the South West LEP Economic Model, Oxford Economics

The HOTSW partners are seeking to develop the local spatial economy by raising productivity (as in Table 4) as the basis of sustained improvements in future living standards for local residents. This can be approached by raising performance uniformly across the sub-region or by focussing on some areas more than others.

To an extent, this is a policy choice, informed by an assessment of specific investment proposals/alternatives, as to whether to attempt to ‘raise all boats’ or to focus on specific places. Evidence shows that focussing investment on places that already benefit from stronger productive performance may bring more “bang for buck” over the medium term because of their favourable agglomeration externalities and other structural and connective factors. It is important for decision makers, however, to consider how the benefits of productivity growth are shared equitably across a wider area.

The overall aim, however, is to spread the net benefit by developing connectivity between the different performing areas. There is merit in

² See Figure 8 of HOTSW “Driving Productivity” Green Paper for an occupational breakdown of HOTSW areas, showing that only Exeter and Mid-Devon have high level ratios above 50%.

considering how direct interventions to encourage the less productive areas, and spill overs to those areas, might be achieved over the long term. This would be a long-term aspiration and strategy requiring careful thought about detailed investment impacts across the HOTSW economy. Table 4's distribution of GVA/FTE across the area is not fixed but it is difficult to shift because nowhere is standing still and spill overs from one place to another are important. There is a policy choice to make as to the distribution of future interventions between the 'best' and the 'worst'.

The motive should be to "do no harm": **productivity growth is not a 'zero-sum' game and investment in one place should never be 'at the expense' of another.** The key will be the way the drivers of productivity can be adjusted in spatial terms (as discussed in the framework sections below).

HOTSW by Sector

Next, we consider HOTSW industries and their sector components. Productivity is essentially linked to inter and intra business relationships between technology and workforce, and products, processes and markets. Some sectors are inherently more productive than others because of the mixture of resources, capital and labour that are engaged.

Table 5 below shows the productivity breakdown across the main industries in the HOTSW area as derived from the LEP's Oxford Model. The range of levels and growth rates need to be interpreted carefully but they do tell us interesting stories about HOTSW industries. For example, some of the utility and minerals sectors, (and the extreme, distortive real estate figures), reflect inherent characteristics in these activities and/or the way they are measured. Often, it is more interesting to focus on the main production and private/public services where the bulk of activity and jobs occur and where productivity growth rates (absolute and relative) are clearer and, perhaps, more important to most of us over time.

Generally, higher productivity levels and rates occur in industries with advanced technologies in relation to skilled labour input (such as, some manufacturing, some financial services, and a range of business services) rather than in the more consumer-orientated, comparatively low wage, service sectors (such as some leisure, personal, accommodation and distribution services).

Again, there is an important assessment to be made about prioritisation and impact in quantitative and qualitative terms. **It is usually easier to raise productivity in already strong sectors at the leading edge of innovation but**

there is a policy issue about also raising the relatively weak (see section 3) and, specifically, identifying the dynamic ‘new’ areas for rapid growth and development. Also, the spill over effects need to be considered in relation to supporting particular activities along supply chains and into indirectly related sectors.

**Table 5: HOTSW productivity by sector
(average GVA/FTE, 2013 base and 2000-30 average change)**

	£'000	% ch		£'000	% ch
Total HOTSW	45.7	1.4	Accomm +	22.4	1.6
Agriculture +	30.7	4.4	Info&comms	50.5	2.8
Mining +	189.6	13.0	Finance	62.9	2.1
Manufacturing	46.4	1.9	Prof, sci & tech	36.8	2.3
<i>Adv engineer</i>	50.0	1.9	Admin +	28.3	3.0
<i>Food & drink</i>	41.9	1.8	Public +	63.2	0.3
Energy	129.7	2.0	Education	41.1	-0.3
Water	79.9	0.6	Health +	33.8	1.6
Construction	37.4	1.0	Leisure +	19.7	-0.3
Distribution	33.6	2.4	Other services	39.6	1.3
Transport +	40.3	1.2	Real estate	391.4	1.8

Source: Heart of the South West LEP Economic Model, Oxford Economics

It is not just a matter of productive scale, however. It is also about local importance³. For example, the HOTSW has some high value, high productivity concentrations (such as the special case of nuclear energy in West Somerset) and some extensive, wide-ranging, low value activities (such as the visitor economy across many parts of the HOTSW).

Equally, financial services are an important part of the HOTSW (indeed, any) economy. But, in scale terms, HOTSW is not a significant centre of financial services in this country. It is unlikely that local LEP partners could shift productivity significantly by investment in this industry. Be supportive of what you have and be open to new ideas about ‘local banking’ but, perhaps, do not focus on this industry per se.

In contrast, it is difficult to think of HOTSW without an important tourism sector. Local tourism is not inherently a high productivity activity but, elsewhere, it can be more productive than in Devon and Somerset. Because of

³ See Figure 4 of HOTSW “Driving Productivity” Green Paper to note that about three quarters of HOTSW employment is in activities with productivity below average and Figure 5 to see how virtually all HOTSW sectors lag national productivity averages for their industries.

its local importance for jobs and spending, it may be worth considering how to raise productivity in these HOTSW services closer to that of industry leaders.

As with the analysis of productivity by place, the message from a sector/industry assessment is that there are 'good' and 'bad' bits and it is a question of policy as to **whether the aim is to promote higher productivity in specific "priority" sectors**, i.e. whether the aim is to support the current 'best' and/or to raise the 'worst' or to focus on where future real gains can be inferred.

The nature of priority in a Productivity Strategy is, to an extent, a choice about what kind of place HOTSW wants to be and what kind of activity HOTSW wants to have. **The worthy goal of raising productivity to uplift future living standards is more than a technical drive for growth. It is also a reflection of reasonable aspiration and expectation about how the area looks and feels.**

In spatial and sector terms, a Productivity Strategy is about setting realistic goals against the current baseline, the behaviour of peers, and the investment available. Rule nothing out and rule nothing in. Be pragmatic and questioning and always bear in mind/ base decisions on prospective and comparative net 'additionality' across the range of productivity factors (see later sections).

Summary & Recommendations

We have established structural characteristics of productivity in HOTSW. These can be highlighted as:

- HOTSW is a 'lower league' performer for productivity overall
- HOTSW places and sectors vary widely on productivity achievement, both within the area and compared with others.

We have considered national and local benchmarks of growth and productivity achieved and projected. We conclude:

- UK productivity performance has been weak everywhere since the "Great Recession" because of subdued investment.
- The current consensus is that productivity growth and underlying growth potential will remain relatively subdued.

A reasonably ambitious Productivity Strategy for HOTSW requires an overall goal of achieving productivity growth in excess of the current view (about

'1.7% per annum') through to 2030. **Moving the productivity rate towards '2% per annum' would be a significant but realistic achievement. It is estimated that this could mean moving HOTSW real GVA growth from about 2.3% per annum to 2.8% per annum and attaining employment growth of 0.8% per annum.**

Ceteris paribus, such an improvement would be likely to allow some of the HOTSW 'gap' with other areas to narrow and, therefore, could lead to some movement up the LEP 'league'. By 2030, it could mean average GVA/FTE reaching towards/through £60,000 and pushing the nominal HOTSW GVA total over £60bn. By the mid 2030s, GVA/FTE could exceed £70,000.

It is important to note, however, that the 1.7% per annum figure for productivity growth is just the current consensus, projected outlook for the UK (and local) performance. Severe disruption because of 'events', 'fortune' and/or 'mistakes' could well drive this rate higher or lower. A true 'forecast' would have to consider a range of other factors, including any assumptions about the economic cycle in these years.

It is the relative performance that matters, however, and the recommendation is that a scenario plan to raise the HOTSW productivity growth rate to about 0.3% above the national or locally expected average might be an achievable and worthwhile target to pursue.

A more ambitious target would be to raise productivity growth by 0.5% a year above the projected local and national baseline. This would indicate productivity growth of 2.2% per annum and real GVA growth of about 3% per annum.

These rates would not be excessive by historical or international standards but they would suggest a profound relative change compared with present thinking about the local and UK baseline: a significant step up for HOTSW from the current consensus.

SECTION 2: DEVELOPMENT CONTEXT & PRODUCTIVITY LEVERS

This section of the report looks at:

- 1) the broader economic and policy context for development,
- 2) the state of local productivity levers, and
- 3) some aspects of measurement.

Productivity & Development Futures

Against the current, uncertain, international and domestic background, the need for real, sustained action on productivity-led economic development is paramount.

The government's proposals for a "Modern Industrial Strategy" (**Building our Industrial Strategy**, green paper January 2017) could contribute significantly to the breaking of the current, sub-optimal economic structure and performance of the UK economy. The Green Paper highlights 10 pillars of economic development that offer a comprehensive picture of potential priorities. It is hard to object to this list in principle, but the detail of policy, funding and delivery that lies behind the strategy is what will really matter.

The ten pillars are:

- Investing in science, research and innovation
- Developing skills
- Upgrading infrastructure
- Supporting businesses to start and grow
- Improving procurement
- Encouraging trade and inward investment
- Delivering affordable energy and clean growth
- Cultivating world-leading sectors
- Driving growth across the whole country
- Creating the right institutions to bring sector development together

At the time of writing, it is unclear how far (breadth and depth) and how soon this strategy will be developed and implemented. There have been announcements about some energy-related and electric vehicle aspirations but we await, with interest, a full white paper – (now promised "before the end of the year").

In July 2017, the new, independent Industrial Strategy Commission (born out of the Universities of Manchester and Sheffield) released "**Laying the**

Foundations” which considers the need, objectives and foundations for a prospective ‘fresh’ strategic approach to economic development. This new commission aims to provide expertise and advice in framing a renewed development model, calling for strategic economic management to create the conditions for investment in productivity on the supply side and to do this across the regions through the promotion of innovation and skills.

The “Foundations” document lists desirable strategic goals as:

- Decarbonisation of the energy economy,
- Adequate investment in infrastructure,
- Sustaining health and social care,
- Unlocking long-term business investment,
- Supporting high value exports and
- Spreading growth across the country.

It seeks better:

- 1) Institutional frameworks,
- 2) Place-based productivity,
- 3) Science and research-led growth,
- 4) Competition policies,
- 5) Finance and investment linkages,
- 6) Skills development and innovation, and
- 7) Alignment between the state’s purchasing and regulatory power over business innovation and growth.

Again, these principles are not controversial or radical. Although UK regional policy has tended to be relatively inconsistent over the years – tribal and short-termist, these ideas have been the foundation of much thinking about regional development for decades.

Another recent document related to productivity was the CBI’s “**Unlocking Regional Growth**” (December 2016). It talked of four main productivity drivers:

- 1) Educational attainment and skills,
- 2) Transport links to widen labour access,
- 3) Better management practices, and
- 4) a higher proportion of firms that export and innovate.

It emphasised the need to consider inter and intra regional differences in productivity performance and potential.

HOTSW issued its own green paper for consultation – **“Driving productivity in the Heart of the South West”** - in January 2017. The Productivity Strategy now being formulated out of this focuses on five key drivers of productivity. Again, these are familiar (see next section) and accord closely with many of the “ten pillars” above. A strong HOTSW Productivity Strategy should be an important positive influence on government funders (e.g. through access to the £7bn National Productivity Investment Fund) and the local business community, boosting the area’s economic benefit in the years ahead.

All these nuanced approaches to productivity-led growth reflect the accepted, mainstream assessment of sub-national development at the present time. They provide a solid context from which to crystallise the current ‘problem’ and to assess HOTSW productivity potential.

There is, however, one other macro-contextual factor that is less certain and needs to be mentioned. The UK referendum vote to leave the EU in 2016 and the current negotiations to put this into effect (BREXIT 2017-19) add uncertainty to the future of the local development process. For good or ill, there is no reliable information about the form or nature of future UK relationships with its trading partners around the world. It is simply unknown how HOTSW’s economic, business and trading behaviours will develop and, thereby, what growth and productivity can be achieved, over the period from now to 2030.

Economic history (and theory) teaches that barriers to trade, be they real or imagined, to spatial ‘openness’ in the patterns of exchange have negative effects on investment, productivity, output and jobs. Avoidance of such barriers needs to be an important element of UK and local economic policy in the years ahead.

It is possible to be optimistic about the long run because people in business and in the community are still clever, creative, entrepreneurial and innovative. Assuming no ‘shocks’ to the current government’s desire to be ‘open to the world’, ways will be found to ‘grow’ in whatever trading structures emerge. There is a period of uncertainty to be traversed, however, and how this will affect the HOTSW Productivity Strategy is unclear. All this report can do is assume any negative impacts from BREXIT are non-severe and open to mitigation. If anything, the need to improve productivity pre-dates and overrides current uncertainty. BREXIT focuses even more attention on the fundamental problem of low productive achievement.

Productivity Drivers & Enablers

Looking at the five key drivers of productivity considered by the HOTSUW consultation document mentioned earlier, four are largely about improving the supply side of the economy and one mainly about developing demand.

- **Investment...** Firms grow by creating and satisfying demand and do this by adding value. Over time, this means increasing capacity through investment in new plant and machinery. More broadly, it means investment in the wider infrastructure – e.g. transport, nature, communications, housing and energy. In a modern, mixed economy, these areas are heavily influenced by national policy and action.

The HOTSUW Green Paper highlights deficiencies of local capacity and resilience in connectivity (transport and broadband links). It also considers housing deficits with supply and affordability problems described as limiting factors for dynamic workforce migration and business creation, especially in the more peripheral parts of the HOTSUW area. In contrast, the natural capital stock is comparatively high and, perhaps, under-exploited economically. Generally, **HOTSUW firms seem to suffer from the UK's relative lack of incentives for investment in the most productive capital machinery**. Capital investment by UK firms, generally, is relatively weak and **HOTSUW capital investment is weaker than average within the country**.

- **Innovation...** Firms grow by creating new or better products and developing new and better processes. **The invention, application and dissemination of new technologies and techniques builds productive value** - maximising revenue whilst minimising costs. The 'cake' gets bigger and better, producing more reward (private and social profit) for distribution to wage earners and shareholders.

The HOTSUW Green Paper finds local strengths in publicly funded R&D but a low ranking on overall business engagement in innovation, in both proportionate and absolute terms. For example, on average, local firms rank 31st of 39 LEPs on R&D spend per FTE. Exeter ranks fairly well but Plymouth less so in terms of patent ratios. These are aspects that productivity planning needs to address.

- **Skills...** Firms grow by having a workforce that, in both qualitative and quantitative terms, creates high value. There is a role for business, education and the state in increasing competencies (building productive potential) through education and training in the broadest

sense. Working together, this can help to:

- 1) replace current 'leavers',
- 2) enhance the present workforce, and
- 3) anticipate future skills needs.

The HOTSW green paper shows that the area ranks in the middle of LEPs for attainment at qualifications level 4 – much higher than its productivity ranking. Moving to a level of GVA per hour consistent with these recorded skills would notably boost overall productivity. HOTSW ranks relatively highly on graduate volumes but has a skills deficit for HOTSW residents at higher levels, with a diverse spread across the local sub-areas. **Employers often mention skills gaps and shortages as a constraint on growth, but there is also evidence of under-training and under-utilisation.**

- **Entrepreneurship...** Firms grow by being aspirational, generating new ideas and taking risks. Entrepreneurship is a vital component of the 'growth through productivity' process because it develops leadership, creates new models of value, and stimulates the process of creative destruction that drives dynamic business change.

The Green Paper finds that the HOTSW area has a high proportion of SMEs, especially small businesses and below average numbers of large companies – often the 'scale' leaders/demonstrators of productivity-led growth. This business population partly reflects a relatively low level of inward investment. Moreover, there is a low rate of dynamic change (company births and deaths) in and of the business stock and its growth, which limits productivity. **Comparatively stable business demographics indicate less competitive market pressures.**

- **Competitiveness...** Firms grow by selling more, which means being competitive. You can be entrepreneurial and innovative (have good ideas and techniques), invest in the right capacity, products and services, and technologies, and apply high skills but, **in the end, you need to penetrate markets.** All the evidence is that businesses that are involved in more markets, especially through overseas exports, are more productive, add more value, employ more people, pay better wages, innovate more, and, therefore, grow better and survive.

The Green paper finds that, generally, HOTSW has a low propensity to export and enter new markets. This reflects low aspirations to engage, often blamed on SW geography, lifestyle and poor connectivity

("peripherality"). In reality, the 'peripherality' argument is more imagined than real. There are plenty of other areas, in the United Kingdom and overseas, such as parts of East Anglia and Cumbria and parts of Ireland, and SW or Eastern Europe that are just as, or more, 'peripheral' but where it is not seen as a barrier to international involvement. The danger is that **psychological barriers to trade can be a significant brake on better productivity outcomes.**

Furthermore, they are a significant aspect of the agglomeration benefits that accrue to local areas through wider concepts of social and environmental connectivity. Broadly, **the HOTSW area lacks some such benefits in comparison with regions that have larger, more integrated conurbations.**

Productive 'Additionalty'⁴

Investment to raise productivity and long-term growth potential is justified by correction of market or government failures: when the economy is not working as efficiently or as effectively as it could. The assumption, therefore, is that **the HOTSW Productivity Strategy will seek to correct these inefficiencies in the local economy.**

Such interventions have to be appraised (justified, undertaken and assessed) in relation to:

- 1) the outputs and outcomes they generate,
- 2) the balance of risks and rewards, and
- 3) the persistence of those benefits in qualitative and quantitative terms.

This can usefully be conceived by reference to '**5 cases' for action:**

- the strategic case – matching the requirements of current policy intentions and desires;
- the financial case – sound funding and affordability;
- the commercial case – business logic and profitability;
- the management case – practical achievability; and
- the economic case – net 'additionalty'.

⁴ See Additonality Guide, fourth edition, Housing and Community Agency 2014 or other sources for a detailed overview of the issues raised in this section.

The economic case considers scale and timing, the distribution of beneficiaries, and the 'crowding out' (eliminating the less efficient) and 'crowding in' (encouraging best practice) effects of action. It looks at minimum standards, market values, economies of scale and scope, and agglomeration.

To that end, **net 'additionality' measures the impact of economic intervention through investment by reference to a range of factors.** It takes the total spending, the output and employment created and qualitative elements to judge the net addition to economic activity. It calculates the potential gross impact and applies a range of factors to judge the net (cost-benefit) effects. **The key word here is judgement.** In any particular investment programme, there is a need to apply experienced judgement to whatever factors are to be used, especially in considering different time periods, sectors, places and workers.

This involves analysis of:

- Deadweight – what would have happened without the intervention – the reference or baseline case
- Leakage – impact that is 'lost' outside the target area, people or sector
- Displacement – effects of the 'new' activity on other existing activities
- Substitution – when firms or others change effective behaviour to accommodate a 'new' policy
- Multipliers – a combination of the direct, indirect and induced impacts from intervention.

Table 6 highlights some average benchmark measures for these factors, drawn from a range of previous studies and our experience. In fact, there are many different studies in the literature and such 'additionality' components can vary widely. In particular, factors for outputs and employment effects can be affected by differing time scales of construction and use, and different characteristics of the intervention.

Nevertheless, the ones shown are useful starting points - broad illustrative benchmarks for measuring net 'additionality', on average, at a regional/sub-regional level, such as HOTSW geography. In practice, ranges are often used to reflect predictive risks and uncertainties. **Overall, these 'additionality' factors hint at a net impact of about one third of the gross value expected.**

In practice, analysis of net 'additionality' tends to be applied to demand factors, through its impact on such as employment and output. For example, if we spend £100mn on an investment, this will generate an element of net

additional GVA or FTEs and the relationship of these will indicate effects for/on productivity. HOTSW's Oxford Model has an impact component of this type.

Table 6: Benchmark 'Additionality' Factors

Investment type	Deadweight	Leakage	Displacement	Substitution	Multipliers
All	40%	12%	28%	3%	1.4
Business & competitiveness	45%	12%	25%	3%	1.5
Regeneration / Infrastructure	30%	10%	38%	2%	1.4
People & skills	33%	15%	22%	4%	1.4

Source: adapted from BIS/CEA guidance

The nature of productivity driven growth, however is that it can be more of a supply side element. Productivity is not merely an outcome but also an input. The key is to look for interventions that boost GVA relative to FTEs or hours above what is currently achieved whereas **'normal' net 'additionality' tends to assume that current patterns of productivity persist.**

A Productivity Strategy needs to be founded exactly on shifting such patterns. Therefore, it can sometimes discount aspects of 'additionality' (deadweight, leakage, displacement and substitution) and needs to amend thinking about multipliers.

Table 7 highlights some examples of sector multipliers, showing, as expected, higher ratios in the production sectors. Broadly, such ratios can be used to judge the broad impact of interventions: £10mn spent on construction will have more impact on GVA and employment than the same amount on legal services. The important answer, however, **needs to judge how such output and employment multipliers are changing because of productivity changes.** This will be more art than science.

Table 7: Benchmark Sector Multipliers

sector	multiplier	sector	multiplier
Electricity	2.8	Accomm & catering	2.2
Construction	2.7	Computer services	1.9
Iron & Steel	2.2	Legal services	1.8
Motor vehicles	2.1	Education	1.8
Machine tools	2.0	Economy	2.2

Source ONS/ Oxford Economics - HCA guidance

Productivity - Measurement

This work has not undertaken new research into the measurement of HOTSW productivity and its parts. But, here, approaches that might be supportive to the Productivity Strategy going forward are reviewed.

The standard approach is to consider labour productivity: a ratio of outputs to inputs. The numerator and denominator in this measure comprise a very wide range of component and causal elements. Many of these factors are inherently intangible and/or recorded poorly in readily available statistics. The theoretical issue is that these do not cover other resource inputs or some aspects of labour quality in assessing real productive performance.

Productivity measurement at a local and sector level is not routinely published in consistent detail, now or historically. This makes forward projection difficult. Moreover, what is measured tends to be synthetic and approximate. It is usually unsafe to make much of marginal relativities in the data, which is why broad macro ranges, as in this report, tend to be favoured. Also, it is important to be clear about differentiating between factors that influence productivity growth and those that affect productivity levels.

In essence, without bespoke surveys and/or dedicated input/output or econometric models that go into more detail than the fundamental GVA and employment characteristics, it is difficult to appraise, monitor and evaluate productivity trends and comparators.

The HOTSW Productivity Strategy will need to consider what aspects of the productivity narrative it wishes to support with more refined measurement and, how much it is willing to invest in procuring such monitoring over time. For example, access to and analysis of the detailed BRES and ABI data sources that have restricted access at ONS will probably require expensive, time-consuming academic or other expert input.

At a macro level, productivity is usually measured by GVA per hour or per FTE worker. Beneath that, however, a range of explanatory and driving variables – often as proxies – needs to be considered. Sadly, such annual data often emerges with a long lag and is subject to revision, especially in relative terms (wherein the distortion of London's economy demands caution).

Ultimately, our interest in productivity reflects concern about living standards and both are connected through wages and other returns to effort. It is important, therefore, to monitor incomes as well as outputs. This requires study of the annual gross household disposable income, average

weekly earnings and annual survey of hours and earnings releases at a sub-regional level. Such analysis is made more difficult, however, by changes in working practices, such as increased self-employment in intangible services, where accurate measurement of incomes and value added is problematic.

Measurement issues are more difficult when wider perspectives are considered. These include:

- 1) Structural industry breakdowns,
- 2) Firm-level variations (including within the same sectors),
- 3) Workforce skills,
- 4) Ownership and occupation,
- 5) Functional specialisation by location,
- 6) Aspects of urban-rural and east-west differentials,
- 7) Broad agglomeration and clustering.

Ideally, quanta for assets - physical, virtual, resource and human capital within firms/industries and communities and assessments of regional infrastructure - are desirable. Next, it is useful to understand patterns of ownership, occupational and geographical (outward) spill overs from inward investment and export engagement. Thereby, the higher multiplier effects of high-tech operations and workers with networked proximity can be emphasised. Further, an understanding of business (start-ups and life cycles) and human (working age factors) demographics are helpful. Finally, market competitiveness, especially with regard to the peripheral, weak mobility, nature of some parts of the HOTSW area, should be considered.

To summarise, the kind of variables it would be useful to monitor and assess in absolute and relative terms, over time, are:

- GDP/GVA, GDHI, average weekly/hourly earnings and wage shares – workplace and residence based in terms of heads, FTEs and hours
- High level/tech and STEM skills, and other qualifications related to education and training, worker retention, workforce activity and occupational structure
- Investment, such as road spending and broadband coverage, and capital stocks and R&D activity per capita
- The stock of and change in businesses, e.g. VAT registered or HMRC totals, firm size and industrial structure (often measured by

employment shares)

- Exposure to, and connectivity with, international and domestic markets and inward investment

The basic measurement problem is that without primary and bespoke research, several of the elements that usefully could be calculated and followed are, and will remain, unavailable.

The HOTSW productivity gap is partly a result of economic characteristics that reflect national or international factors: elements that cannot be changed at a regional or local level without investment well beyond anything envisaged by current policy and funding.

The rest of the gap reflects four key ingredients⁵:

- 1) Demography and workforce;
- 2) Industrial composition;
- 3) Price or cost differentials; and
- 4) The productivity drivers and enablers discussed earlier.

Effects from demography and workforce, industrial composition, and price differentials have proved difficult to isolate. They are there to a degree but there are offsetting tendencies in the data that hide any significant net effect. This would amount to saying the economy has 'good' bits and 'bad' bits'. So, expand the 'good' bits and raise the 'bad' bits.

One of the good 'bits' appears to be foreign ownership and export engagement, reflecting:

- 1) Economies of scale,
- 2) Adoption of 'best practice' techniques, and
- 3) Competitive pressures on costs, and innovation and skills.

In this respect, the current uncertainty over future trading relationships needs to be short-lived.

With regard to the five productivity drivers, it has been found⁶:

⁵ Meeting the Productivity Challenge & other research: Universities of the West of England and Bath, for SWRDA, 2005

⁶ op. cit.

- A 10% increase in the proportion of the population with higher-level skills could be associated with a 2-3% increase in output per head
- A 10% increase in investment per job could also be associated with a 2-3% increase in productivity
- An increase in infrastructure is influential (for example, through journey times and distance from major economic centres) but hard to quantify because the effects are indirect, largely observed inadequately through other variables
- An increase in innovation would help but its effects might be modest in aggregate, unless it is truly transformative. In other words, the impact tends to be highly concentrated amongst a few key businesses and sectors and wider distribution occurs only over the very long run
- A 10% increase in VAT registrations could be associated with a 5% boost to productivity
- An increase in market (especially international) engagement will boost productivity through greater competitive pressures that favour dynamic change and agglomeration and counter the persistence of 'zombie' firms and activities

The HOTSW productivity gap is real and reflects:

- 1) Capital stock,
- 2) Sector composition,
- 3) Firm characteristics,
- 4) Labour skills and effort, and
- 5) Access/distance to markets.

Accumulated research suggests that **the HOTSW Productivity Strategy needs to focus on higher-level skills, capital investment and key infrastructure, highly targeted promotion of innovation, new business growth and competitive engagement.**

Summary & Recommendations

We have discussed a range of strategic approaches, focusing on the underlying similarities of most plans for productivity-led growth. In all cases, the development approach for intervention needs to consider:

- Current structures (scale and scope), sectors and places, technologies and practices, and agglomeration and aspiration, and
- Drivers of productivity, viz. infrastructure investment, business product and process innovation, workforce skills, entrepreneurship and market competitiveness.

We have discussed productive 'additionality' and how the multiplier impacts of intervention, both a priori and during monitoring and evaluation, need to be framed against a number of assessment judgements.

We have considered the data inadequacies in assessing productivity at a local, workforce and community, and business sector level. Nevertheless, current research suggests **the Productivity Strategy needs to focus on:**

- 1) **High-level skills,**
- 2) **Capital investment and infrastructure,**
- 3) **Targeted innovation, and**
- 4) **Business growth and competitive engagement.**

The key message is that productivity is a process of dynamic change resulting largely from supply side changes in response to demand pressures. The Productivity Strategy needs to promote the five productivity drivers but recognise that the different elements can be supported to different extents.

- Entrepreneurship and competitiveness are largely a matter of knowledge provision and dissemination, building aspiration and engagement and attracting inward investment to drive 'best practice' in terms of enhancing productivity
- Innovation and skills are about co-operation to build connectivity through the promotion of more R&D and training spend per worker by local businesses.
- Investment is about direct intervention to promote new infrastructure but also indirect schemes (access to funds, knowledge and markets) to raise capital investment per worker.

SECTION 3: DEVELOPMENT FRAMEWORK & PRODUCTIVITY CHANGE

This third section establishes:

- 1) A framework for consideration of productivity-aimed interventions, and
- 2) A narrative of what might be achievable.

The ABCD Model

Intervention for development occurs because the market growth process is imperfect, generating 'market or other failures' derived from inequalities in information or market power (adverse distributional effects) and externalities (non-monetised issues).

Given limited resources, development choices are always required. The development community may choose to support the 'best' and/or improve the 'worst' or try to balance the two. It can encourage the 'new' and/or try to 'raise all boats'?

Our approach to answering these questions is to use Development Matrices (see diagram below) that

- Relate 'cluster specialities' to business strengths and weaknesses and
- Compare the five 'productivity drivers' (from the previous section) to HOTSW priority areas of the economy that warrant intervention.

The ABCD approach⁷ explained here establishes a robust yet flexible framework of local economic assessment. At an early stage, it allows development professionals to consider the impact of their proposals across a complex local economy. Later, it allows the impact appraisal and monitoring evaluation of actual interventions.

In the ABCD structure, against individual business, sector or places:

- A is for '**anchors**' – parts of the economy that are vital for output and employment (now and/or in the future). They might constitute 'prime' companies in a supply chain (nuclear energy in Somerset), major local employers (public and health services in Plymouth) or key sectors

⁷ a modelling technique previously developed and used by the author

(business services in Exeter) that contribute significantly to the scale and growth of local value. The diagram below indicates some of HOTSW's anchors by broad sector.

- B is for '**beacons**' – companies or sectors that demonstrate and disseminate 'best practice' (such as some high-tech electronics and photonics in Torbay, aerospace in Yeovil, marine engineering in Plymouth) and research/education establishments (the Universities in Plymouth and Exeter, and the Met Office in Exeter). They offer 'learning' directly or indirectly to other businesses/activities about effective and efficient ways to achieve productive growth.
- C is for '**catalysts**' – businesses or markets where constructive (supporting existing businesses) and/or destructive (replacing existing businesses) change is underway - both raising future development potential. Currently, many of these dynamic changes reflect digitalisation of old and new products and services, processes and markets (as in some creative and computer industries and services). Thereby, more competitive systems with higher growth potential are generated whilst eliminating uncompetitive, 'outmoded' alternatives.
- D is for '**drifters**' – economic actors that are important (for jobs and communities, such as some elements of tourism and social services) but could "do things better or do better things". This is where quick wins in productivity might be difficult but where the long term, cumulative effects of such change can be significant.

Marrying the ABCD matrix with a Productivity matrix (see table below) that considers three local development priorities (derived from the HOTSW Strategic Economic Plan) against the five productivity drivers allows a consistent assessment of local productivity strengths and weaknesses and of the development measures being considered and/or implemented.

Using the outline matrices, HOTSW can frame the process of future development strategy, policy and delivery in considered, objective terms. Recognising where the strengths and weaknesses of development proposals rest, (as indicated by the ticks in the Development Matrices below), sets a framework from which a narrative about desirable and desired patterns of future productivity-led development can evolve.

The ABCD approach is a qualitative narrative about growth realities, potential and prospects with some quantitative scope. Importantly, the

process of debate about, and assessment of relative weights within, the matrices can be an important tool for clarifying aims and impacts.

HOTSW Development Matrices

ABCD Matrix

Priority Clusters	Anchor	Beacon	Catalyst	Drifter
Aero & marine engineering		✓	✓	
High tech/digital		✓	✓	
Education & research	✓	✓	✓	
Energy	✓	✓	✓	
Tourism & leisure	✓			✓
Health & social	✓			✓
Distribution services	✓			✓
Food & drink		✓		✓

Productivity Matrix

Priority Approaches	Infrastructure	Innovation	Skills	Enterprise	Competitiveness
Place					
Transport & connectivity	✓	✓			✓
Energy & environment	✓		✓	✓	
Housing & community	✓	✓			✓
Business					
Enterprise capacity	✓	✓		✓	
Business support & finance		✓		✓	✓
Market engagement					
People					
Education & skills		✓	✓	✓	

Source: Strategic Economics Ltd

The ABCD framework can be adapted in several ways with 9 potential parameters:

- As a sector, spatial or workforce driven approach
- As a current, medium or long-term dynamic approach
- As a technology, demographic or investment approach

By basing policy and delivery on current strengths and weaknesses as revealed by an ABCD assessment, transformation of productivity-led growth across HOTSW can help to create an economy that:

- Is growing, resilient and sustainable,
- Preserves the environment and builds community,
- Contributes progressively to growth performance and prospects.

The Development Matrices provide a tool for objective judgement and agreement about the state of the local economy and how future investment plans might develop a more productive economy. When a specific investment is considered, the ABCD matrix is applied to it, identifying which priority 'clusters' are likely to be affected and to what extent and how it will provide benefits to the wider economy in terms of supporting or generating net gains to anchors, beacons, catalysts and in developing drifters. Moving to the productivity matrix, the impact of an intervention can be judged in terms of how, when and what the places, businesses and people will be affected and which productivity drivers the productivity boost will come from.

By completing a "ticked" assessment of exactly where and what productivity and value impact might be anticipated, analysts can then move to the financial and option parameters, applying 'additionality' factors et al to generate cost-benefit figures and to consider the net worth of proposals under consideration. The objective assessment derived from the Development Matrices allows a consistent framework to be adopted and accepted by local partners and should support stronger, comparative, decisions to be made.

Productivity Policies

Productivity-led growth supports sustainable living standards.

Having: established macro targets in section 1, covered strategic foundations in section 2, and built the ABCD framework above, realistic aspirations for the HOTSW area and its geographical and industrial components can be considered.

The macro targets suggested in section 1, recommend target uplifts of 0.3-0.5% per annum in productivity growth. If current projections and forecasts of real productivity growth averaging 1.7% per annum are achieved, this implies HOTSW real productivity growth of 2.0-2.2% per annum between now and 2030, with real productivity (GVA/FTE) attaining a range around £60,000 by the end of the period, up from about £45,000 today. It suggests a HOTSW economy potentially producing over £60bn of nominal value per annum by the end of the next decade or £70bn by the mid-2030s.

To achieve this step change in performance will require a combination of dynamic improvements across the factors highlighted in the Development Matrices. It means a shift in the supply curve arising from technological, organisational and other changes to reduce cost per unit of production and to increase profitability.

Greater private investment needs to be stimulated through the innovation and skills drivers, and by boosts to entrepreneurship and competitiveness. Thereby, labour resources are released for allocation to new, higher value/higher growth opportunities. Higher productivity means job creation at higher wages, (pushing average HOTSW wages from about 90% of the UK average towards parity or better) thereby stimulating the demand side of the economy and creating a virtuous circle of growth and development.

Nevertheless, productivity remains an intangible object in respect to future prospects. It is easy to discuss the kind of measures that will promote a step change in productivity but it is hard to establish these quantitatively because of the inherent uncertainties and complexity in the process of dynamic business development.

HOTSW by Sector:

Building robust local supply chains is an important part of raising productivity. This requires:

- 1) Dissemination of 'best practice',
- 2) Openness to trade and
- 3) Application of new technologies and skills.

HOTSW offers opportunities in creative and leisure services, high value engineering in design and systems, such as in aerospace and marine engineering and nuclear energy. Importantly, the digital revolution requires more integration of supply chains across industries – developing capacity and capabilities and forming linkages across the usual sector boundaries.

New technologies and processes, such as in artificial intelligence, wider digital methodologies, biotechnologies and life sciences, and environmental technologies are ripe for local development.

As shown by the recent Science and Innovation Audit⁸, HOTSW and its neighbours have greatest industrial strengths, research capacity and long-term potential in aerospace and advanced engineering, new energy systems, and next-generation microelectronics. Digital innovation across HOTSW

⁸ South West England and South East Wales Science and Innovation Audit, 2016

sectors needs to be based on resilience and environmental sustainability. It is proposed, for example, to support the creation of a network of Digital Innovation Hubs (DIHs) to bring together academic and industry expertise and to embrace the practical application of cloud computing and digital communication, with a focus on smart cities, media, autonomous systems, manufacturing and health.

Table 8 summarises the outlook for HOTSW sectors if the higher productivity rates projected in section 1 are applied over the period to 2030. These figures assume current differentials in industry performance are maintained. In practice, changes in supply and demand, technology, trade and policy are likely to shift some of these patterns. The Productivity Strategy will need to focus on the supply chains and market areas where digital disruption and higher long-term growth potential are likely. These are probably going to be centred on a range of high value business services and the main production industries, at least initially, but many other areas may face transformation.

Table 8: HOTSW productivity by sector (projected GVA/FTE, 2030, £)

	£'000		£'000
Total HOTSW	62	Accomm +	32
Agriculture +	40	Info & comms	80
Mining +	298	Finance	85
Manufacturing	64	Prof, sci & tech	53
<i>Adv engineer</i>	69	Admin +	43
<i>Food & drink</i>	57	Public +	70
Energy	257	Education	45
Water	106	Health +	46
Construction	48	Leisure +	23
Distribution	53	Other services	58
Transport +	55	Real estate	538

Source: Heart of the South West LEP Economic Model, Oxford Economics and Strategic Economics calculations

We prefer and recommend an approach to sector productivity that does not set specific activity priorities but that embraces a focus on anchors, beacons, catalysts and drifters across the industrial spectrum and highlights technology and skills in relation to innovation and competitiveness.

HOTSW by Place:

The structure of functional economic zones across HOTSW reflects a mix of occupational, travel-to-work, transport and communications, and wider agglomeration linkages. There is productive value in closer integration of

networks between the urban and rural areas of the HOTSW and from them to places outside the region. It is about connectivity and resilience and stimulating demand amongst business and household users as well as building universal capacity.

It is also about ‘green productivity’ – increasing energy efficiency, minimising materials use and conserving the area’s natural capital. It needs innovation in research and development and their application to real processes. It requires Productivity Strategies that support housing development that provides capacity (perhaps another 1,500 or more dwellings per annum over current rates and over a dozen years) and reduces current extreme affordability ratios of 8-12.5 for median house prices-to-incomes.

Table 9: HOTSW productivity by place (projected GVA/FTE, 2030, £)

	£ '000		£ '000
<i>Devon Co</i>	63	Total HOTSW	63
Exeter	87	<i>Somerset Co</i>	65
East Devon	62	Mendip	60
Mid Devon	53	Sedgemoor	66
North Devon	59	South Somerset	68
South Hams	53	Taunton Deane	65
Teignbridge	54	West Somerset	79
Torridge	55	Plymouth	66
West Devon	59	Torbay	58

Source: Heart of the South West LEP Economic Model, Oxford Economics. Strategic Economics calculations

Based on the target productivity growth specified in Section 1, we derive projected levels for GVA/FTE in Table 9, assuming differentials between areas are largely maintained for the years to 2030. These figures show a range from just over £50,000 in South Hams to approaching £90,000 in Exeter. The pattern of relatively high and low productive dispersion between urban and rural areas, and between east and west of the HOTSW, is likely to persist. The Productivity Strategy also needs to consider the balancing effects on wages and incomes across the local geographies.

We recommend an approach to spatial productivity that is less about distributional outcomes but more about connective networking based on improving physical and virtual infrastructure in support of demographic change, community aspiration and workforce development.

HOTSW skills:

The HOTSW population of just over 1.7 million is expected to increase by about 150,000 over the years to 2030. Most of the increase is expected to be at the older age range, only partly offset by the net immigration of working age people. The risk, therefore, is that existing workforce 'gaps' and low rankings on higher qualifications, STEM subjects and graduate retention are exacerbated. Without productivity gains among the engaged/active workforce, it will be hard for HOTSW to maintain, let alone raise, average local living standards.

Measures to reduce these deficits and mismatches are worthwhile, especially with regard to workforce flexibility/training that anticipates future digital and other technical needs. Raising knowledge intensive jobs from 44% of the total towards/beyond the national average of 49% is warranted.

HOTSW Business support:

Support for business need to focus on four areas.

- Stimulating entrepreneurship to raise leadership skills and aspiration in local businesses, especially those moving from start-up to growth. **HOTSW does not have a problem starting businesses but it does have a problem in growing them.**
- Encouraging export engagement to increase from about one-in-four of the HOTSW 83,000 businesses towards the UK average of one-in-three.
- Attracting inward investment from global technological/market leaders.
- Diffusing productive knowledge along supply chains and dispersing 'best practice' across industries.

It is important that measures to **encourage the raising of business productivity improve R&D intensity and capital investment ratios, at least, towards national averages.** Beyond supporting start-ups, it is desirable to help firms move towards sustained growth, through measures to promote knowledge acquisition and dissemination, including business-university collaboration and market penetration. **It is about capturing positive externalities and minimizing negative ones in order to boost total factor**

productivity, shifting the supply curve outwards and upwards.

Previous studies and evaluations have uncovered a range of positive effects from public support for R&D that is taken up by private businesses. Private rates of return can reach 20-30%, with social returns significantly higher (by a factor of 2-3). Science and innovation funding can 'crowd in' £1.36 (range £1.13-£1.60) for each £1 spent, yielding 'additionality' of c0.58.⁹

These ratios depend on the particular circumstances of specific sectors, reflecting:

- 1) R&D intensity,
- 2) Co-operation with research bodies,
- 3) Innovation productivity by sector, and
- 4) Absorptive capacity.

This all shows a positive link between R&D investment and wider economic productivity.

Government and agency influence on productivity occurs through incentives, capability and flexibility in order to increase the value of goods and services. Delivery is about:

- 1) R&D-led innovation and knowledge transfer,
- 2) Adoption and diffusion of new technical skills,
- 3) Promotion of competition, and
- 4) Better resource allocation – including the push and pull of regulation and taxation and the flexibility of workforces, energy and planning.

In short, all decisions to intervene/invest need to be based on sound appraisal of the breadth and depth of impact on productivity by place and activity through advances in R&D intensity and knowledge transfer.

Summary & Recommendations

Using the ABCD framework, Development Matrices can be established for analysing sectors, places or firms in the HOTSW area. By categorising economic actors in terms of anchors, beacons, catalysts or drifters, the likely

⁹ This evidence summarises findings from recent works by Economic Insight, UK Innovation Research Centre, and Frontier Economics

impact of policy interventions on a range of economic factors - such as supply chains and knowledge exchange - can be assessed.

Relating the ABCD assessment, and the way it is evolving dynamically, to the productivity drivers correlates characteristics with intervention methodology.

The sequence:

- 1) from investment in infrastructure,
- 2) through innovation and skills,
- 3) to entrepreneurship,

builds competitiveness across industries, people and areas.

This approach can inform and unify local development professionals, agents and strategists when considering how to build productivity and, thereby, sustained growth potential.

To increase HOTSW labour productivity to and above the national average will require:

- 1) Anchors to be reinforced/introduced,
- 2) Beacons to be highlighted,
- 3) Catalysts to be promoted, and
- 4) Drifters to be transformed.

Because the process has elements of intangibility and non-predictability, it is not possible to model or prescribe in advance where intervention will have greatest effect quantitatively – at least not before real examples are available for analysis. It is not feasible to know, a priori, which companies, sectors or places are going to provide the greatest productivity boost. **Each proposal needs to be assessed on its own absolute and relative merits within a broad analytical framework** that considers probable outcomes in terms of collaborative R&D, training and knowledge.

There is a requirement to build innovation by increasing the breath and depth of knowledge exchange. There needs to be a closure of skill 'gaps' and promotion of holistic training and education for the digital revolution. There is great value in expanding market penetration, raising export engagement and trading volumes.

Also, it is important to provide adequate enabling infrastructure in terms of energy, transport and housing. Any productivity uplift is likely to be based on existing concentrations of relative excellence, as in the main urban centres,

but this needs to be spread by widening the influence of agglomeration benefits to more rural and peripheral areas.

We anticipate that the HOTSW Productivity Strategy will focus on:

- **Encouraging digital specialisation and market penetration**
- **Connecting places and sectors through investment in infrastructure and knowledge exchange**
- **Supporting business growth by promoting entrepreneurial, analytical and technical skills**
- **Increasing R&D and wider business innovation and investment as a ratio to output**

CONCLUSION

A priori, it is not easy to link productivity outcomes to specific policies in robust quantitative terms. The fundamental nature of productivity growth is that it is not mechanistic. Interventions to grow productivity can only be evaluated over the long-term. The narrative in this report reflects levels of current uncertainty and avoids spurious accuracy. But, it supports future debate, planning and delivery.

We have shown why productivity-led growth is important and analysed what drives it. It is vital to local living standards but, over the last decade, it has been sadly lacking.

Currently, the risk is that uncertainties about the UK's policy, trade and regulatory framework, raise new barriers to productivity growth. Accordingly, the role of development activity coming out of any "Modern Industrial Strategy" is vital in mitigating, eroding and removing barriers to productivity at all spatial and sector levels.

Productivity needs & targets

In the HOTSW area, the productivity gaps are partly in connectivity and partly in engagement, whether this relates to integration within and across supply chains or between spatial and peripheral centres. Closure of such gaps is likely to be driven by building capacity, aspiration and market penetration. It is about knowledge acquisition, dissemination and application and it is about networking. It needs to be supported by higher business R&D, training and capital investment per worker.

The key for future intervention through a HOTSW Productivity Strategy is to provide capacity and capability that allows businesses to develop growth potential by "co-operating to compete".

It is vital that the development community recognises the intangible nature of the development process when tackling the productivity drivers. There are no simple answers about what a Productivity Strategy should prioritise. Rather, it is about absolute and relative choice based on principles of effective resource allocation and the net costs and benefits of specific investments.

Modelling the necessary linkages, in advance, is difficult because they are inherently unknown and unknowable. It may require a local input-output or econometrically driven approach that offers more than the traditional demand-driven perspective but that is supported by experience and

judgement. Commissioning a bespoke model that integrates supply factors with local measures of productivity would be resource intensive but could support future appraisal, monitoring and evaluation and, thereby, well-judged decision-making.

Nevertheless, the macro target of achieving productivity growth (GVA/FTE or per hour) of between 0.3% and 0.5% per annum above average, whilst significant and ambitious respectively, is achievable with careful choices of the kind discussed in this report. This is likely to continue to reflect the embedded urban-rural and east-west divides in productivity growth and resulting levels of GVA/FTE and overall economic contribution. The key, however, is to spread net positive impact wider.

In sector terms, productivity growth rates are likely to improve most amongst some professional-science and technical services and information and communications services. Generally, however, the digital revolution offers the prospect of productivity gains across a wide range of production and services industries. In the end, a robust gain in HOTSW productivity by 2030 require an average productivity uplift of 0.3-0.5% per annum across a range of production and services where the digital revolution will encourage integration.

Innovation rates would need to increase towards, and through, international norms and engagement in export markets needs to increase towards a third of local companies. Skills mismatches need to be addressed, replacing leavers, filling gaps and anticipating new skill requirements.

A higher growth potential, driven by higher productivity, will need a growing workforce, supported by infrastructure development of transport, energy, housing and the wider connectivity and agglomeration factors.

Achieving the desired productivity uplift can be done through raising productivity across the spatial patch but is likely to still be concentrated in and around current urban areas. The key is to develop integrated networks of knowledge and market access between the HOTSW's centres of high value creation and their hinterlands.

To these ends, business support needs to focus on knowledge acquisition, dissemination and application and by developing collaboration between ABCD businesses, agencies and institutions: promoting an aspiration to co-operate in order to compete.

Productivity Strategy – Indicative Options

Finally, identify areas where this report indicates that the HOTSW Productivity Strategy could usefully concentrate effort, supporting (S) or improving (I) productive performance across the area. This is presented as a guide for debate amongst local partners when applying the Productivity Strategy rather than a precise recommendation. In particular, a limited number of suggestions are made at this stage, merely for illustrative purposes. The eventual areas of concentration will have to reflect a more detailed assessment of local capacity, desire and opportunity.

HOTSW Development Matrices: Possible Areas for attention in the Productivity Strategy

ABCD Matrix

Priority Clusters	Anchor	Beacon	Catalyst	Drifter
Aero & marine engineering		S		
High tech/digital			I	
Education & research	S	S		
Energy	S		I	
Tourism & leisure				I
Health & social				I
Distribution services	S			
Food & drink		I		

Productivity Matrix

Priority Approaches	Infrastructure	Innovation	Skills	Enterprise Competitiveness
Place				
Transport & connectivity	I			
Energy & environment		I		
Housing & community			S	
Business				
Enterprise capacity				S
Business support & finance		S		
Market engagement				S I
People				
Education & skills		I		

Source: Strategic Economics Ltd

From the **ABCD matrix** it is suggested that the plan can support the Beacon characteristics (exhibiting best practice) of aerospace and marine engineering and research as well as the Anchor characteristics (significant activity/employer) of education and energy. Furthermore, there is value in improving the Catalytic (productive

transformation) potential of the digital and energy sectors and in reducing the Drifter characteristics in the visitor economy and personal services.

Aerospace and marine engineering, for example, might benefit from interventions that build robust supply chains in terms of technological expertise and mutual understanding of market requirements and opportunities, with the ultimate aim of encouraging higher capital investment per head. Similarly, high-tech sectors, such as creative industries and life sciences, might benefit from interventions to encourage cross-sector collaboration on new techniques and applications of catalytic invention and innovation.

Turning to the **Productivity Matrix**, it is postulated that local partners may wish to focus support on skills in housing/construction generally, and entrepreneurial capacity, particularly with a view to engagement in a wider range of product and spatial markets and greater access to finance. In addition, there are productivity arguments for improving transport/connectivity, environmental services, market competitiveness and skills innovation.

The transport/productivity interventions, for example, could be linked to strengthening linkages between more spatial areas with urban centres, promoting agglomeration and capacity benefits across a larger geography. Alternatively, innovation in environmental services can work with education improvements to drive competitiveness benefits.

Bringing the two matrices together, a balanced approach to productivity options and investment proposals can be defined. For example, if HOTSW decides to invest to support marine engineering, it is likely to involve an appreciation of its:

- 1) Beacon characteristics in particular economic locations (Plymouth plus),
- 2) Links with University research (innovation),
- 3) High-tech cross overs and apprenticeships (skills and innovation),
- 4) Promoting local supply chains (entrepreneurship), and
- 5) Entry into wider markets (competitiveness)

Consideration of the complex raft of factors exposed by the Development Matrices can focus minds on the productivity benefits of specific proposal: in simplistic terms, identify which and how many boxes are ticked and then move on to consider detailed investments in terms of potential resource use and net additional impacts.