



HM Government



Building our Industrial Strategy

**Green Paper
January 2017**

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Foreword from the Prime Minister



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Last summer's referendum was not simply a vote to leave the European Union, it was an instruction to the Government to change the way our country works – and the people for whom it works – forever.

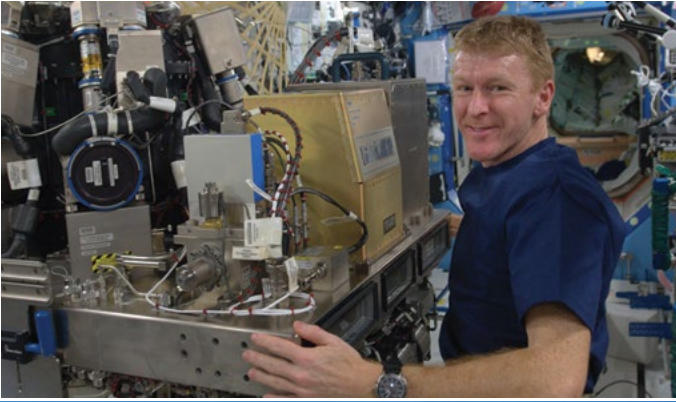
So our Plan for Britain is not just a plan to leave the EU, but a plan to shape a new future for the kind of country we will be when we have left. It is a plan to build a stronger, fairer Britain that works for everyone, not just the privileged few. It is a plan for a nation that stands tall in the world and is set up to succeed in the long term. And it is a plan for a country in which future generations have the chance to do better than their parents and grandparents today.

That is why our modern industrial strategy is a critical part of our plan for post-Brexit Britain. It will help to deliver a stronger economy and a fairer society – where wealth and opportunity are spread across every community in our United Kingdom, not just the most prosperous places in London and the South East. It will help our young people to develop the skills they need to do the high-paid, high-skilled jobs of the future. And it will back Britain for the long term: creating the conditions where successful businesses can emerge and grow, and backing them to invest in the long-term future of Britain.

Underpinning this strategy is a new approach to government, not just stepping back and leaving business to get on with the job, but stepping up to a new, active role that backs business and ensures more people in all corners of the country share in the benefits of its success. This active government will build on Britain's strategic strengths and tackle our underlying weaknesses, like low productivity. This is vital because if we want to increase our overall prosperity, if we want more people to share in that prosperity, if we want higher real wages, and if we want more opportunities for young people to get on – we have to raise our productivity.

Through this new approach we will move beyond short-term thinking to focus on the big decisions that will deliver long-term, sustainable success – and we will seize the opportunities of Brexit to build a brighter future for all.

In doing so, we will deliver the change we need – the change people voted for in June – by making post-Brexit Britain an even stronger, fairer and more successful country than it is today. A country that really does work for everyone.



Introduction from the Secretary of State

This is a hugely important moment for the United Kingdom. A moment when we must prepare a new strategy to earn a prosperous living in the years ahead.

Leaving the European Union allows – and requires – us to make long-term decisions about our economic future.

We will, of course, be ambitious in the upcoming negotiations and will secure the best possible access for businesses to trade with and operate in the European market. We aim for a smooth and orderly exit that works for the UK and for the EU.

While the terms of trade with other economies is important, so is the competitiveness of our own economy. That is why the Government is committed to a modern industrial strategy. Its objective is to improve living standards and economic growth by increasing productivity and driving growth across the whole country. This is part of our Plan for Britain – our vision for a country that is stronger, fairer, more united and more outward-looking than ever before.

We start from a position of considerable strength. We are the fifth biggest economy in the world, despite having the 22nd highest population¹. We have achieved higher levels of employment than ever before in our history – in fact 2.7 million more people in work than in 2010.

Greg Clark
Secretary of State
for Business, Energy
and Industrial Strategy



We have businesses, research institutions and cultural achievements at the very forefront of global excellence.

And for all these reasons, we attract investment and talented individuals from around the world.

But there are challenges that the UK must face up to, now and in the years ahead.

The first is to build on our strengths and extend excellence into the future.

British excellence in key technologies, professions, research disciplines and institutions provides us with crucial competitive advantages. But we cannot take them for granted.

If other countries invest more in research and development, and we do not, then we cannot expect to keep, let alone extend, our technological lead in key sectors – or the world-beating performance of our universities. The same goes for our record as Europe's leading destination for inward investment or our position as a centre of international finance. Our competitors are not standing still. They are upgrading infrastructure networks and reforming systems of governance. Therefore we too must strive for improvement.

In industrial sectors – from automotive and aerospace to financial and professional services and the creative industries – the UK has built a global reputation. But the competition for new investment is fierce and unending. The conditions that have allowed UK investment destinations to succeed include the availability of supportive

research programmes, relevant skills in local labour markets and capable supply chains. However, for continuing success, these foundations must be maintained and strengthened.

The second challenge is to ensure that every place meets its potential by working to **close the gap** between our best performing companies, industries, places and people and those which are less productive.

Britain is one of the most centralised countries in the world, but this has not led to places being uniformly prosperous. For all the global excellence of the UK's best companies, industries and places we have too many who lie far behind the leaders. That is why, on average, workers in France, Germany and the United States produce around as much in four days as UK workers do in five². It is also why despite having the most prosperous local economy in Northern Europe – in central London – we also have twelve of the twenty poorest among our closest neighbours³.

For all the progress of more people going to university than ever before, too many people do not have the education and skills they need to be able to command a good wage. We have more university graduates than the OECD average, but also more people with low levels of literacy and numeracy.

We must address these long 'tails' of underperformance if we are to build a strong economy and ensure sustainable growth in living standards.

The third challenge is to **make the UK one of the most competitive places in the world to start or to grow a business**. A fatal flaw of 1970s-style industrial strategies was the dominant focus on existing industries and the companies within them – and then mostly the biggest firms. Too often they became strategies of incumbency.

It is worth noting that many of the most important companies in the world today did not even exist 25 years ago. Unlike in the past, industrial strategy must be about creating the right conditions for new and growing enterprise to thrive, not protecting the position of incumbents.

A modern British industrial strategy must make this country a fertile ground for new businesses and new industries which will challenge and in some cases displace the companies and industries of today.

The UK has benefitted greatly from its open economy: pro-competition rules, flexible labour markets, less intrusive regulation and a favourable taxation regime have all made this country an excellent place to do business. But there is much more that can be done. For example, while the UK has had a strong record of scientific and technological discovery, we have had a weaker record in translating these discoveries into new businesses. And for all the advantages of having such a deeply specialised and globally successful financial industry, many growing businesses report that they struggle to access the patient capital needed to help them grow from fledgling firms to vigorous competitors. To secure Britain's future prosperity we must ensure that all the foundations of competitiveness are in place.

To recap, a modern industrial strategy must:

- build on our strengths and extend excellence into the future;
- close the gap between the UK's most productive companies, industries, places and people and the rest; and
- make the UK one of the most competitive places in the world to start or grow a business.

It is also important to ensure that our aims for this industrial strategy can be achieved while continuing to show the world we are committed to fiscal responsibility. Since 2010, this Government has delivered record employment while reducing the deficit by almost two-thirds. We will return the public finances to balance at the earliest possible date in the next Parliament. Moreover, we will put the UK on a path to fiscal sustainability by reducing the structural deficit to below two per cent of GDP and ensuring debt as a proportion of GDP is falling by the end of this Parliament. We will continue to make tough choices, deliver value for money in public spending and maintain fiscal discipline.

By addressing these challenges we will be able to achieve our objective: to improve living standards and economic growth by increasing productivity and driving growth across the whole country.

In building an industrial strategy we aim to set out an approach which endures. The policies that the Government pursues, the institutions it sustains and creates, and the decisions that it takes, should be, as far as possible, stable and predictable. In a world containing much uncertainty, public policy should aim to be a countervailing force for stability, not an additional source of unpredictability.

Our aim is to establish an industrial strategy for the long term – to provide a policy framework against which major public and private sector investment decisions can be made with confidence. It is therefore vital that the full development of our industrial strategy should take place with – and not just for – British enterprise. The full involvement of innovators, investors,

job creators, workers and consumers in England, Scotland, Wales and Northern Ireland is the only basis on which we can produce an enduring programme of action. We invite the devolved administrations, as well as local councils and mayors, to work together with us to develop jointly plans to help every place meet its potential.

That is why this is a Green Paper – a set of proposals for discussion and consideration, and an invitation to others to contribute collaboratively to their development.

And while our industrial strategy looks to the long term, its benefits can be felt immediately. The strategic approach that we are taking is already bearing fruit: whether in major upgrades in our infrastructure such as the decision to proceed with Hinkley Point C, the third runway at Heathrow or High Speed 2; major commercial investments predicated on our continuing industrial success such as Nissan in Sunderland, Google and Facebook in London and Softbank's investment in ARM in Cambridge; and bold new government policies such as the decision taken in November to make the biggest increase in public research and development investment of any Parliament since 1979.

So this proposed strategy is live and is already having an impact. This Green Paper gives an important opportunity for the whole country to contribute to its continuing progress.



How to respond to this Green Paper

This paper sets out how we propose to build a modern industrial strategy. It is not intended to be the last word, but to start a consultation. It is set out chapter by chapter, theme by theme; these are there to provoke debate not to constrain it – and the same goes for the points made within each chapter and the questions at the end of them.

This is a public consultation to which we hope anyone with an interest will respond.

We welcome your comments as part of a broad discussion on the approach and ideas we have set out, in order to make the industrial strategy effective in delivering an economy that works for everyone.

Responses should be submitted no later than **17th April 2017** using the CitizenSpace online consultation platform: <https://beisgovuk.citizenspace.com/strategy/industrial-strategy>

Details of forthcoming engagements will be set out at:

www.gov.uk/government/consultations/building-our-industrial-strategy

Alternatively, responses can be sent by email (industrial.strategy@beis.gov.uk), or to the following postal address:

Industrial Strategy Team
Department for Business, Energy and Industrial Strategy
1 Victoria Street, London, SW1H 0ET

Questions about policy issues raised in this document can also be sent to the above addresses.

When responding please state whether you are responding as an individual or representing the views of an organisation. If you are responding on behalf of an organisation, please make it clear who the organisation represents by selecting the appropriate interest group on the consultation form and, where applicable, how the views of members were assembled.

Confidentiality and data protection

Information provided in response to this consultation, including personal information, may be subject to publication or release to other parties or to disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004). There is also a statutory Code of Practice issued under section 45 of the FOIA with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

If you want information, including personal data, that you provide to be treated in confidence, please explain to us what information you would like to be treated as confidential and why you regard the information as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the department.

Summary

Why we need a modern industrial strategy

Industrial strategy can mean many different things. In the 1970s, industrial strategy became synonymous in Britain with the failures of nationalised industries like British Leyland, “picking winners”, poorly targeted government investment and sclerotic growth.

More recently, industrial strategy has been used to describe successful interventions in countries as diverse as South Korea, the United States, Germany and in some aspects, the UK. Targeted interventions – ranging from tax breaks and deregulation to strategic procurement decisions and specific investment in particular skills – have been combined with free market economic policies to nurture growth in particular sectors and places. Far from the experience of 1970s Britain, the international approach to industrial strategy has often been fruitful, leading to more productive and better balanced economies.

This document sets out a new vision. A vision for a modern British industrial strategy that does not repeat the mistakes of our past, and learns the lessons of our own successes and those of our overseas competitors. It is a vision to support, strengthen and develop our different industries, and to get all parts of the country firing on all cylinders.

The objective of our modern industrial strategy is to improve living standards and economic growth by increasing productivity and driving growth across the whole country.

This is not about the Government directing the economy or determining the industries of the future from Whitehall. Instead, we will identify our competitive strengths, explore with industry the ways in which government can help, and put in place institutions and relationships to sustain higher levels of productivity over the long term. It is about creating an economy resilient to change and fit for the future.

In some industries, this approach is already mature. The Government has long worked collaboratively with the aerospace industry to create one of the world’s best business environments for advanced aerospace engineering, design and manufacture. In the automotive sector, close partnership between government and industry has supported strong growth, with thousands of people employed in highly skilled jobs. But this relationship is less developed in other industries, and we have not established a coherent framework for industrial strategy across all sectors. This document starts to set out that framework.

We identify 10 pillars we believe are important to drive forward our industrial strategy across the entire economy: science, research and

innovation; skills; infrastructure; business growth and investment; procurement; trade and investment; affordable energy; sectoral policies; driving growth across the whole country; and creating the right institutions to bring together sectors and places. These pillars frame our approach, and across each of them we set out a programme of new policy.

The way in which these pillars relate to specific places will vary, and will change over time. In some areas, it will be important to target government investment flexibly to support specific areas or sectors. In others the right intervention might be to create new sector bodies, research institutions or financing bodies – where the lack of those institutions is holding back growth and productivity.

In all cases, we will work with industry and draw upon the considerable expertise of UK business to design our industrial strategy.

Why we are proposing this strategy

This strategy draws on lessons from other countries and identifies some of the key approaches that have enabled stronger productivity and more balanced growth in other economies.

It also draws on our own history: what has worked and what has failed; the strengths we must build on and the weaknesses we must correct.

These lessons have led us to the 10 pillars for the industrial strategy we set out in this paper. We are proposing these areas because the evidence shows that they drive growth. Places with higher rates of investment in research and development, more highly skilled people, better infrastructure, more affordable energy and higher rates of capital investment grow faster and have higher levels of productivity. Policies on trade, procurement and sectors are tools we can use to drive growth by increasing competition and encouraging innovation and investment. Through central government actions and by strengthening the local institutions that support a more productive economy we can ensure that growth is driven across the whole country.

The pillars

1. **Investing in science, research and innovation** – we must become a more innovative economy and do more to commercialise our world leading science base to drive growth across the UK.

 2. **Developing skills** – we must help people and businesses to thrive by: ensuring everyone has the basic skills needed in a modern economy; building a new system of technical education to benefit the half of young people who do not go to university; boosting STEM (science, technology, engineering and maths) skills, digital skills and numeracy; and by raising skill levels in lagging areas.

 3. **Upgrading infrastructure** – we must upgrade our standards of performance on digital, energy, transport, water and flood defence infrastructure, and better align central government infrastructure investment with local growth priorities.

 4. **Supporting businesses to start and grow** – we must ensure that businesses across the UK can access the finance and management skills they need to grow; and we must create the right conditions for companies to invest for the long term.

 5. **Improving procurement** – we must use strategic government procurement to drive innovation and enable the development of UK supply chains.

 6. **Encouraging trade and inward investment** – government policy can help boost productivity and growth across our economy, including by increasing competition and helping to bring new ways of doing things to the UK.

 7. **Delivering affordable energy and clean growth** – we need to keep costs down for businesses, and secure the economic benefits of the transition to a low-carbon economy.

 8. **Cultivating world-leading sectors** – we must build on our areas of competitive advantage, and help new sectors to flourish, in many cases challenging existing institutions and incumbents.

 9. **Driving growth across the whole country** – we will create a framework to build on the particular strengths of different places and address factors that hold places back – whether it is investing in key infrastructure projects to encourage growth, increasing skill levels, or backing local innovation strengths.

 10. **Creating the right institutions to bring together sectors and places** – we will consider the best structures to support people, industries and places. In some places and sectors there may be missing institutions which we could create, or existing ones we could strengthen, be they local civic or educational institutions, trade associations or financial networks.
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These pillars all reinforce one another. An economy with more innovative start-ups will require more highly skilled people, more venture capital, and better digital infrastructure. Inward investment can drive productivity growth by bringing new ideas and new ways of doing things to the UK. But to attract inward investment we need to be competitive on energy costs and infrastructure – as well as having a strong science base and highly skilled people. And the aims of our strategy will be further advanced by other complementary work – such as our further thinking on the labour market which will be set out later in the year.

In many of these areas, such as innovation, finance and attracting inward investment, the UK already has great strengths. The industrial strategy will enable us to capitalise fully on them.

The nature of the challenge

The UK has grown strongly in recent years – by over 14 per cent since 2010, second only to the United States among major advanced economies⁴.

Employment has reached a record high, with 2.7 million more people in work than in the first quarter of 2010⁵. Unemployment is at its lowest level for 11 years.

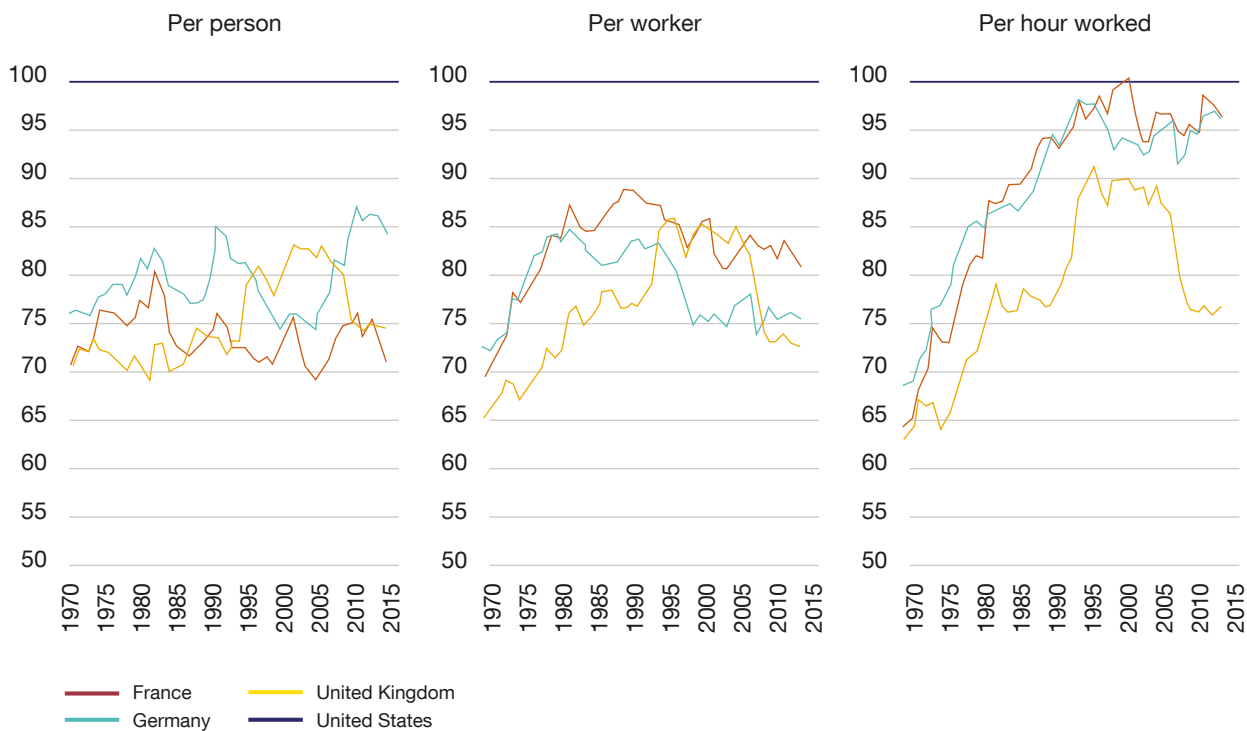
But while real wages are now growing, earnings are still recovering from a substantial decline following the recession of 2008⁶. Per capita growth in incomes has not been as strong as headline figures on overall GDP growth.

If we want to see faster growth in wages, sustained over the long term and experienced across the country, the UK needs to address the productivity gap with other leading countries. While the proportion of people in work is at a record high, we still produce less for every hour we work than our competitors.

The gap with our competitors is a longstanding one. Following the reforms of the 1980s, the UK reduced the productivity gap with the United States. During the years before the 2008 recession, the UK had largely caught up with Germany in terms of output per worker, and moved ahead of France on output per person, showing that we can improve our performance. However, though we closed the per-worker gap substantially, per-hour productivity remained lower than France, Germany and the US⁷.

The recession of 2008 reversed much of this progress, with the UK hit harder than other countries. As a result, productivity in the UK fell substantially behind our competitors. As the graph opposite shows, workers in France, Germany and the US produce on average as much in four days as UK workers do in five⁸. To get sustainably higher wages, this gap must be closed.

Productivity and output in the UK, France and Germany, compared to the US



*As a percentage of the USA (USA=100) Source: OECD Dataset: Level of GDP per capita and productivity 2017

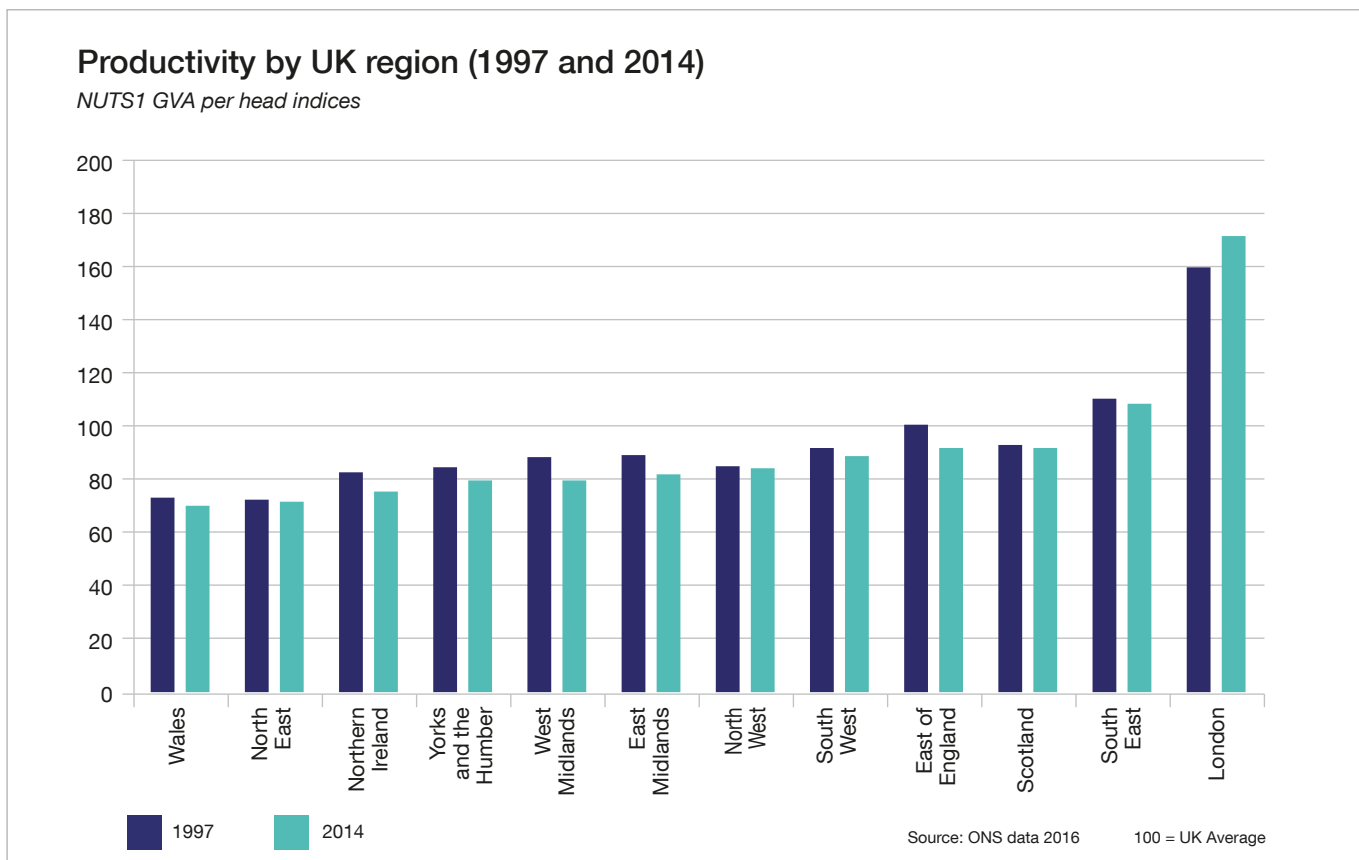
Improving productivity does not mean making people work harder. It means helping them to work smarter – producing more value for each hour of their time and thereby increasing their earning power. This is how economies grow and how living standards improve.

The differences hidden beneath the UK’s headline rate of productivity are also of great significance.

Our country has significant disparities in economic performance. The productivity gap between different parts of the country has been widening for decades, and it is these differences that ultimately impact on how much people earn.

As the graph overleaf shows, the majority of increases in productivity have been focused in London. Since 1997, London has moved from being 59 per cent higher than the UK average ‘gross value added’ per person (GVA is a measure of economic performance), to 72 per cent above, while most other regions have fallen further behind the national average⁹.

Regional disparities are now wider in the UK than in other western European nations. In the UK, 61 per cent of people live in areas with incomes 10 per cent below the national average¹⁰. This compares to only 50 per cent in Germany, and just 40 per cent in Italy. Even France, with a similarly dominant capital city, is more balanced – 53 per cent of people live in areas 10 per cent below the average.



It is important not to over-simplify this story. For instance, the productivity gap within each region is greater than between regions. Furthermore, since the 1990s, the gap between north and south has been driven by the resurgence of London, which for most of the twentieth century had been falling behind the rest of the country¹¹. We want London to continue to prosper, but the rest of the country needs to keep pace too.

Change is possible. Since 2010 wages have grown fastest in Northern Ireland and the North East of England¹², while the unemployment rate has fallen fastest in Wales¹³. Scotland has seen the fastest growth in productivity.

So while regional disparities are especially high in the UK, change in the right direction is possible. Indeed, more than possible, it is essential – because that is where much of the untapped potential of the British economy is to be found.

Tackling the productivity gap and driving growth

The objective of the modern industrial strategy is to improve living standards and economic growth by increasing productivity and driving growth across the whole country.

The 10 pillars in this Green Paper are summarised here and explored in more detail in the following chapters.

Investing in science, research and innovation



Innovation is not just about a few people in labs making breakthroughs, but about adopting new and more productive ways of working. To become a more innovative economy requires the ability to seize new opportunities and adapt to change. The United Kingdom has the advantage of a strong science base – including more Nobel Laureates than any country outside the United States¹⁴.

But historically, we have not been as successful at commercialisation and development as we have been at basic research. We have often been slower than competitors to take up and deploy existing technologies: for example, the UK makes less use of robotics and automation than most other countries in Western Europe¹⁵.

Our competitors have also grown their investment in research and development relative to the UK. The UK invests 1.7 per cent of GDP in private and public funds on research and development. This is below the OECD average of 2.4 per cent¹⁶ and substantially below the leading backers of innovation – countries like South Korea, Israel, Japan, Sweden, Finland and Denmark – which contribute over 3 per cent of their

GDP to this area¹⁷. Compared to competitors in Asia, UK public funding is relatively concentrated on early stage research.

Furthermore, there are regional disparities in how the public sector and companies spend money on research and innovation, with UK public R&D funding heavily focused on the ‘golden triangle’ of Oxford, Cambridge and London. As well as continuing to unleash the excellence of institutions, we need to build on the excellence in research and innovation that exists in other parts of the country too, and ensure that capital, institutional influence and government attention is targeted there effectively.

We will invest an additional £4.7 billion by 2020-21 in R&D funding, a bigger increase than in any Parliament since 1979. This paper starts a consultation on how to invest this funding, setting out options ranging from investment in local science and innovation strengths, and increased support for commercialisation, to investing in future research talent. For example, by increasing the number of PhDs in the STEM subjects – science, technology, engineering and maths.

It also consults on the technologies which the new Industrial Strategy Challenge Fund could support, including: smart and clean energy technologies (such as storage and demand response grid technologies); robotics and artificial intelligence (including connected and autonomous vehicles and drones); satellites and space technologies; leading edge healthcare and medicine; manufacturing processes and materials of the future; biotechnology and synthetic biology quantum technologies, and transformative digital technologies including supercomputing, advanced modelling, and 5G mobile networks.

Given its central importance to a range of new technologies, including in the automotive sector, the government has also asked Sir Mark Walport, the Government's Chief Scientific Adviser, to consider the case for a new research institution as a focal point for work on battery technology, energy storage and grid technology. Sir Mark will report in early 2017. Given the UK's underlying strengths in science and energy technology, we want to be a global leader in battery technology.

Developing skills



The United Kingdom has some of the top universities in the world and a larger proportion of our population have degree-level qualifications than most of our competitors. However, technical education has been relatively neglected. A bewilderingly complex array of qualifications, some of which are poor quality, makes the system hard to use for students and employers.

Consequently, we have a shortage of technical-level skills, and rank 16th out of 20 OECD countries for the proportion of people with technical qualifications¹⁸.

We have particular skills shortages in sectors that depend on STEM subjects, where we need more of these graduates to compete successfully in a global economy.

We still have too many underperforming schools and low overall levels of numeracy and literacy. England remains the only OECD country where 16 to 24-year olds¹⁹ are no more literate or numerate than 55 to 64-year olds. Large differences in skill levels around the country, including among school leavers, are compounding imbalances in the UK economy.

This paper opens a discussion on how we can create a new system of technical education, including: a radically simplified set of qualifications; an easy means of finding and applying for technical education courses similar to the UCAS process for higher education; and creating prestigious new Institutes of Technology to deliver higher-level technical education in all regions. A process will be launched this year to establish Institutes of Technology.

This paper also consults on how to boost STEM skills at all levels, from further encouraging the uptake of these subjects at university and expanding the number of specialist maths schools across the country, to new steps to ensure universal basic numeracy. The creation of a new "transition year" will help ensure no-one drops out of education at the age of 16. Faster changes in technology mean we need to help more people retrain in new skills, so we will embed the concept of lifelong learning. To renew communities affected by economic changes and support people in industries at risk of decline, we will explore new approaches including more effective outreach directly into workplaces to promote retraining. The Government will set out its approach in the Spring Budget 2017.



Upgrading infrastructure



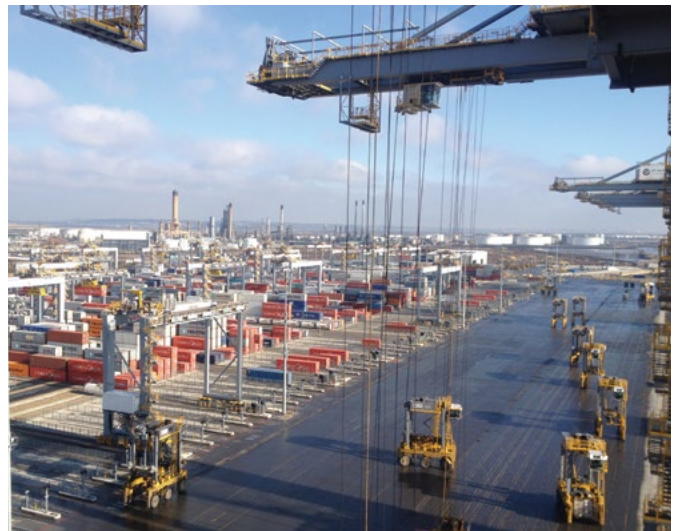
Though the United Kingdom has pioneered many types of infrastructure from railways to mobile telecoms, the quality of our transport infrastructure has been rated as second lowest among G7 countries. According to World Economic Forum surveys our overall infrastructure is perceived by international businesses as worse than our competitors²⁰.

This has been driven by factors such as a lack of clear long-term plans and budgets, a complex planning system, and failure to align planning for infrastructure with planning for housing and industry. We need to upgrade our energy, transport, water, flood defence and digital infrastructure across the country.

This will ensure that our businesses can thrive, services are resilient and can enable higher rates of house-building, making houses more affordable. And, as one of the world's leading digital nations, much of the UK's current and future prosperity depends also on our ability to exploit technology and to ensure our data and networks are secure against the many threats we face.

In the Autumn Statement the Government announced a new National Productivity Investment Fund that will add £23 billion in high-value investment from 2017-18 to 2021-22. This includes: £2.6 billion for improvements in transport projects to reduce journey times and help deepen labour markets through improved travel links, and £740 million to support the roll-out of fibre broadband connections and future 5G mobile technology. As well as increasing central government economic infrastructure investment by 60 per cent between 2016/17 and 2020/21, we have improved the framework

for public investment through use of long-term budgets and new institutions like the National Infrastructure Commission and Infrastructure and Projects Authority to enhance planning and project delivery. We will also take action to support more private infrastructure investment: as well as taking strategic decisions on major projects such as Heathrow, Hinkley Point C and HS2, the Government will extend support for infrastructure bonds and loans and create new opportunities for private involvement with new construction-only guarantees.



The Government has established new funding to enable central investment to support local growth. The new £2.3 billion Housing Infrastructure Fund will allow joined-up planning for housing and infrastructure in areas of severe need, and will fund the infrastructure needed to enable house-building on sites with marginal viability in areas with an acute housing need. Our £1.7 billion Accelerated Construction programme will support new entrants and developers, innovative private sector partners and offsite manufacturers to ensure homes are built at up to double the speed of traditional house builders. A total of £1.1 billion of funding for local roads and public transport networks will allow communities to fix local travel bottlenecks that hold back growth.

Supporting businesses to start and grow



The United Kingdom is a world-leading financial centre, but we need to do more to ensure that firms across the whole country can get the finance they need to grow.

The UK ranks third for start-ups, but 13th for the number of businesses that successfully scale up according to OECD research. One potential cause of this is an under-supply of long-term funding – “patient capital” – and later stage venture capital for growing UK companies²¹. Some report that equity finance is more available in London and the South East than other parts of the country. More broadly, we need to ensure that barriers to entrepreneurship and scale-up are identified and addressed in order for UK companies to be able to grow into major global players. We also need to ensure the conditions are right for companies to invest.

The UK invests on average two to three per cent of GDP less than France, Germany and the United States in fixed capital – such as plant and machinery²². This is a long running problem: the UK has ranked in the lowest 25 per cent of all OECD countries for investment in 48 out of the last 55 years.

The Patient Capital Review, recently announced by the Prime Minister, will identify the most effective ways to improve the availability of patient capital for growing businesses.

It is essential that we explore all options that could improve businesses’ ability to invest for the long term, so in this paper we are also inviting views on how to address the factors constraining quoted companies and fund managers from making longer-term investment decisions. We will work with the British Business Bank and the ScaleUp Institute to understand and address the relative weakness of venture capital funding and entrepreneurship networks outside the South East.

Improving procurement



The public sector spends around £268 billion per year, equivalent to 14 per cent of GDP²³. Used strategically, government procurement can encourage innovation, competition, and investment in skills. US agencies and initiatives like the Defense Advanced Research Projects Agency (DARPA), and the Small Business Innovation Research programme have shown how strategic procurement can drive innovation and the creation of new technology businesses.



To realise this potential, the Government has launched an independent review of the UK’s Small Business Research Initiative to examine how we can use strategic procurement to support businesses developing innovative new products and services. It will report in early 2017. The Government is rolling out the “balanced scorecard”, an approach recently developed by the Cabinet Office, across all major construction, infrastructure and capital investment projects over £10 million, including

those in the recently published National Infrastructure and Construction Pipeline²⁴. The scorecard will ensure the impact of procurement on the growth of small business and UK supply chains, skills and apprenticeships is taken into account when considering the value for money of different bids.

Encouraging trade and inward investment



Government trade and inward investment policies can open up markets for UK firms and bring in income. Measures to support trade and investment can have a crucial impact on long-term growth; not only do they bring in money, trade and investment, but also bring new ideas and approaches, increasing competition and growth.

We start from a strong position on investment – as the number one location for inward investment in Europe – but not enough UK firms export, and trade as a share of the economy has grown more slowly than in our G7 competitors over recent decades.

The creation of the new Department for International Trade is an opportunity to upgrade dramatically support for investors and exporters. The Autumn Statement doubled capacity to support exports through UK Export Finance. We are also building future trading relationships, and we are encouraged that countries such as Canada, China, India, Mexico, Singapore and South Korea have already said they want to discuss our future trading relationships.



The Government is working to support businesses through discussions on market access issues with third countries²⁵. We will test a new 'Team UK' approach to trade, convening consortia of businesses around UK Export Finance backed funding to bid for major overseas contracts, and providing the strong political support that competing countries often do.

We will continue to improve how the promotion of inward investment links up with local areas and we will explore where there are sectors in the UK which could benefit from support to create recurring international trade fairs. We will also consider how we can develop a more strategic approach to targeting inward investment, including measuring our success in terms of the impact of investment on growth. We are also reviewing what we can learn from inward investment strategies of key competitors and will report in 2017.

Delivering affordable energy and clean growth



We need to ensure that we keep costs down for businesses, we coordinate changes to energy infrastructure triggered by new technologies (such as electric vehicles), and we secure the economic benefits of the transition to a low-carbon and resource-efficient economy by making sure next generation technologies are created and harnessed in the United Kingdom.



The Government will set out a long-term roadmap in 2017 to minimise business energy costs. This will be informed by a review, commissioned by the Government, of the opportunities to reduce the cost of achieving our decarbonisation goals in the power and industrial sectors. The review will cover how best to support greater energy efficiency, the scope to use existing instruments to support further reductions in the cost of offshore wind once current commitments have been delivered, and how Government can best work with the regulator Ofgem to ensure markets and networks operate as efficiently as possible in a low-carbon system.

We will also review the opportunities for growth from the energy sector and the opportunities for the UK. We are already testing the use of new grid technologies in various locations around the country in preparation for the shift to electric vehicles. To ensure that new energy technologies are developed here – and the UK benefits from global investment in this area – we have doubled support for energy innovation, and are already investing over £600 million in support to accelerate the transition to ultra low emission vehicles. At the Autumn Statement 2016 additional funding of £270 million was announced.

Cultivating world-leading sectors



Leadership from business has been key to the success of sectoral policies in the UK and other countries. We propose to set an ‘open door’ challenge to industry to come to Government with proposals to transform their sectors through ‘Sector Deals’. The Government will work with sectors that organise themselves behind strong leadership to help deliver upgrades in productivity.

This could involve: addressing regulatory barriers; promoting competition and innovation; working together to increase exports; and working together to commercialise research. Sector deals will be driven by business to meet the priorities of business.

The Government welcomes initial work on early sector deals, including from Sir John Bell on life sciences; Richard Parry-Jones on the transition to ultra low emission vehicles; Juergen Maier on industrial digitalisation; Lord Hutton on improving UK competitiveness and skills in the nuclear industry; and Sir Peter Bazalgette on the creative industries.

Driving growth across the whole country



Economic imbalances between different parts of Britain are larger than our competitors, with incomes and living standards lagging behind in too many parts of the country. These disparities hold back the country's growth and limit opportunities for too many people.

We should confront the fact that our economy is one of the most centralised in the world, with institutions that are often too fragmented to provide the most effective leadership in shaping successful places. Evidence and experience suggests that strong, streamlined, decentralised governance – such as through our city deals, growth deals and mayoral devolution deals – can improve economic decision-making and spur innovation and productivity gains.

We will use infrastructure investment to support local growth and the rebalancing of the economy. The creation of new funding like the Housing Infrastructure Fund and £1.1 billion of funding for local roads and public transport networks will enable infrastructure decisions to be matched more effectively with local economic plans.

We will tackle historic underinvestment and have provided development funding for major infrastructure upgrades such as the Midlands Rail Hub and Northern Powerhouse Rail. We will continue to support better local decision-making structures for infrastructure planning, including the new mayoral combined authorities, and regional bodies like Midlands Connect and Transport for the North. Strong

and accountable place-based governance – with a clear business voice – will be critical to making the most of this additional investment.

Differing skill levels entrench the disparities in our economy, so we will go beyond the national skills reforms set out above and take further actions where skill levels are too low. We will work with local areas to test new approaches to closing the skills gap. These could include: improved pre-school education to reduce the divergence of achievement which opens up before school; new schemes to support the retention and attraction of graduates; and measures to increase the take up of apprenticeships.



We will also use the additional R&D investment set out above to back world-class research and innovation, supporting local economies across the country. New funding streams, such as the Industrial Strategy Challenge Fund, could allow us to invest in the innovation strengths of different areas, whether led by businesses or universities. Expanding existing streams supporting universities' commercialisation activity would allow them to do more for their local economy and support more local small businesses.

Creating the right institutions to bring together sectors and places



Two key lessons from industrial policy in other countries are the need for consistency and patient effort, and to deliver this, the need to create the right institutions to support development over the long term.

At the national level, progress has been through the creation of business-led institutions. We will now build on such institutions where they exist, or work with business to create them where they are needed.

We will work with local areas to help develop industry clusters based around local expertise, putting in place the right institutions with the right powers to help support local areas of economic strength. This may involve creating new institutions or strengthening existing ones such as educational and innovation institutions, business networks and trade associations, or financial networks and local funds.

We will maximise the benefit that ‘anchor’ businesses can bring to an area by supporting the growth of UK supply chains. The Department for International Trade will review the potential role it can play in attracting businesses, including with reference to the impact they can make on areas where productivity needs to catch up.

The Cabinet Office is reviewing the location of Government agencies and cultural institutions and will consider relocating them where they could help reinforce local clusters and support private sector growth. Recognising the importance of cultural and sporting institutions in making different places attractive

to people and businesses, this review of arms-length bodies will include cultural institutions, particularly where cultural assets could be better used and exhibited to support local areas – for example, the Government Art Collection.

We will support the creation of new educational institutions where they are needed, and support local networks of universities where they want to come together to improve commercial opportunities. We will also review whether there is more that can be done to leverage government and research council laboratories to drive local growth. We will work with local government to review how to bring more business expertise into local government, for example through the creation of a modern “Alderman” type of role within local government; and we will work with Local Enterprise Partnership (LEPs) to review their role in delivering local growth, examining how we can spread best practice and strengthen LEPs, including extending the support they receive from the What Works centre for Local Economic Growth. We will work with the new Mayoral Combined Authorities to build up their capacity in the run up to the first elections in May.



For those areas where responsibility is devolved to Scotland, Wales and Northern Ireland, we will both respect devolved arrangements, and endeavour to build on shared interests to deliver better outcomes for people in all parts of the United Kingdom. To this end, we propose establishing Ministerial Forums on Industrial Strategy with each of the Devolved Administrations. These will bring together all

relevant UK Government departments and the Devolved Administrations to consider how the Industrial Strategy can best address key productivity barriers in Scotland, Wales and Northern Ireland. This is an open invitation to representatives of each Devolved Administration to develop plans jointly with the UK Government to support all areas of the UK, and to align our economic plans and strategies closely.

Questions for consultation

1. Does this document identify the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?
2. Are the 10 pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?
3. Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?
4. Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?



Investing in science, research & innovation



The opportunity

For an advanced economy, the path to competitiveness is not to copy what others are doing. It is to do things that others cannot do, or to do things in different and better ways.

Higher levels of investment in innovation correlate with faster growth and higher income levels, both within different areas of the United Kingdom and internationally. Research and development leads to the creation of new products and services, more effective processes and better ways of doing business. These improvements are the essence of economic growth. The Government has an important role to play in driving investment in innovation. Some types of research are important, but too far away from being market-ready; these will mostly be funded by government. It can take action to invest and introduce tax incentives to encourage businesses to invest in R&D. The Government also has a key role to play in facilitating the exchange of ideas and collaboration between business, universities and government laboratories.

Innovation is not just about breakthrough technologies or scientific and engineering processes. Effective adoption of technology throughout businesses and improvements in management and workforce skills are just as important, as are new ways of providing services, from financial services and retail to professional advice. Innovation can sometimes be disruptive, but ultimately we must embrace

innovation to keep ahead of the competition, create more good jobs, and make sure jobs in the UK are secure.

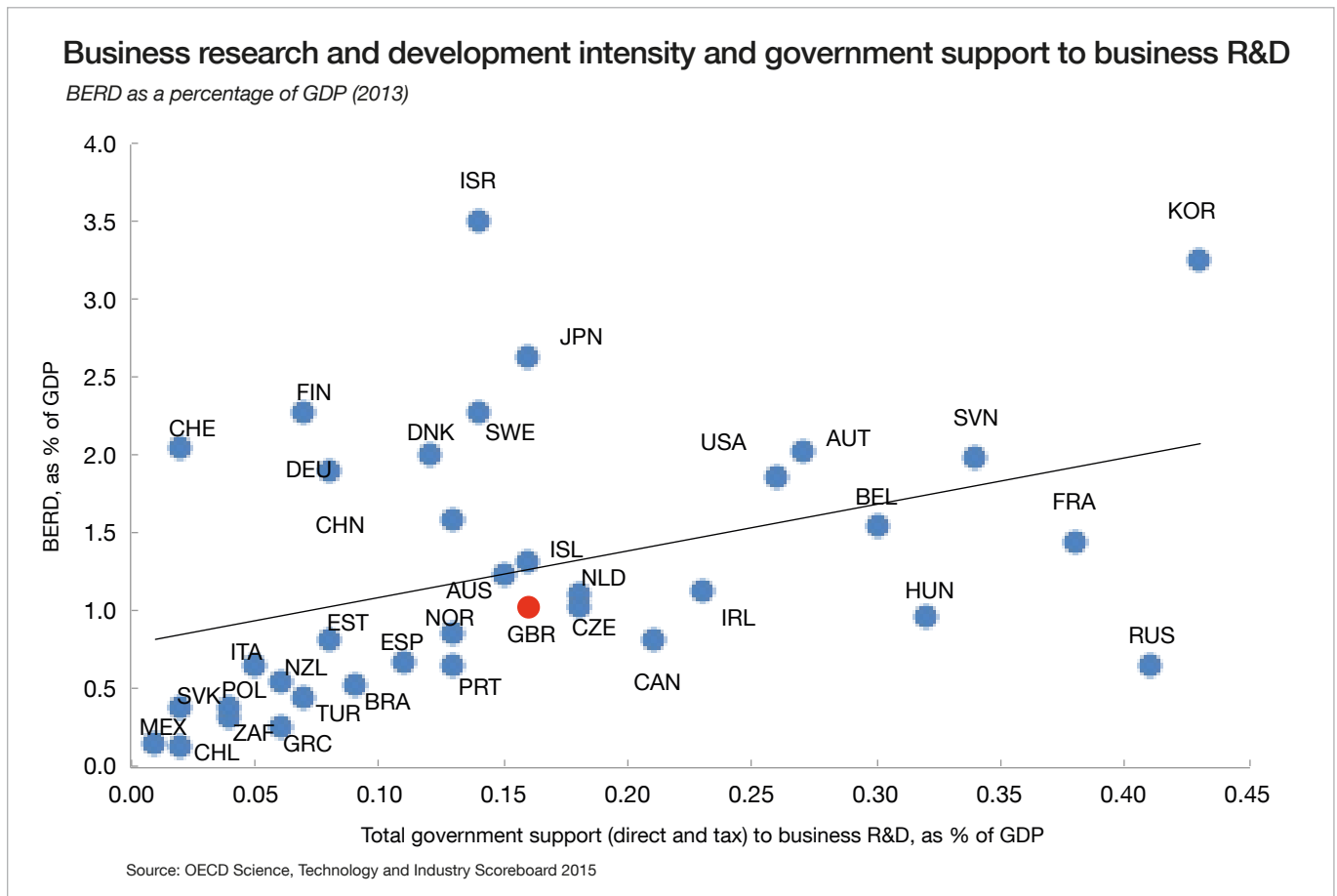
At a time when the pace of scientific discovery and innovation is quickening across the world, the UK is fortunate to be a nation of science and technical progress. We have three of the world's top 10 universities, and 12 of the top 100²⁶. Of the G7 countries, the UK has the most productive science base and we rank first in many key global measures of research quality²⁷.

These academic achievements have practical benefits for our economy, with firms investing into the UK to access our research – such as IBM, which has invested £200 million in the Hartree Centre in Cheshire to boost 'big data' research.

The challenge

Excellence in science, research and innovation is recognised by our international competitors as an important source of future competitive advantage and many are taking significant steps to increase their own investment in this area.

The Government has protected the public science budget since 2010, despite having to make substantial savings to reduce the inherited deficit. But other countries have been increasing their investment in research and development in relation to GDP.



The UK invests in total 1.7 per cent of GDP in private and public R&D funding. This is below the OECD average of 2.4 per cent and far behind the leading backers of innovation – South Korea, Israel, Japan, Sweden, Finland and Denmark – which contribute over 3 per cent of their GDP to this area.

The graph above shows this challenge. Business investment in R&D (BERD) is just over one per cent of GDP in the UK, close to half the rate in Germany and substantially below the OECD average²⁸. Though there is variation, there is a correlation between government investment and tax support for R&D, and the amount that private businesses invest²⁹.

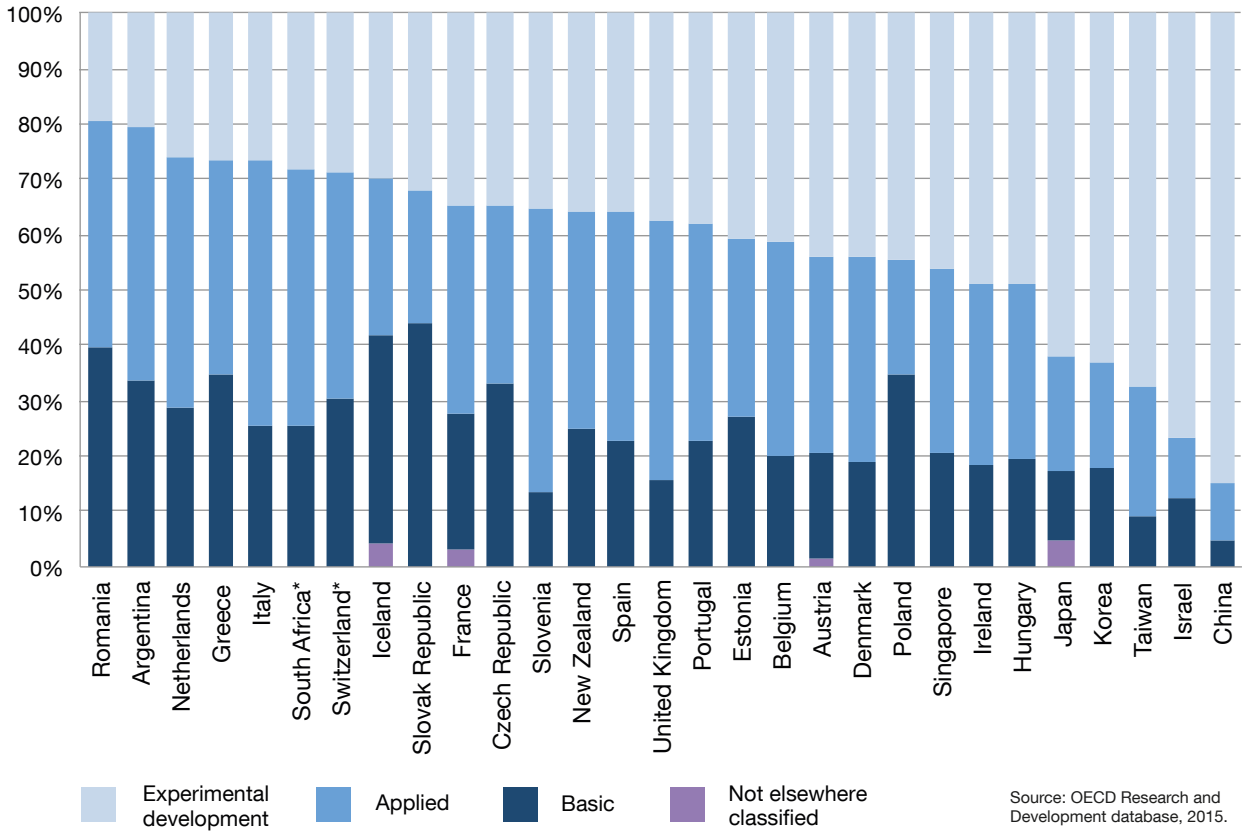
The graph also shows that the ratio of business to public investment varies considerably. In some countries like Germany and Japan the ratio of business investment to public investment is far higher than in the UK.

We have a challenge, too, in translating our leadership in global research into commercial outcomes – a longstanding weakness relative to other countries. From the development of medical imaging technologies to biotechnology, the UK has too often pioneered discovery but not realised the commercial benefits.

This may reflect in part the balance of funding. While the way we distribute funding across different stages of R&D is not out of line with other European countries, it is striking that in leading innovation nations, such as Israel and countries in Asia, a greater proportion of total R&D investment is on later-stage, experimental development. China, for example, currently spends twice the share of the UK. This may amplify the industrial impact of such countries' funding commitments to R&D³⁰.

Type of research and development spending at different stages of research

As a percentage of total research and development expenditure (2013)



Source: OECD Research and Development database, 2015.

We have already taken action to address the UK’s historic relative weakness in commercialisation, through the establishment of new, more industrially focused institutions such as Innovate UK, and by strengthening support for universities to commercialise their research ideas. We have also protected Government spend on basic science, in recognition of its central role in generating new knowledge and breakthrough discoveries. We will also ensure allocation of additional research investment takes full account of the need to continue our world-class dual support system.

The UK now produces a similar number of spin-off companies as US universities, and substantially more than Japanese institutions, when measured per unit of research funding³¹. But we register far fewer patents³². We have world-class research universities, but not one

features in the ‘Top 10’ list compiled by Reuters covering innovation and commercialisation³³.

This illustrates the need to do much more to build on the progress to date. The so-called ‘golden triangle’ of institutions and businesses between Oxford, Cambridge and London is internationally revered, and rightly so. We must do more to replicate that success in other parts of the UK, building on research strengths in businesses as well as universities. The chapter of this Green Paper on local growth describes how we can use additional R&D investment to back world-class research and innovation, supporting local economies across the country.

Our strengths need to be seen against the backdrop of an increasingly global and mobile research community. The proportion of the UK’s business R&D investment financed from abroad



is considerably higher than other countries: 22 per cent in 2013, compared to seven per cent in the OECD³⁴. Under the current European Union programme, Horizon 2020 (2014-2020), the UK has to date secured €2.63 billion, the second highest level of funding³⁵.

As the Prime Minister has outlined, we are determined to continue to be one of the best places in the world for science and innovation and will welcome agreement to continue to collaborate with our European partners on major

science, research and technology initiatives. As the UK prepares to leave the EU we remain committed to maintaining and building on our strengths in R&D to continue attracting world-class people, skills and foreign investment – as set out in the chapter that follows on trade and investment.

Our approach

Our industrial strategy will launch a major upgrade in the role of science and innovation in our economy for the years ahead. It will build on our world-leading science base and hardware innovation into our businesses, schools, workforce and individuals.

We will:

Substantially increase investment in R&D and ensure that UK research continues to be world class. We will provide an additional £4.7 billion of funding by 2020-21 – an increase of around 20 per cent to total government R&D spending, and the biggest increase in any parliament in almost 40 years. We will also explore how we can best use this additional funding and the tax environment for R&D to drive up the level of private investment in science, research and innovation across the economy.

Strengthen our strategic capability through the creation of UK Research and Innovation (UKRI) which will bring together the Research Councils and later-stage innovation funding through Innovate UK. UKRI will develop and deliver a clear strategy from fundamental research through to business innovation. It will enable us to identify future opportunities and keep the UK at the cutting edge of new technologies and developing solutions to global challenges.

This paper seeks initial views on the priorities for this increased investment, and UKRI will consult in more detail in early 2017.

For example, increased R&D funding could allow us to:

- **Keep improving how we translate our world-class research into commercial outcomes.** We could look to expand successful mechanisms such as Higher Education Innovation Funding (HEIF), which supports universities to patent their
- **Capitalise on local strengths across the UK.** At present 46 per cent of Research Council and Higher Education Funding Council for England (HEFCE) funding is spent in Oxford, Cambridge and London. We have the Research Partnerships Investment Fund (RPIF), which supports capital projects in universities with an eye to local economic strengths, with co-funding from industry. However, there are constraints: RPIF funding from government is for capital infrastructure only, and it only applies to a particular range of project sizes – providing between £10-£50 million project funding. Most importantly, it has to be led by a university, and we have no equivalent fund that can take bids from groups of companies. We could create new funding streams to support world-class clusters of research and innovation in all parts of the UK, whether they are led by business or universities, and for large or small projects where they meet quality thresholds. In some cases, this could involve creating new research institutions to back local strengths in world-class research. In this way we will use some of the additional R&D funding to help boost growth across the economy, as well as growing it overall.
- **Build the pipeline of talent for an innovative economy.** Demand for higher level qualifications is growing strongly, and today's PhD students are often tomorrow's research leaders, entrepreneurs and industrial researchers. Existing funding

discoveries and work with local businesses, or expand Knowledge Transfer Partnerships, which place PhD students into companies. This would allow universities to provide greater support for their local economy and small businesses. We could also identify potential new types of interventions to enable research and business to collaborate (such as skills, or funding time away from the laboratory in businesses).

programmes for PhDs and post-doctoral researchers are heavily over-subscribed (for example, the most recent round of Medical Research Council “CASE” awards had a success rate of just 31 per cent³⁶).

This means many excellent candidates are not able to get places, so we will consider with stakeholders the best way to substantially increase the number of PhDs and research fellowships in STEM subjects (science, technology, engineering and maths).

- **Ensure that the UK attracts top international talent.** Researchers have shown that the presence of academic “stars” acts to pull in other researchers and private businesses³⁷. Other countries have active programmes to attract leading academics who can anchor strong departments. We could explore a similar programme for the UK.
- **Deliver the institutions and infrastructure we need for a world-leading research and innovation base.** UKRI could develop a new capital spending roadmap to provide the modern infrastructure to support fundamental research.
- **Deliver sector-specific funding to support business investment in R&D.** We will look at the value for money and effectiveness of such approaches compared to other funding mechanisms. This could include examining the value of sector-specific innovation funds matched by industry, like the funds created for the auto, aerospace and life sciences sectors through the Advanced Propulsion Centre, Aerospace Technology Institute and Biomedical Catalyst. We could explore similar arrangements for further sectors or deepen existing funds.

- We could create ring-fenced funding for **innovative procurement** schemes, like the Small Business Research Initiative, discussed further below.
- The Prime Minister has announced that we will create a new **Industrial Strategy Challenge Fund** to help Britain capitalise on its strengths in research and innovation such as robotics, clean energy and biotechnology. This builds on the creation of UKRI. The Industrial Strategy Challenge Fund creates a new funding stream which will enable UKRI to back technologies at all stages where the UK has the potential to take an industrial lead, from early research to commercialisation. This is additional funding and will not require reductions in existing research priorities to pay for it. Some challenges may well cut across the boundaries of existing research councils, and the creation of UKRI will enable us to take an effective overview of the development of new technologies unrestricted by traditional silos.

The new fund will draw on the experience of the US Defense Advanced Research Projects Agency (DARPA) programme and support business-led collaborations with coordinated research efforts and focus on the challenges, opportunities and technologies that have the potential to transform existing industries and create entirely new ones.

The Industrial Strategy Challenge Fund will focus on challenges where:

- the global market is potentially large, or fast growing and sustainable;
- the UK has capabilities to meet market needs in terms of research strength and business capacity;

- there are significant social and economic benefits; and
- there is evidence that government support will make a difference
- Based on these criteria, and analysis of the UK’s research strengths, including through the Eight Great Technologies initiative, areas from which specific challenge could be drawn include:
 - Smart, flexible and clean energy technologies (such as storage, including batteries, and demand response);
 - Robotics and artificial intelligence (including connected and autonomous vehicles and drones);
 - Satellites and space technologies;
 - Leading-edge healthcare and medicine;
 - Manufacturing processes and materials of the future;
 - Bioscience and biotechnology;

- Quantum technologies; and
- Transformative digital technologies including supercomputing, advanced modelling, and 5G mobile network technology.

These are early suggestions for potential challenge areas and there may be more opportunities – for example, in the creative industries. Innovate UK and the Research Councils are currently engaging with academics and businesses across the country to gather evidence on the challenge areas and identify where government support can make the biggest difference. We want to hear your ideas through this consultation in order to develop these further.

The Industrial Challenge Strategy Fund will enable UKRI to support a range of industrial R&D activities: joint research projects between businesses and academic researchers; placing graduate students into companies; setting up demonstrators to test near-to-market technologies in real-world environments; and creating centres to bring together academic



experts with entrepreneurs to promote commercialisation. In some cases a challenge could lead to the creation of a new institution to drive forward a priority technology.

As an early example of a new institution to support a key technology, the government has asked Sir Mark Walport to review the case for a new research institution to act as a focal point for work on battery technology, energy storage and grid technology, reporting in early 2017.

Battery technology is of huge importance to a range of new technologies, including the automotive sector, smart energy systems and consumer electronics. Electric vehicles are less polluting and cheaper to run, and have the potential to provide electricity storage and demand flexibility that could provide benefits to consumers and our electricity system. Drawing together these battery, energy storage and grid technologies is sensible because step-changes in innovation will likely involve all of them. For example smart grids that respond to the demands of consumers could potentially use new battery technologies, particularly storage in electric vehicles, to deliver power efficiently and at lower cost.

A new institution would build on existing strengths in this field that exist in universities and companies across the UK.

Increasing the effectiveness of research investment

As well as increasing overall funding for research and development, the Government will continue to work with universities and research institutions to further improve the economic impact of research investment.

We need to ensure that university spin-outs have the best chance to survive, attract investment and grow over the long term. With a view to spreading best practice the Government will commission research on different institutions' principles and practices on commercialisation of intellectual property, including how they approach licensing intellectual property and take equity in spin-outs.

For example, the size of equity stakes taken in spin-outs varies considerably, with little consensus over what is appropriate. Too large a stake can hamper future investment prospects, but some new companies will have to rely heavily on university funds for initial support. This research will explore the approaches taken by different institutions and examine the impact these have on spin-out creation and growth. The Government will then use the findings to identify and spread best practice among universities' technology transfer offices.



Investing in science, research and innovation

Actions under way:

- **We are increasing research and development investment** by £4.7 billion in total, an extra £2 billion per year by 2020-21.
- We are creating a new **Industrial Strategy Challenge Fund** to help the UK capitalise on its strengths in science and innovation such as robotics, clean energy and biotechnology.
- We have committed new **investment for R&D facilities and knowledge sharing** with £100 million until 2020-21 to extend and enhance the Biomedical Catalyst and a further £100 million until 2020-21 to incentivise universities to collaborate on technology transfer and partnering with business.
- We have announced that we will be supporting further **Science and Innovation Audits** in eight new locations across the UK to help develop the evidence base of their research strengths and innovation capability. We have launched the call for bids for the next wave of audits.
- We have launched a **review of the tax environment for R&D** to examine whether there is more we should do to stimulate private sector investment and make the UK an even more competitive place to do R&D.
- We have established a **high-level forum on EU Exit, Universities, Research and Innovation**. It will advise on how best to build on the excellence of UK research and innovation, maximising the opportunity of the UK's exit from the European Union.

New commitments:

- This paper starts the consultation on the priority challenges for the **Industrial Strategy Challenge Fund**, and other opportunities we can address using the increase in R&D funding. UKRI will then consult in more detail in early 2017 based on feedback to this Green Paper.
- Given its importance to a range of new technologies, including the automotive sector, the government has also **asked Chief Scientific Adviser Sir Mark Walport to review the case for a new research institution to act as a focal point for work on battery technology, energy storage and grid technology**, reporting in early 2017.
- We will be commissioning **independent research on approaches to commercialisation** in different institutions, including how they approach licensing intellectual property and taking equity in spin-outs.
- We will seek to harness the potential of the UK's **home-grown inventors** and stimulate user led innovation by launching a challenge prize programme. This prize, which will be piloted through the NESTA Challenge Prize Centre, will help inform our support to the 'everyday entrepreneurs' operating in companies and at home – such as through supporting enabling environments, incubators and maker spaces.
- We are reviewing how **to maximise the incentives created by the Intellectual Property system** to stimulate collaborative innovation and licensing opportunities – including considering the opening up of registries to facilitate licensing deals and business-to-business model agreements to support collaboration. We will place **Intellectual Property Office representatives in key UK cities** - starting with pilots in the Northern Powerhouse and Midlands Engine to build local capability to commercialise intellectual property.
- We will set out a **UK Measurement Strategy**, establishing a framework to capitalise on our National Measurement System which provides UK industry with world-leading measurement science and technology. The new strategy will ensure we have the knowledge and facilities to support all sectors to benefit from measurement – helping them to trade, manufacture and export.

Questions for consultation

5. What should be the priority areas for science, research and innovation investment?
6. Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?
7. What else can the UK do to create an environment that supports the commercialisation of ideas?
8. How can we best support the next generation of research leaders and entrepreneurs?
9. How can we best support research and innovation strengths in local areas?



Developing skills



The opportunity

We are building on some strengths in our education system. We have an additional 1.8 million children in good and outstanding schools than there were in 2010³⁸. We had a record 2.4 million apprenticeship starts in the last Parliament, and we are on track to deliver a further 3 million by 2020³⁹, with closer links to employers through the new apprenticeship levy.

The UK has one of the most accomplished higher education systems in the world, with three universities in the top 10 in international rankings and 12 in the top 100⁴⁰. A university education was once reserved for a small minority of school leavers; it is now estimated that around half of all 17-year olds will participate in higher education by the age of 30⁴¹. The United Kingdom has a larger proportion of people with degrees than the OECD average⁴². The Government's Higher Education and Research Bill, currently before Parliament, will build on strengths of the UK's universities, put in place a 21st Century regulatory framework and enable innovative ways of learning.

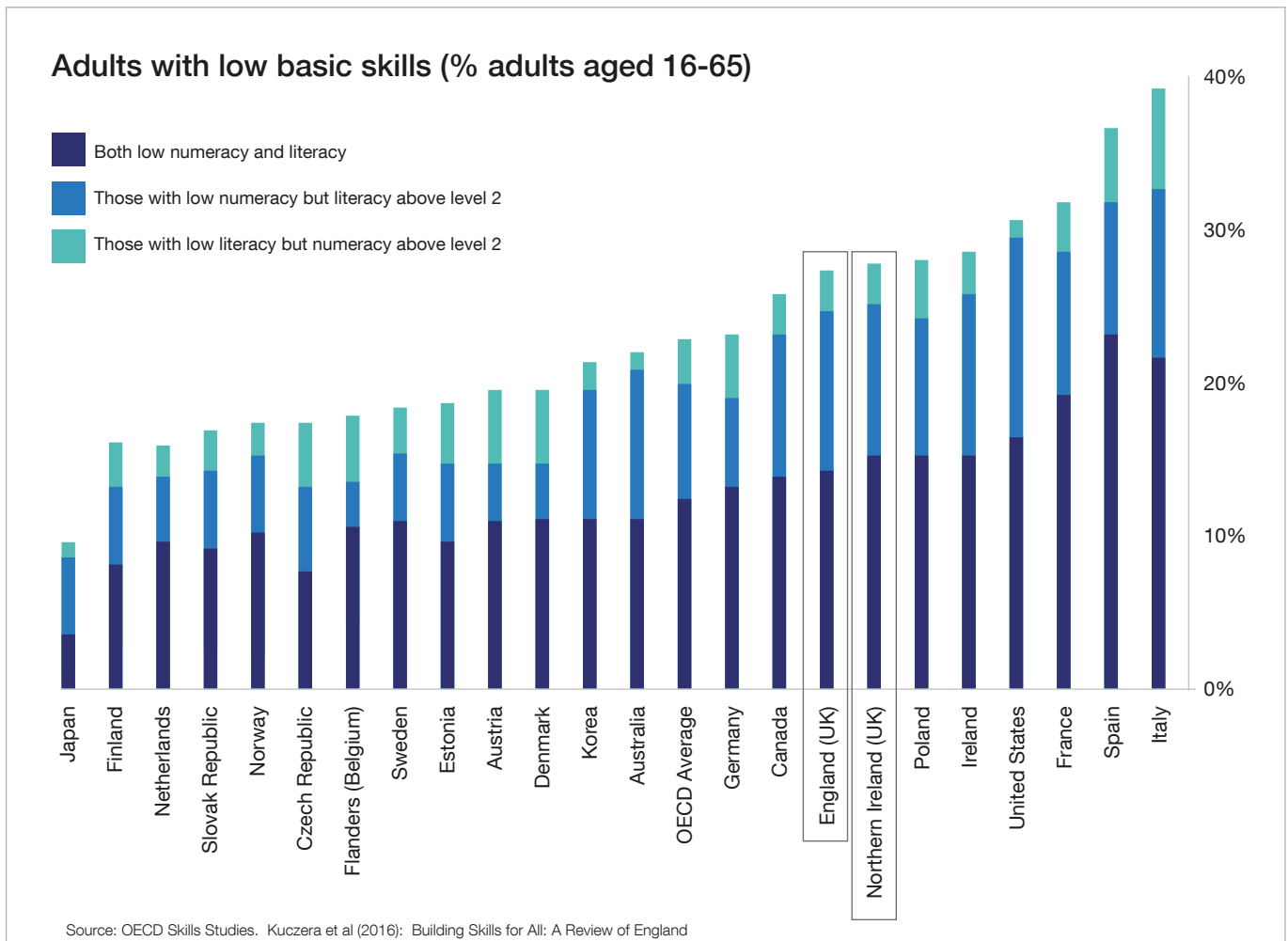
Raising skill levels is an important way to drive higher incomes over the long term. The Government has a key role to play as the major contributor to investment in skills but it is not the only player. It needs industry to help shape qualifications and the curriculum – for technical qualifications in particular – to ensure they are

useful to future employers, and needs more involvement of industry experts in delivering technical education to drive up standards. The new Apprenticeships Levy ensures business invests in apprenticeships, and it puts business in control of apprenticeship provision. Companies invest in skills and training for their own staff and in some cases, such as PhD funding, business and government are jointly providing skills investment. A modern industrial strategy can help create the right framework to incentivise business to invest in skills alongside public investment.

The challenge

While our higher education system has its strengths, our poor performance in basic and technical skills is key to the UK's persistently lower levels of productivity compared with other advanced economies. Skills shortfalls in some parts of the country contribute to imbalances in productivity in the UK, as shown in a recent CBI report⁴³ highlighting education and skills as the biggest determinants of regional variations in productivity.

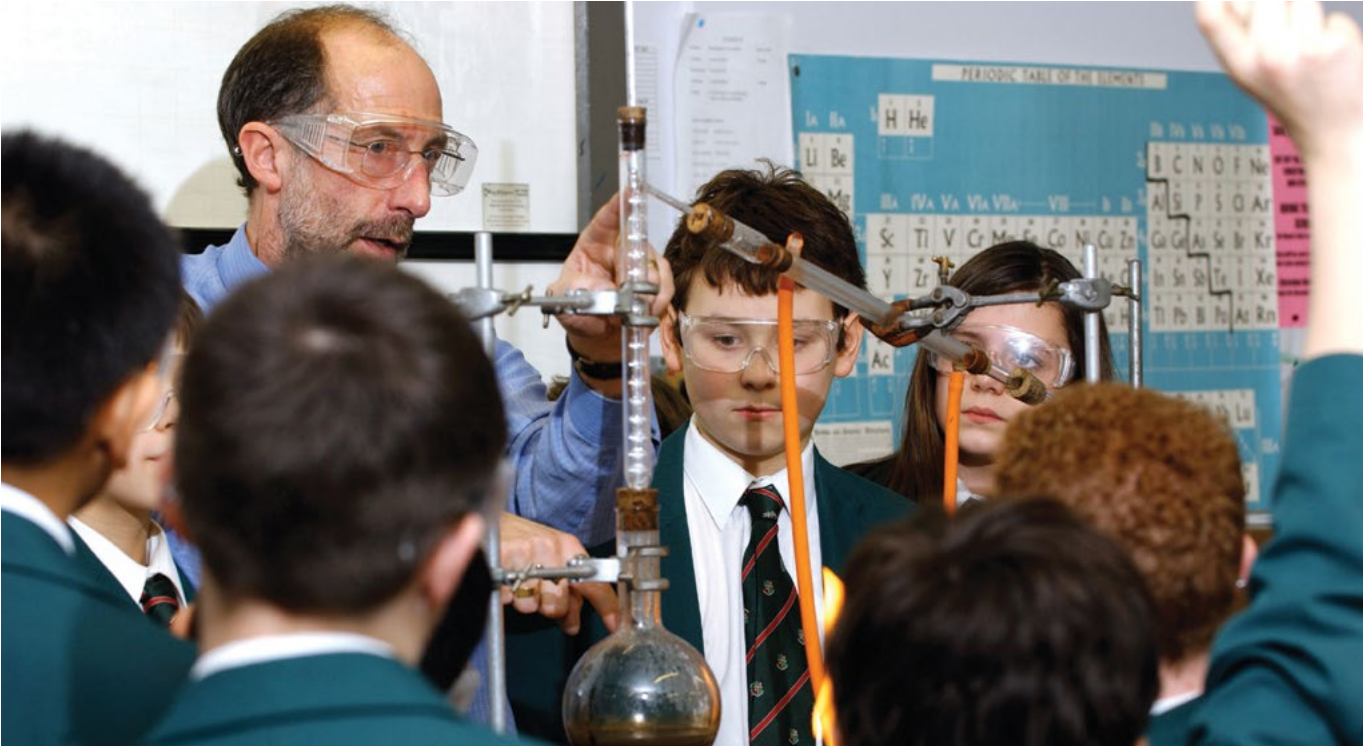
Apprenticeships aside, technical education for those not pursuing the academic path has fallen behind. The existing system can be complex and confusing, which often does not deliver either for individuals, for the skills needs of employers, or for the wider economy. Our failure to address skills shortages has increased our reliance on flows of migrant labour.



There is progress now being made but we need further action to address a number of key issues:

First, there remain significant **problems with basic skills**. England is the only OECD country where 16 to 24-year olds are no more literate or numerate than 55 to 64-year olds⁴⁴. In 2011, 49 per cent of adults had numeracy levels at or below those expected of an 11-year old, and 15 per cent were at or below this level for literacy⁴⁵. In 2011 to 12 our 16 to 18-year olds were the worst performing on literacy and second worst for numeracy out of 18 OECD countries⁴⁶. Within the next two decades, 90 per cent of jobs will require some digital proficiency, yet 23 per cent of adults lack basic digital skills⁴⁷. This is a barrier to people fulfilling their potential and to a more productive workforce.

Second, we have a **shortage of high-skilled technicians below graduate level**. Reflecting the historic weakness of technical education in the UK, only 10 per cent of adults hold technical education as their highest qualification⁴⁸, placing us 16th out of 20 OECD countries. Unlike academic education, the progression path between levels of technical education is insufficiently clear, meaning that around 125,000 young people in each year are studying for qualifications at the same or lower level than they have already achieved⁴⁹. Students face a bewildering choice of thousands of qualifications, some of which are poor quality. Both students and employers find it difficult to select the option that adds most value to their career ambitions.



While there is good provision, too many of our further education (FE) colleges only offer a broad, generalist curriculum at lower qualification levels; the sector has too little provision of higher level technical qualifications.

Third, we face particular **shortages in sectors that depend on science, technology, engineering and maths (STEM) skills**.

For example, nearly half of businesses report a shortage of STEM graduates as being a key factor in being unable to recruit appropriate staff⁵⁰. The number of STEM undergraduates has been increasing over the last few years, but there remains unmet demand from employers. We must ensure the higher education sector is able to meet this need.

Fourth, there are also skills shortages specific to certain **sectors**, which force some employers to look overseas to fill certain vacancies. Even with shortfalls in STEM skills and technical education addressed, we could be left with shortages in particular specialisms – such as those faced by the nuclear industry – unless we develop a better system to identify and fix emerging gaps.

Fifth, we need to do more to empower students, parents and employers to make **confident and informed choices** about their education and careers options, whether they are in schools, technical education or higher education. The quality of careers advice is a particular issue for disadvantaged students who lack the social capital to get advice or work experience opportunities via family members⁵¹.

Finally, the accelerating pace of technological change means there is a growing challenge with **lifelong learning**: supporting people to up-skill and re-skill across their working lives. People are living and working longer, but training across working life is going down. The world of work is changing too, with one study stating that 35 per cent of existing UK jobs estimated to be at high risk of replacement by technology in the next 10 to 20 years, particularly at medium-skill levels⁵². Older workers and low to medium-skilled groups are less likely to undertake learning opportunities and adults in the highest socio-economic groups are twice as likely to participate in training as those in the lowest⁵³.

We need to address these concerns at the same time as we continue to drive up the number of good school places in every part of the country.

Our approach

To meet the six challenges set out above we propose the following actions:

1. Action to improve basic skills

A key part of any effective technical education system – as well as any academic education – must be a firm grounding in basic skills. In the last five years, the Government has taken steps to improve literacy and numeracy at all stages of education. For under-16s, the national curriculum and GCSEs have been reformed to be more stretching at the top, and to provide better assurance of core literacy and numeracy than previous standards.

The Government has also introduced the requirement that every 16 to 18-year old who achieves a ‘D’ grade or below in GCSE English and maths should continue to study these subjects, resulting in a significant increase in young people retaking their GCSEs.

There has been progress, but the challenges set out above show more needs to be done to help students achieve their potential.

Emerging evidence from Professor Sir Adrian Smith’s independent review into post-16 maths provision points to a number of areas where action will need to be taken to improve basic mathematics provision in FE colleges. A total of 70 per cent of young people who do not achieve A*-C GCSEs in these vital subjects and who go on to full-time post-16 study, do so at FE colleges. Yet still too far many of these young people fail when they retake them⁵⁴.

So the Government is reviewing the effectiveness of current policy to help as many young people as possible leave compulsory education with a good standard of maths and

English. We will explore how to support FE colleges to be centres of excellence in teaching English and maths, spreading teaching and curriculum best practice as has been done successfully in the schools system. We have also recently asked the Education Endowment Foundation to expand their remit to cover post-16, specifically investigating what works in relation to teaching and learning in English and maths for disadvantaged students in FE colleges. We welcome the work to date of the Behavioural Research Centre for Adult Skills and Knowledge, a collaboration with the Behavioural Insights Team. The Centre’s pioneering work has provided insight into how behavioural science can be used to help learners with basic skills.

There is also an issue with the number of young people with weak basic skills who ‘churn’ through a series of low-level vocational and other qualifications that do not prepare them for further study or employment.

So through the Skills Plan, published in July 2016, we committed to putting in place a ‘transition year’ at age 16 for students who have substantial basic skills gaps and are not ready for more advanced study or employment. This is a major step forward, providing intensive support in basic skills for those who need it most and reducing significantly the numbers of young adults at risk of leaving full-time education without the skills needed for employment. The primary purpose of the transition year will be to develop achievable career plans and the skills needed for them, including numeracy and literacy. For some, the transition year will be an opportunity to ‘catch up’ with their peers before progressing to technical education the following year; for others it will be about developing the skills to make them more employable and continuing their education in the workplace. The transition year will help ensure no-one drops out of education at the age of 16.

A recent report by Ipsos Mori/Go ON UK⁵⁵ found that more than 10 million adults in England lack basic digital skills. New legislation being introduced through the Digital Economy Bill will mean that, where it is offered, basic, publicly-funded, digital skills training will be available free of charge to those adults in England who need it.

We will also work to improve digital skills among those still in education. We will work with the Institute for Apprenticeships and Technical Education to determine what digital content will be included in the new technical education routes.

2. The creation of a new system of technical education

If we are to boost growth and address regional imbalances in our economy, we must also create a proper system of technical education – as exists in countries such as Germany and Norway. This system, which will sit alongside the academic track, will benefit in particular the half of our young people who do not do A-levels or go to university, and those parts of the country where more people take a technical track. Reforming traditional FE into a new system of technical education means the following changes:

(a) Clear, high quality routes for technical education

A high performing technical education system needs a clear, simple framework of high standard qualifications that enable progression up through different skill levels and into skilled employment.

The Skills Plan was the start of a major programme of reform to address the UK's long-term structural failings in this area. It accepted the recommendations of the independent panel led by Lord Sainsbury for a new framework for technical education.

Commitments in the plan build on key features of international exemplars, including Denmark, Germany, the Netherlands, Norway and Singapore. Rather than having thousands of qualifications, and some low quality, we are creating 15 core technical “routes” which will be defined through rigorous labour market analysis. This will be the fundamental basis for our technical education system. Each route will start with high quality two-year programmes for 16 to 19-year olds and extend to the highest skills levels, leading to full professional competence in a number of defined occupations. Students will be able to progress on the routes either through an apprenticeship or college-based provision.

It will be essential for routes to be led by employers to meet the needs of our industrial strategy. Government will have the first employer panels to design and develop the new qualification requirements up and running this spring, with the first routes delivered in September 2019. In addition, it is our aspiration that every student undertaking one of the technical education routes in college will be entitled to a high quality, substantive work placement. This will give these students the opportunity to develop the knowledge, skills and behaviours required for work, making them more attractive to employers and generating a future pipeline of skilled labour. We will be launching pilots with employers and colleges later in the year to test and learn how to roll out such work placements more widely.

(b) High quality technical education providers with excellent teaching

A high-quality technical education system needs high-quality and resilient colleges and other providers to deliver it. The reforms outlined in this chapter will represent a major endorsement of the crucial role that FE colleges play in the economy, and will represent a major development in what they teach, with the opportunity for more training at higher levels and wholly new qualifications designed to meet the needs of industry.

The new technical routes and expanding apprenticeships, especially at higher levels, will increase the need for excellent teachers who have a strong industry background and high-level specialist and technical knowledge.

We will work with the sector to explore ways to attract more industry specialists to work with and in the sector to increase the quality of this training.

(c) Higher level technical education and new Institutes of Technology in all regions

Students should have a clear view of their progression, whether to higher levels of training including undergraduate and post-graduate degrees, or to direct entry into skilled employment.

We will create a clear single framework of approved technical qualifications at Levels 4+ (above the equivalent of A-level standard) based on standards developed by employers and overseen by the Institute for Apprenticeships

and Technical Education. This will allow young people who have studied for technical qualifications for full-time education to progress to higher skill levels. We will work with qualification providers and learning institutions to ensure new courses are developed to enable part-time and distance learners to participate, to appeal more to those already in the workforce looking to re-skill or up-skill.

Further to these measures, the Government recognises that it needs to do more to stimulate provision at higher technical levels and make the infrastructure available to support this teaching.

The Government will support the creation of new Institutes of Technology. These institutes will increase the provision of higher-level technical education, which only exists on a limited scale in the UK today, to ensure that it is available in all areas. For example, a person could study a level 3 (A-level equivalent) at a local college, before moving on to study a higher-level technical qualification at an Institute of Technology in a nearby city.



The Government has already announced it will create a network of Institutes of Technology to ensure we have sufficient provision targeted at delivering high-quality technical education at higher skills levels, tailored around the needs of employers in local areas. The Government will provide £170 million of capital funding to deliver this commitment.

These institutions will help to deliver excellence in technical education across the country, providing students with a clear route to employment or higher education. They will harness the expertise of local employers, both in leadership and design of the curriculum, to fill local skills gaps.

We would expect most Institutes of Technology to grow out of high-quality provision. All Institutes of Technology would be expected to: specialise in technical disciplines (such as STEM) that are aligned to technical routes; offer high quality provision at levels 3, 4 and 5 (i.e. the equivalent of A-level to just below degree); and have a local focus to deliver qualifications of value that meet the skills needs of local employers.

Within this framework there will be flexibility for Institutes of Technology to adopt different models suited to their local needs. We have worked with stakeholders to test the viability of some delivery and governance models. The lessons learned from this work will feed into the process to be launched this year to establish new Institutes of Technology.

(d) Ensuring Technical Education routes are demanding

We need to ask more of post-16 education and training to ensure that everyone has the chance to develop the skills crucial to their future and the economy. This is central to the Government's mission to make Britain a country that works for everyone, not just the privileged few.

Further education students currently receive fewer than 17 hours per week of tuition over a 36-week teaching year, compared with over 27 hours per week typically within schools pre-aged 16⁵⁶. We know high-performing countries often have bigger and broader programmes, some with nearly twice as many hours: at least 30 hours a week in Shanghai, 27 in Singapore, 26 in Canada and 28 in Norway⁵⁷.

The Sainsbury panel on technical education recommended that teaching the new routes may, in some cases, require more specialist expertise, rather than teaching existing lower-value qualifications. The Government will review how we can best deliver the increased level of ambition we have for the new routes, including whether there are ways to drive up quality and make the new routes more demanding.

For those people aged 19 or older we will review the current loan system for technical education and the various restrictions on accessing it. We have also consulted on and are reviewing the option to create maintenance loans for technical education.

(e) Creating a course-finding process for technical education similar to the UCAS process

Effective information and support should be available for everyone, regardless of their education and training choices. People choosing apprenticeships or courses in colleges currently face significant complexity when selecting and applying a course. Applications for higher education institutions, in contrast, are much more straightforward, with a way of searching and applying for courses similar to the UCAS process. We will therefore explore how to give technical education students clear information and better support throughout the application process, with a similar platform to UCAS, which will also make it easier for students to compare options in technical education and higher education.

3. Addressing STEM shortages

As well as addressing the UK’s weakness in technical education, we need to address across the board shortfalls in STEM skills and the issues these cause. The Government has committed to make Britain the best place in the world to study maths, science and engineering. In March 2015 the Government announced a five-year package worth £67 million to train an additional 2,500 specialist maths and physics teachers, and to improve the skills of 15,000 non-specialist teachers in those subjects.

Professor Sir Adrian Smith’s review of post-16 mathematics has identified that one factor contributing to the shortage of STEM skills is the take up of advanced mathematics qualifications, including A level mathematics, further mathematics and core mathematics. We have already made substantial progress on this since 2010: the proportion of people studying mathematics is now at its highest ever level, and it is the most popular A-level. But there is significant regional variation and students in some areas are much less likely to progress to A-level mathematics than their peers in other parts of the country. There are significantly more students studying advanced mathematics in London and the South East than other parts of the country⁵⁸.

The review will propose solutions to these imbalances and the wider challenges that reduce progression to A-level and other important maths qualifications. These include both cultural factors and practical barriers, including financial ones, for schools and colleges. Furthermore, the proportion of girls studying A-level mathematics and physics still lags behind that of boys significantly⁵⁹.

Maths free schools such as Exeter and King’s College London, have the potential to drive up standards in the subject and ensure advanced mathematics education is available to pupils who might not otherwise be able to access it. The Government will consider how to enable this model to spread and deliver benefits for mathematics education in their wider community. We will seek partners to open mathematics schools of this kind across the country.

Furthermore, there is also evidence of increasing demand in STEM subjects within higher education, with UCAS acceptances for full-time undergraduates in these subjects growing by 19 per cent between 2010 and 2016⁶⁰. The Government already recognises the importance of support in this area through the subsidy paid to higher education institutions via Higher Education Funding Council for England (HEFCE) to incentivise provision of high-cost, mostly STEM subjects.

Proportion of those who achieved A*-C at age 15 studying level 3 maths at 16 (by local authority).

LAs with highest L3 maths participation local authority	% study L3	LAs with lowest L3 maths participation local authority	% study L3
Reading	57%	Wakefield	15%
Sutton	46%	York	15%
Harrow	45%	Blackburn with Darwen	14%
Barnet	45%	Salford	13%
Redbridge	43%	Barnsley	13%
Wokingham	42%	City of Kingston Upon Hull	12%
Brent	42%	Middlesbrough	12%
Enfield	40%	Knowsley	7%

To deliver a world-class industrial strategy we will want to encourage the education sector to increase opportunities in grow STEM subjects even further.

4. Identifying and addressing sector-specific skills gaps

The actions set out above, taken together, will help deliver the long-term surge in skills that this country needs. They will tackle, over time, the legacy of historic underperformance. But we know that there are also acute and urgent skills shortages in key industrial sectors including infrastructure and the nuclear industry. In some sectors – for example digital and rail – action is already being taken through the creation of sector-specific national colleges. The Transport Infrastructure Skills Strategy (published in January 2016) and taskforce are driving jobs and skills in roads and rail across the country.

We recognise that previous efforts by the Government and industry to forecast skills shortages have lacked the accuracy to enable timely and effective action, and that further action could be taken to ensure that we can better identify and address future shortages.

Part of the problem has been the lack of a single authoritative source: the UK Commission for Employment and Skills (UKCES), the Low Pay Commission, the Migration Advisory Committee, and individual sectors have produced assessments focused on their specific remits. But no organisation has been tasked with identifying persistent or emerging sector specific gaps and proposing action. We will now work towards a single, authoritative view of the gaps faced by the UK now and in the future.

5. Higher quality careers information and advice

Our improved education and skills system must be supported by high-quality careers provision. We know that young people who are uncertain

or unrealistic about career ambitions at the age of 16 are three times more likely than their peers to spend significant periods out of education, employment or training⁶¹. And teenagers who have direct experience of the labour market (such as through careers talks at school), earned more in adulthood than those who missed out⁶². Good careers advice is particularly important for young people from disadvantaged backgrounds, who may have less informal information, contacts and support on which to draw⁶³.

We have made a good start by investing £90 million over this Parliament to support young people in accessing the advice they need. The Careers & Enterprise Company's Enterprise Adviser Network is now live – connecting 1,300 schools and colleges with local employers to provide experiences of the workplace for young people. The Government will consider what more we can do to involve businesses in providing experience of different careers.

But we need to go further if everyone is to get the information, advice and guidance they need to succeed. Careers provision continues to be patchy and inconsistent – both in schools and in later life. The amount of time invested by adults in training mid-career is going down, while employers' investment in training has been in decline for two decades despite numerous attempts to reverse the trend.

The Government is reviewing the current careers offer for people of all ages, and will build on the best international evidence to publish a comprehensive strategy later this year for careers information, advice and guidance.

6. Testing new approaches to lifelong learning

For busy people in work with family commitments, the barriers to retraining or gaining higher qualifications can be considerable. A recent review by the Department for Education identified significant declines in training with age, and in work-

based training; and that poorer or less well-educated groups are less likely to undertake it. Perceptions of affordability and attitudinal factors (such as a lack of confidence) are key inhibitors.

However, the increasing pace of technological change means it will be increasingly necessary for people to retrain during their careers. To connect more people to opportunities to retrain, we will test ambitious new approaches to encourage lifelong learning, which could include direct outreach with busy people, particularly where industries are changing or in decline. We will trial the use of 'contact moments' people have with the Government to promote opportunities to retrain and we will consider the role of community learning centres as part of this. In addition we will review the option to introduce maintenance loans for higher technical education, of the kind the Government already supports in higher education.

We will also explore how to bring together information on training opportunities, costs, government support and likely employment benefits, in order to increase take-up of skills training. This will include better signposting and promoting online training that be accessed as needed by users.

As part of the Government's higher education reforms we will look to promote opportunities for students to transfer between courses and institutions. Opportunities to transfer offer more options for students wishing to continue with their studies later in life and will contribute to raising higher level skills among people of all ages.



Developing skills

Actions under way:

- We are moving forward with **schools reforms**, consulting on our plans for a new, fair National Funding Formula for schools.
- We are delivering more, higher-quality **apprenticeships** and introducing the Apprenticeship Levy to bring in investment needed in our young people.
- Through **the Sainsbury Review** and the **Skills Plan**, the Government has set out its plan to radically simplify the thousands of vocational qualifications into a smaller number of high quality new routes.

New commitments:

- We will create a **proper system of technical education**, to benefit the half of young people who do not go to university and provide new, better options for those already in the workforce. This involves creating a small number of high quality new routes, as set out in the Skills Plan, and attracting more industry specialists to work in the sector to raise the quality of higher skills training.
- We are committing **£170m of capital funding to the creation of prestigious new Institutes of Technology** to deliver higher technical education in STEM subjects and meet the skills needs of employers in local areas.
- We will explore how to **support further education colleges to be centres of excellence in teaching maths and English**.
- We will explore how to **give technical education learners clear information**, which could include a way of searching and applying for courses similar to the UCAS process.
- Professor Sir Adrian Smith's independent review of post-16 mathematics will propose measures to improve take up of mathematics and **close large regional imbalances in take up of advanced mathematics**.
- We will consider how to enable the specialist maths school model pioneered by Exeter and King's College London to spread. We will seek partners to open mathematics schools of this kind across the country.
- We will explore and further encourage the uptake of STEM subjects to help meet unmet demand and build on the growth of recent years.
- We will work towards a **joined-up, authoritative view of the sector specific skills gaps** that the UK faces now and in the future.

- We will publish a **comprehensive careers strategy** later this year to radically improve the quality and coverage of careers advice in schools and colleges, to make it easier for people to apply for technical education, and to give people the information they need to access training throughout their working lives.
- **We will explore ambitious new approaches to encouraging lifelong learning**, which could include assessing changes to the costs people face to make them less daunting; improving outreach to people where industries are changing; and providing better information.
- We will take further actions to **address differences in skill levels between different areas** to help drive economic growth and opportunity throughout the country (explored in later chapters of this paper).

Questions for consultation

10. What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?
11. Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?
12. How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?
13. What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?
14. How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?



Upgrading infrastructure



The opportunity

Investment in economic infrastructure⁶⁴ is a key part of industrial strategy. The Government often needs to back investments which cannot be provided by the private sector, but go on to be transformative in the long term. But private investment is crucial too. Getting the right investment and regulatory relationship between the Government and private providers can unlock investment in infrastructure and support longer term growth. Previous industrial revolutions, from railways to mobile telecoms have spread because we got this relationship right.

Infrastructure supports the other pillars of a modern industrial strategy. Good transport infrastructure does not just reduce delays; it can raise productivity by enabling towns and cities to achieve agglomeration effects, and so support the rebalancing of our economy.

Better connected towns and cities have deeper labour markets, greater competition and greater economies of scale, leading to higher growth and living standards. This is one reason the Government is supporting the development of major infrastructure projects like Northern Powerhouse Rail and the Midlands Rail Hub – to join up towns and cities more effectively, and enable them to pool their labour markets and economic strengths. HS2 is driving major regeneration schemes across the UK and has already played a role in attracting significant new investments.

Good digital infrastructure also opens up new opportunities for growth, for example through better connected business and consumers. Research suggests that increased broadband speeds alone could add £17 billion to UK output by 2024⁶⁵.

Improvements to digital infrastructure will be felt most in rural areas. Supporting the roll-out of fast broadband in rural areas enables new business to locate and grow there. It is estimated that an increase in broadband penetration of 10 per cent yields 0.25 per cent increase in GDP growth⁶⁶.

Resilient infrastructure fit for our long-term needs is vital to economic growth – such as water supplies for businesses and people. Investing in infrastructure also mitigates potential economic losses, for example from a changing climate, flooding and drought. The 2016 National Flood Resilience Review sets out our expectations of key infrastructure providers to ensure assets are flood resilient, minimising the impact on immediate and wider communities and business.

Infrastructure investment can also play a key role in driving and supporting private funding, such as to encourage private investment in housing-building on much-needed but more challenging sites.

Alongside these economic benefits, high quality infrastructure provision can raise living standards directly and have a positive impact

on health through reduced costs and time of travel, reduced pollution, and faster and lower-cost digital and transport connectivity.

The UK starts from a better position than its competitor countries in terms of private sector involvement in infrastructure. Nabarro LLP's 2015 Infrastructure Index⁶⁷ judges the UK as the number one country for attracting private infrastructure investment, with an innovative business environment and high rates of private participation. The UK's system of economic regulation is also regarded as one of the best in the world, supporting investor confidence through its stable and independent regime.

New opportunities are now being opened up by the combination of increased investment matched by the creation of a better institutional framework for planning infrastructure.

The Autumn Statement set out how central Government economic infrastructure investment will rise by almost 60 per cent between 2016/17 (£14 billion) and 2020/21 (£22 billion). This increased funding is matched by better planning. Since 2010 we have moved away from stop-go planning for infrastructure, creating multi-year budgets for road spending and putting Network Rail's long term plans on a sounder footing. The publication of the first National Infrastructure Plan in 2010 and the National Infrastructure Delivery Plan 2016-21, along with the new National Infrastructure Commission is driving better long-term planning, including considerations of the interdependencies between different types of infrastructure. The creation of the Infrastructure and Projects Authority (IPA) enables this long-term planning to be translated into successful project delivery.

Higher investment plus a better framework for planning creates the opportunity to address the UK's historic weaknesses on infrastructure.

The challenge

It is critical we continue to focus on improving our infrastructure services.

In recent years, the UK's performance has been rated poorly compared with other developed countries, and business highlights it as a key issue. According to the International Monetary Fund, UK capital stock is the lowest of all G7 countries⁶⁸, while the World Economic Forum ranks the country 24th globally in overall transport infrastructure quality (the second lowest of the G7)⁶⁹. A survey⁷⁰ in 2015 by the Confederation of British Industry found that 90 per cent of businesses were concerned that trains are full, 96 per cent felt that roads are too congested, and 59 per cent were dissatisfied with the reliability of digital connections.

These national weaknesses are felt more acutely in certain areas of the country exacerbating regional disparities. People experience lengthy journey times and poor transport links, particularly outside London and the South East. Manchester and Leeds are less than 40 miles apart and yet on the congested M62 this often takes more than two hours by car. The distance between London and Paris is more than double that between Liverpool and Hull. Yet travelling from Liverpool to Hull by train takes longer. Such challenges directly affect our workforce, creating a shallower labour market and less choice and competition. That leads to lower growth and living standards.

Our weak record on economic infrastructure has been driven by a number of factors.

There has been an **historic lack of clear long-term thinking in the Government's approach to national infrastructure strategy – in how we join up at a national level**, and in a way that more consistently considers the interdependencies of infrastructure sectors.



This has contributed to the disjointed **provision of infrastructure and a legacy of underinvestment**. The recent introduction of National Policy Statements and the development of the National Infrastructure Plan (now the National Infrastructure Delivery Plan) has helped, but this underinvestment has led to low confidence among investors and undermined planning in the supply chain.

The absence of a clear national strategy has been compounded by the **lack of joined-up policies to meet local needs**. The fault lies partly in the poor coordination between central and local government, but also the lack of strong infrastructure institutions such as Transport for London outside the capital.

There have also been problems with the delivery of schemes. Projects have been delayed by years and provided at excessive cost. There has been improvement in recent years, but the local planning and consent system still remains a contributing factor in some instances. There has also been fragmentation in the construction sector and its supply chain, with businesses often unable to deliver long term investment at large scale. This is combined with shortages in key construction skills.

Ultimately, lower levels of infrastructure investment outside London – particularly transport funding – has held back other towns, cities and areas. This issue is explored in more detail in the chapters below.

Our approach

This Government has begun to tackle our infrastructure challenge. We are providing **higher rates of public investment**, with improved institutions to support how the money is best spent. This will provide greater certainty and long-term direction across infrastructure policy, including, where relevant, how we use and improve our stock of natural capital⁷¹.

We will continue to **support private sector infrastructure investment**, by creating the right business environment through more consistent policies and, where appropriate, through direct support schemes set out below.

We will continue to focus on how we can deliver infrastructure more effectively, and make **infrastructure costs more competitive** against global comparisons.

Finally, we will **align the planning of infrastructure more effectively with local growth priorities** to ensure more places benefit. Infrastructure decisions will be better matched with local economic plans to boost productivity locally and support places that have suffered historical underinvestment. We will create a stronger institutional framework to support this process for cities and regions across the country. Each of these is explored in more detail below.

Higher rates of public infrastructure investment

In the Autumn Statement 2016, the Government committed additional capital to fund new high-value economic infrastructure over the next 4 years through the National Productivity Investment Fund (NPIF).

This includes:

- **£2.6 billion for improvements in transport projects;** including £1.3 billion for upgrades to local transport and national roads, £390 million for future transport, including support for ultra low emission vehicles and connected and autonomous vehicles, and over £450 million to support rail improvements including digital signalling, smart ticketing and other measures to improve services.
- **Government investment of £400 million in a new Digital Infrastructure Investment Fund** to boost commercial finance for emerging fibre broadband providers, with £740 million earmarked for:
 - Local full fibre broadband rollout – developing the infrastructure to deploy full fibre networks into businesses and the public sector
 - 5G mobile technology and optical fibre – coordinated programme of integrated 5G and fibre projects to accelerate and de-risk deployment of future digital technologies
- **A new £2.3 billion Housing Infrastructure Fund,** a flexible new fund which will back infrastructure such as transport and utilities, which can encourage new private investment in housing.
- **£170 million investment in flood defences, as part of a total £2.5 billion of investment over six years.** Key projects will include improving the resilience of the railway at Dawlish, building 1,500 new flood defence schemes and protecting over 300,000 more homes.

These plans build on the commitments made in the Spending Review 2015. Central government economic infrastructure investment will now rise by almost 60 per cent between 16/17 (£14 billion) and 20/21 (£22 billion).

The Government has also asked the National Infrastructure Commission to plan on the basis that government infrastructure spending will be between one and 1.2 per cent of GDP between 2020 and 2050. This would sustain our new higher level of spending consistently over the medium term.

Supporting private sector infrastructure investment

The Government is taking the necessary decisions to drive forward progress on specific critical projects:

- support for a new runway at Heathrow – the first full length runway in the south-east since the Second World War, the development of which will benefit the whole country
- confirmation of Hinkley Point C – the first new nuclear power station for a generation
- further investment in and progression on road and rail projects, including setting out the route for phase 2 of HS2

In addition to taking the decisions on major projects, the Government is creating a framework to enable higher levels of private investment in infrastructure. This includes:

- **Infrastructure bonds and loans.** The Government is supporting private infrastructure investment by providing the £40 billion UK Guarantees Scheme (UKGS) to help projects raise finance from the capital markets through Treasury-backed guarantees for bonds and loans. The Autumn Statement extended this scheme to at least 2026 and we will explore creating

new construction-only guarantees which will provide new opportunities for private involvement in infrastructure.

- **Public-Private Partnerships.** The Autumn Statement also committed to the exploration of a new pipeline of projects suitable for delivery through the Public-Private Partnership scheme PF2, to be set out in early 2017. This will provide new opportunities for the private sector to play a role in delivering infrastructure.

Making infrastructure costs more competitive

The Infrastructure and Projects Authority will lead a new review to identify ways the Government, working with industry, can improve the quality, cost and performance of our infrastructure. The review will report in summer 2017 and will build on the 2010-2014 Infrastructure Cost Review, which supported a 15 per cent reduction in the capital cost of projects.

The Chief Secretary to the Treasury will also chair a new Infrastructure Delivery Ministerial Group which will oversee the delivery of the Government's infrastructure commitments through tackling cross-cutting issues which are challenging the delivery of priority projects.

Better matching infrastructure to local plans, using infrastructure to support local growth

The provision of new funding at the Autumn Statement 2016 will allow public funding to support local economic plans.

The new £2.3 billion Housing Infrastructure Fund will allow joined-up planning for housing and infrastructure for the first time. At present, local councils' choices about where to encourage development are constrained by a lack of resources to build roads, install utilities like electricity and sewerage, and carry out other requirements to make sites viable.

The Autumn Statement announced £1.1 billion of additional funding to upgrade local transport, to improve congestion, growth and housing. Through devolution deals with major cities we are devolving decisions over public transport, and roads from Whitehall, enabling cities to take a joined up approach to planning infrastructure for public transport, housing and industrial growth.

Regional strategic transport bodies such as Transport for the North and Midlands Connect will help to ensure that transport projects are more closely linked with economic priorities, and so really benefit people across communities. We will support these regions to roll out smart ticketing across multiple transport types and are providing development funding for major upgrades to regional connectivity, including Northern Powerhouse Rail and the Midlands Rail Hub.

Data infrastructure

As well as physical and digital infrastructure, we need to make sure that we also have in place an effective data infrastructure. This means the right elements for an economy in which open data drives growth, efficiency and innovation.

This includes secure services that allow individuals and organisations to prove who they are online – for example, the GOV.UK VERIFY service, which gives people safer, simpler and faster access to government services like filing their tax or checking the information on their driving licence.





Upgrading infrastructure

Actions under way:

- **We are providing greater certainty and a clear long-term direction:** central government economic infrastructure investment will now rise by almost 60 per cent between 2016/17 (£14 billion) and 2020/21 (£22 billion).
- **We are creating a better institutional framework,** with longer-term budgets and the creation of the National Infrastructure Commission.
- **The Government will deliver projects more effectively:** We created the Infrastructure and Projects Authority in January 2016 to support the successful delivery of the Government's infrastructure priorities. Part of both the Cabinet Office and Treasury, it brings together the expertise of Infrastructure UK and the Major Projects Authority into a single organisation at the heart of government.
- **We are supporting private sector infrastructure provision** by providing the £40 billion UK Guarantees Scheme (UKGS) to help projects raise finance from the capital markets through Treasury-backed guarantees for infrastructure bonds and loans; and using private finance to deliver public assets through the Private Finance 2 model. The Autumn Statement 2016 included new announcements about both the UKGS and PF2: the government has extended the UKGS to at least 2026, and committed to explore construction-only guarantees; and has committed to explore a new pipeline of projects suitable for delivery through PF2, to be set out in early 2017.
- **We are improving local involvement in infrastructure policy:** The Government has agreed multiple mayoral devolution deals with cities and regions across England in recent years. These mayors will have control over a consolidated transport budget and 30-year investment funds, enabling strategic prioritisation of projects in a way that is properly informed by local need. Plans announced in the Autumn Statement 2016 will enable Mayoral Combined Authorities to borrow for investment, and the Government is consulting on introducing a new lower borrowing rate for local government infrastructure projects, helping local government finance and build infrastructure at a lower cost.
- **Regional strategic transport bodies such as Transport for the North and Midlands Connect** will help to ensure that transport projects are more closely linked with economic priorities, and so really benefit people across communities. We will support these regions to roll out smart ticketing across multiple transport types and are providing development funding for major upgrades to regional connectivity, including Northern Powerhouse Rail and the Midlands Rail Hub.
- **Accelerating the digital modernisation of railways.** The Autumn Statement allocated over £450 million to trial the deployment of digital signalling, which has the potential to increase capacity dramatically and improve reliability on existing rail routes. Over the next

10 years, public and private investment in digital rail signalling will aim to cement UK leadership in a global market which will be worth over £30 billion by 2020. To achieve this, we are developing a plan to introduce digital train control technologies on some of the UK's busiest rail links, building on previous experience, and working closely with industry to maximise the opportunity the digital modernisation of railways offers for jobs and growth and the UK's standing in a growing global market.

- **Improving flood defence and resilience.** The Government is committed to spending £2.5 billion by 2021 on improving flood defence and resilience, which will ensure 1,500 new flood defence schemes are built and over 300,000 more homes are better protected.
- **We are making the UK the safest place to do business online:** the Government's £1.9 billion National Cyber Security Strategy set out how we will work to assess the level of cyber security across our critical national infrastructure and have measures in place to intervene where necessary to drive improvements that are in the national interest.
- **The Infrastructure and Projects Authority will lead a new review to identify ways the Government, working with industry, can improve the quality, cost and performance of our infrastructure.** The review will report in summer 2017 and will build on the 2010-2014 Infrastructure Cost Review, which supported a 15 per cent reduction in the capital cost of projects.
- The Chief Secretary to the Treasury will chair a new **Infrastructure Delivery Ministerial Group** which will oversee the delivery of the Government's infrastructure commitments through tackling cross-cutting issues which are challenging the delivery of priority projects.

New commitments:

- **Using infrastructure to support rebalancing.** As we develop and plan future rounds of infrastructure investment we will take account of the balance of spending per head between different regions. We will continue to prioritise the highest value-for-money projects, as we seek to address productivity weaknesses across the country, and unlock the benefits of agglomeration economies.
- **We will support key roads investments, including:**
- **The M60 North West Quadrant,** the most congested road outside of London, which is holding back Greater Manchester and the north as a whole. Major upgrades to the M60 around Manchester will fix a bottleneck that holds back the growth of Manchester, and of the north as a whole.
- **The A66** is an essential link across the north. We will transform the A66 from the A1 to the M6, with the first new dual carriageway across the Pennines since 1971.
- **A303 Stonehenge route.** The A303 is an essential connection for the South West. A key part of the route runs past Stonehenge and we will be consulting on tunnel options that will cut congestion, improve journeys and enhance the iconic monument in its natural setting.

- **Oxford to Cambridge.** We have confirmed plans to go ahead with a new expressway from Oxford to Cambridge. This will help some of our fastest-growing towns and cities create more jobs, change the way people travel nationwide, and take traffic off of roads as far apart as London and Birmingham.
- **Lower Thames Crossing.** More than 47,000 people took part in the consultation on the Lower Thames Crossing earlier this year making it the largest ever public consultation for a UK road project. The Government will consider the findings and take a decision on the location, route and type of crossing in due course.
- **We will support other major infrastructure investments, including:**
- **Connected and autonomous vehicles.** We will cement the UK's position as a go-to destination for the development of this technology by establishing a new testing ecosystem, using both controlled and real world environments. We will announce the location of the coordinating hub for this project by spring 2017.
- **Local transport.** We have announced initial allocations to local areas for 2017/18 from the additional £1.1 billion of funding for local roads and transport.

Questions for consultation

As part of producing its National Infrastructure Assessment, the National Infrastructure Commission has issued a detailed call for evidence, seeking views from stakeholders on a range of questions about UK infrastructure policy. The National Infrastructure Commission's call for evidence is open until 10 February 2017. The questions below seek to complement this work.

15. Are there further actions we could take to support private investment in infrastructure?
16. How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?
17. What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?



Supporting businesses to start and grow



The opportunity

The United Kingdom is a success story on business start-ups, ranking 3rd according to OECD research. There were 350,000 new enterprises registered in 2014 and the UK now has a record 5.4 million small businesses⁷³. The UK is also one of the world's leading financial centres, and this should be a powerful advantage for British business.

To raise our productivity we need to marry our effective start-up culture with the right support and investment to facilitate the growth of businesses and social enterprises with the greatest potential. The Government can support businesses which want to expand by improving access to capital for growing businesses, through the creation of financial incentives, and by encouraging the creation of networks and institutions that help to connect firms to opportunities to get financing.

Access to bank loans for SMEs has recovered since the recession of 2008⁷⁴ – in part as a result of actions by the Government such as the establishment of the British Business Bank.

Equity finance is growing too⁷⁵. Tax reliefs such as the Enterprise Investment Scheme and Seed Enterprise Investment Scheme have also helped encourage the growth of venture capital investment in the UK, so that firms looking to expand can raise equity as well as debt. In 2015 there were a record number of venture investments, and total investment into venture-stage grew by 62 per cent compared to 2014 figures⁷⁶. An increasing number of start-ups

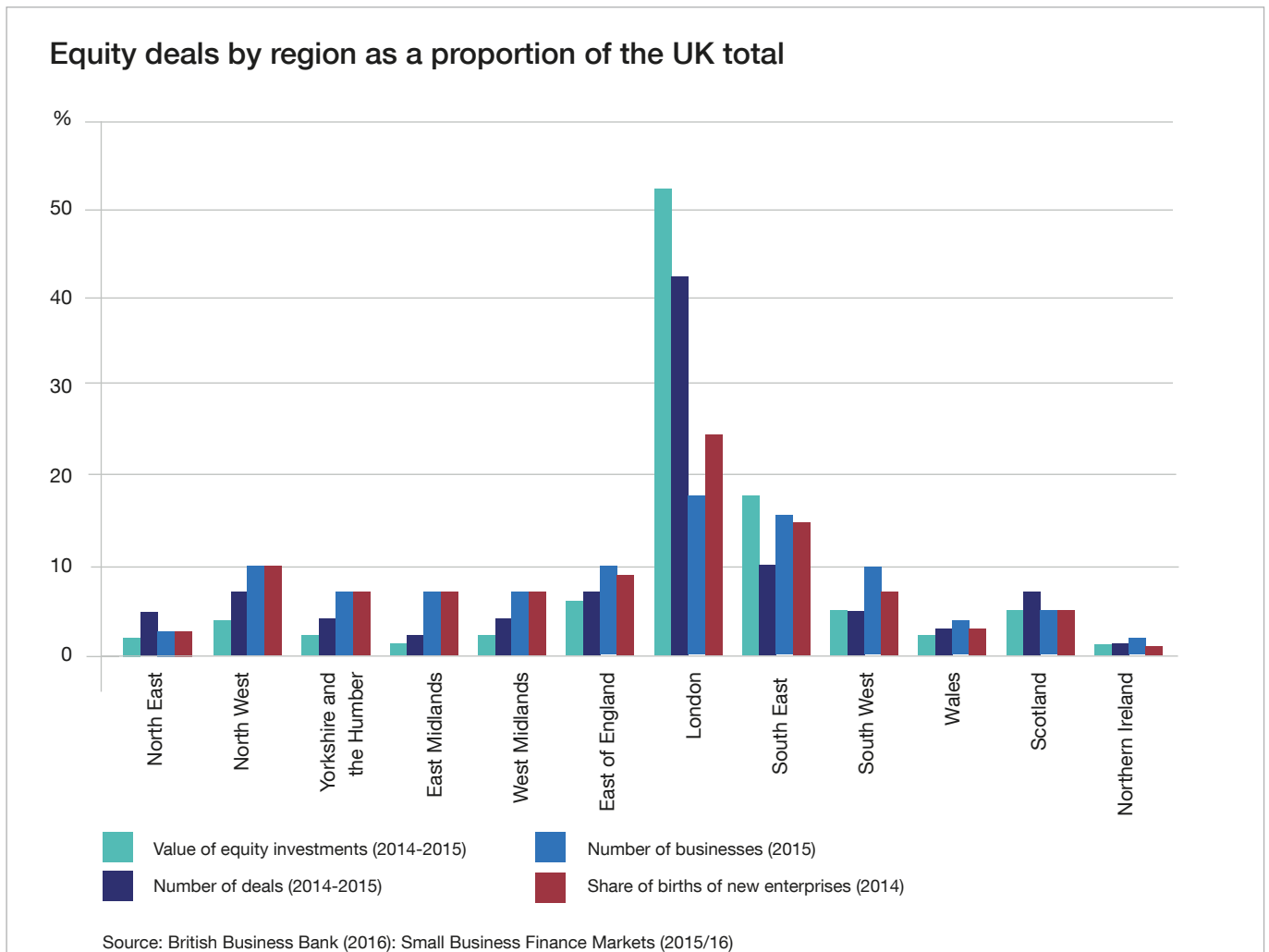
is a positive development, but it will also mean there will be more firms in need of later stage growth funding in the coming years.

Investment in businesses that are growing, and investment decisions by private companies, are fundamentally a role for the market. But the Government can play a catalytic role in establishing and deepening new capital markets. It needs to ensure that regulatory frameworks, tax and fiscal incentives support business investment rather than distort markets. To this end, we are committed to saving businesses £10 billion by improving regulation during this Parliament. We delivered £885 million of this in the first year and have published five of the first round of Cutting Red Tape reviews, engaging with different sectors across the economy, helping to further reduce bureaucratic and regulatory barriers to growth, innovation and productivity.

The challenge

Though the UK has an excellent record in creating businesses, many of them face barriers to scaling up – including a lack of finance to support growth, their inability to adopt digital processes, and limited access to skills, particularly the leadership and management skills required to scale up successfully.

Larger companies may also face incentives which do not support investment and the long-term decision-making required for growth.



Access to capital for growing firms, and barriers to scaling up

While we rank third among for start-ups, we rank only 13th for the number of businesses that scale up successfully, according to OECD research⁷⁷. One part of the challenge is about improving access to finance for businesses looking to grow.

Despite the UK’s position as a world leader in financial services, some observers say we have an under-supply of late-stage venture capital for innovative, expanding UK businesses compared to the United States. It is certainly the case that a lower proportion of UK start-ups grow into standalone businesses than in the US. This problem is further compounded by low awareness and take-up of alternative funding

options among SMEs, and a low appetite for equity investment⁷⁸.

There is also some evidence that the supply of equity finance varies between different parts of the UK and is concentrated in London and the South East⁷⁹. New types of funding, such as crowdfunding, appear to be highly concentrated in London and the South East, and are spreading only slowly to other areas.

Scaling up is not just a question of capital. It is also about having the leadership and management skills to make the right decisions for a business. Many UK companies have excellent leadership and management skills, but comparisons with overseas competitors show we lag behind. Organisations with better qualified management and a dedicated

programme of management development have been shown to perform more effectively, and have more sophisticated and higher quality products and market strategies⁸⁰.

We should also recognise that not all businesses will seek to scale up rapidly. Research by the Federation of Small Businesses⁸¹ shows that around half of small businesses are seeking to grow over the next year. Yet only around 10 per cent are seeking to grow their turnover by more than 20 per cent. The majority of those looking to grow are therefore aiming for moderate or steady growth rather than rapid expansion.

In this context, local economic growth strategies should focus not only on high-growth scale-ups, but also on those with more moderate ambitions. Enabling many small businesses to achieve their more moderate goals could have significant economic impact alongside supporting other firms to increase their rapid

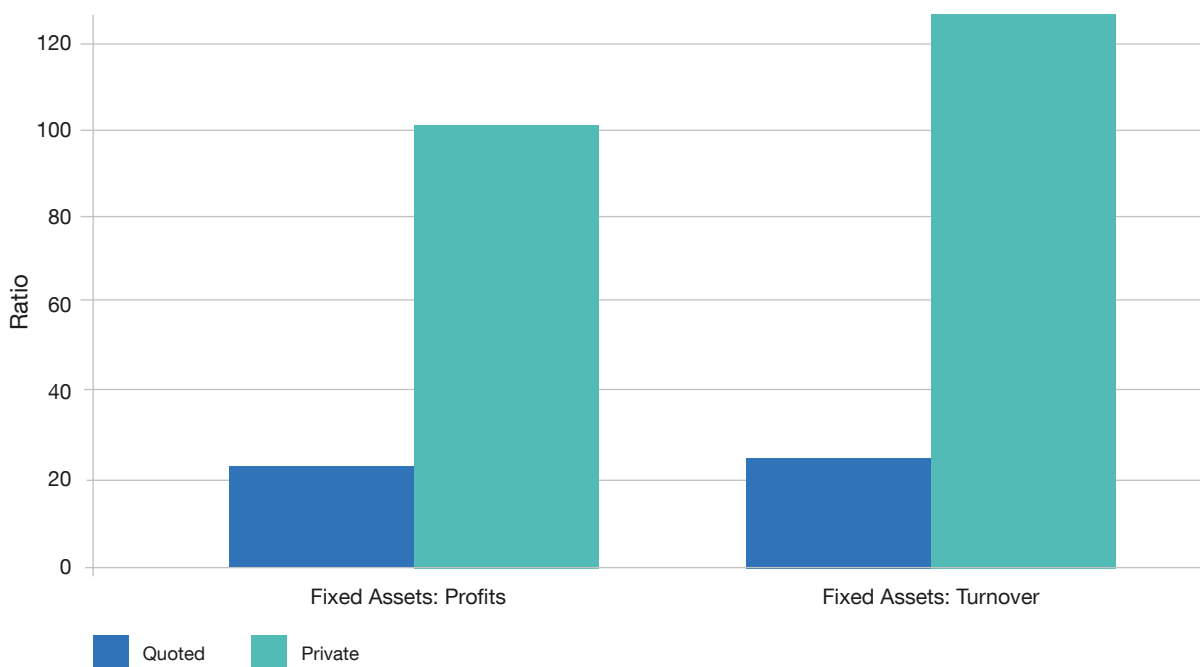
growth. The Government provides support for all businesses through a combination of the Business Support Helpline, GOV.UK and the Growth Hub network.

Long-term investment and incentives for publicly-listed companies

The UK has lower levels of fixed capital investment than competitors in other countries⁸². The UK has ranked in the lowest 25 per cent of all OECD countries for 48 of the last 55 years and in the lowest 10 per cent for 16 of the last 21 years. It has also invested on average two to three per cent of GDP less than France, Germany and the US.

In practice this has meant the UK has experienced lower investment in assets that drive productivity than other major industrialised countries. For example, the UK has lower take up of robotics and automation technology than competitors.

Stocks of fixed assets of UK private quoted firms, scaled by profits and turnover (2010)



Source: Davies, Haldane, Nielsen, Pezzini (2014): Measuring the costs of short-termism

These differences in investment rates can be partly but not wholly explained by differences in the makeup of the UK economy.

Another factor is the incentives large companies in the UK receive. Some commentators have argued that quoted companies and their investors find it more difficult to invest in assets that pay back over the longer term⁸³. For example, one study found quoted firms in the UK invest far less in fixed assets than similarly sized private firms⁸⁴.

There is some evidence that incentives in fund management may undermine long-term decision-making as funds are often expected to deliver short-term returns against an industry benchmark. More than two-thirds of respondents to a 2013 survey of European investors by the Chartered Financial Analyst Institute cited short period evaluation cycles by asset owners as an impediment to long-term investing. Fund managers sometimes believe that short term underperformance will result in the termination of their mandates, even when this is not intended by the asset owner⁸⁵.

Our approach

We are committed to driving business growth and productivity by:

- improving access to finance for businesses looking to grow;
- backing institutions that can catalyse private sector equity investment – particularly in places where this may be more of a problem;
- improving other support for scale-ups and entrepreneurs by building up networks, supporting the business-led Productivity Council, and using government data in a smarter way;
- ensuring the uptake of new technology and digital processes which support growth;
- considering whether any measures need to be taken to promote a more long-term approach to funding.



Accessing the finance to grow

To understand better where there are barriers to the growth of long-term investment, the Government has launched a new Patient Capital Review, led by the Treasury. The review will be supported by a panel of leading investors and entrepreneurs, chaired by Sir Damon Buffini.

It will:

- consider the **availability** of long-term finance for growing innovative firms looking to scale up;
- identify the **root causes** limiting the availability of long-term finance for growing innovative firms, including any barriers that investors may face in providing long-term finance;
- review **international best practices** to inform recommendations for the UK market;
- consider the role of **market practice and market norms** in facilitating investment in long-term finance; and
- assess what **changes in government policy**, if any, are needed to support the expansion of long-term capital to support growing innovative firms.

The review will publish a consultation document in the Spring and make its final recommendations ahead of the Autumn Budget 2017.

Backing institutions which can catalyse private sector equity investment

The Government has also taken steps to support the availability of finance in different parts of the country – such as the creation of the British Business Bank (BBB), which is improving access to capital across the country.

Alongside the Patient Capital Review we are increasing investment in venture capital by the BBB by £400 million – to unlock £1 billion of new finance. This will act as a catalyst for the creation of larger funds to support follow-on investments in promising scale-up companies across the UK. The British Business Bank will invest in funds alongside private investors, helping more late-stage venture capital funds to be created.

We are in the process of creating the Northern Powerhouse Investment Fund and Midlands Engine Investment Fund, which add to and aggregate up existing local investment funds, enabling economies of scale and better management.

The Business Growth Fund (BGF) – set up by UK-based banks Barclays, HSBC, Lloyds, RBS and Standard Chartered, and supported by the Government – is another example of the creation of an institution to catalyse private investment. Through its nine regional offices the BGF has successfully invested more than £1 billion into more than 160 growing SMEs since it was founded in 2011, with nearly three-quarters of this funding invested in businesses outside London and the South East. Government will support the continued expansion of the BGF.

Surveys show that new businesses may not be aware of what is available in their area or familiar with how to access it⁸⁶. New models of funding such as crowdfunding are also concentrated in London and the South East. Funding networks have also been weaker outside this area, and we will work with the ScaleUp Institute, the British Business Bank, the BGF and other partners to examine how we might improve business networks and so improve access to capital in the rest of the UK.



Improving support for scale-ups and entrepreneurs

To help improve management and leadership skills to boost productivity, the Government proposes to work in partnership with Local Enterprise Partnerships (LEPs), Growth Hubs and the private sector to enable the timely delivery of scale-up plans across the country. To achieve this we will take the following actions:

- Recognising the particular challenges faced by businesses scaling up rapidly, the Minister for Small Business will take the role of ‘Scale-up Champion’, working to support high growth scale-up companies across the UK.
- Businesses that are growing fast have unique challenges and can benefit from connections between others in analogous positions. The Government will work with the ScaleUp Institute and other partners, including LEPs and Growth Hubs and their network of strategic partners, including universities, business schools, business bodies, associations, and the private sector to build peer-to-peer business networks specifically for fast-growing firms.
- We will use data that only government has – such as VAT returns – to help identify fast-growing firms at an early stage. This will enable the efficient offer of advice and support to catalyse business growth and support scale-up businesses in cooperation with the Behavioural Insights Team and the ScaleUp Institute.
- A review into entrepreneurship will be led by the Chief Entrepreneurial Adviser at the Department for Business, Energy and Industrial Strategy, entrepreneur Professor Tim Dafforn. This is a newly-created role. The review will assess the support currently available to entrepreneurs and consider international best practice, with the aim of identifying any potential gaps in current policy. It will examine the entire entrepreneurial journey, focusing on the motivations and opportunities for those embarking on business ventures, from education to business development and growth.
- The entrepreneurship review will also examine how to ensure best practice across business schools can reach the widest audience. To-date, Lord Young’s recommendations to increase the impact of business schools in supporting small companies have been implemented. In particular, setting up the Small Business Charter has resulted in 33 business schools being awarded Charter status. The Chartered Association of Business Schools

has helped 4,700 students to find work placements in Britain's micro-businesses and start-up sector. These business schools have also directly helped over 8,000 small businesses and more than 800 new businesses have already been started as a result of the Small Business Charter schools.

Sharing excellence through peer-to-peer networks

We have announced £13 million of funding support for the business-led Productivity Council in the Autumn Statement, to support stronger business-to-business engagement to improve productivity, including through the appropriate use of digital technologies. This initiative, chaired by Sir Charlie Mayfield, will provide strong and sustained leadership to raise productivity across the business community, offering management training and business-to-business coaching through its specialised productivity academies across the country.

The work of the Council will offer support in understanding the levers to improve productivity at company level, including practical advice for individual businesses. It will help develop a long-term movement to engage businesses seeking to improve their productivity.

Corporate performance and investment

The Government has published a Corporate Governance Green Paper, which includes options for strengthening the link between executive pay and long-term company performance, and encouraging greater shareholder engagement with corporate decision-making.

Some argue that changes need to be made to the UK's listings regime to further support high growth and innovative businesses. One change which has been suggested is to make it easier

for companies to list with dual class share structures on the UK's listed markets. While these structures are allowed under a Standard Listing, they are not permitted in the Premium Listing regime⁸⁷. Proponents believe that the dual class share structure of companies such as Google, Facebook and LinkedIn, which give their founders enhanced voting rights, have contributed to their success. They argue that these structures allow firms to retain a long-term perspective by insulating founders from short-term market pressures, such as the need to meet quarterly earnings targets.

However, many institutional investors and shareholder representative groups have opposed dual class shares, arguing that they would weaken the UK's high standards of corporate governance and disadvantage minority shareholders.

The Financial Conduct Authority has announced in its 2016/17 Business Plan that it will be reviewing the structure of the UK's listed markets, and it plans to release a discussion and consultation paper in the first quarter of this year. This review will discuss whether changes to the listing regime are desirable to enable it to continue to provide appropriate access to capital for issuers, while maintaining the UK's high standards for investor protection. With the increasing internationalisation of capital markets, this discussion will include a consideration of whether the broader listing regime might accommodate more effectively significant foreign listings that may have different corporate governance structures without affecting the UK's high standards of market integrity and investor protection. The review will also seek to explore how the UK's primary markets can further support the provision of patient capital to the science and technology businesses that are crucial to the long-term success of the UK.



Supporting businesses to start and grow

Actions under way:

- We have established **the Patient Capital Review** which will assess how the Government can help growing innovative firms obtain the long-term ‘patient’ finance that they need to scale up.
- We have invested **an additional £400million in the British Business Bank** to catalyse later stage venture capital investments by the private sector.
- We have committed to provide **£13 million of funding for the Productivity Council, over three years**. The Council will provide strong, sustained leadership and business-to-business advice to raise productivity across the business community.
- The Government has published a **Corporate Governance Green Paper**, which includes options for strengthening the link between executive pay and long term company performance, and encouraging greater investment by firms.

New commitments:

- We will work with the British Business Bank to **build understanding of the obstacles to firms accessing capital outside London and the South East**, and the supply and demand-side causes of lower rates of equity deals.
- **The Minister for Small Business will take on a new role of Scale-Up Champion**, overseeing a task force to support high growth scale-up businesses across the UK and to build peer-to-peer business networks to improve productivity, working with Local Enterprise Partnerships, Growth Hubs, the ScaleUp Institute and other partners.
- We will explore **how data – such as that held by HMRC and Companies House – can be used to identify scale-up businesses** and be made available to enable local public and private sector organisations to better identify, target and evaluate their support to scale-up businesses more effectively.
- We will continue to **build on the success of the British Business Bank, and will work with the Business Growth Fund (BGF) and other private partners** to raise awareness of equity funding, diversify funding streams and increase the supply of finance for growing businesses.

- We will explore how we can **support the development of B2B ratings and feedback platforms** to make it easier for SMEs to determine the quality of business advice and support services provided to them by other firms.
- A **review into entrepreneurship** will be led by the Chief Entrepreneurial Adviser at the Department for Business, Energy and Industrial Strategy. The review will assess the support currently available to entrepreneurs and consider international best practice with the aim of identifying any potential gaps in current policy.

Questions for consultation

18. What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can they be addressed?
19. What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?
20. Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?
21. How can we drive the adoption of new funding opportunities like crowdfunding across the country?
22. What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are the outstanding examples of business networks for fast growing firms which we could learn from or spread?



Improving procurement



The opportunity

The public sector spends approximately £268 billion per year, equivalent to 14 per cent of GDP. Taking a strategic approach to government procurement presents the opportunity to support investment in innovation and skills; strengthen UK supply chains; and increase competition – in particular by creating more opportunities for SMEs.

This means creating the right conditions to put UK supply chains in the strongest possible position to compete for contracts on the basis of best value for the taxpayer. The public sector can use its demand – particularly when its needs are novel or complex – to drive innovation from industry, stimulating and accelerating the development of new and transformational products and services. We have committed to raise SMEs’ share of central procurement to one-third and to ensure all major government suppliers sign up to the Prompt Payment Code, promising to pay suppliers, including small businesses, promptly and fairly.

Other countries, such as the United States, have engaged with procurement in this way to help drive innovation in both the public and private sectors, through programmes like the Small Business Innovation Research programme⁸⁸. The US Small Business Administration has helped ensure that new businesses and SMEs are able to compete for government work. These policies have helped nurture small businesses and grow new innovative businesses in the US.

The challenge

Procurement policy is currently heavily shaped by European Union law, with many procurements required to go through the EU’s standardised process (OJEU) if they are above certain size thresholds.

There are also domestic barriers which can hold back procurement of innovative products and services in the public sector.

Historically central government has had limited visibility of the supply chains of the key companies it contracts with, so it has lacked a full view of the impact of its procurement decisions on UK supply chains. We are taking action to improve this, but there is more to do.

Our approach

To address this challenge, we will focus on the following areas:

- stimulating innovation through government procurement;
- supporting economic growth through better procurement practices through a “balanced scorecard” approach;
- procurement in key industries like health and defence where Government’s role as customer provides unique opportunities to achieve wider benefits through procurement; and
- transforming digital procurement.

1. Stimulating innovation through procurement

The Small Business Research Initiative (SBRI) is an existing programme which has enjoyed some limited success⁸⁹ in addressing the barriers to innovative public procurement. It provides competition-based opportunities for companies to develop innovative products for the public sector. Companies retain the intellectual property rights of products developed and can commercialise them more widely.

However, the US equivalent of this programme, which inspired the creation of the SBRI, has supported a wider range of innovations that have gone on to be commercialised, and has aided the growth of major US technology corporations such as Symantec and Qualcomm by providing funding at an early stage of their development.

David Connell is currently leading a review to consider how to improve the UK SBRI in light of the US scheme, considering how we can increase its impact and give more innovators their first break.

One option may be to extend the scheme to new parts of the public sector. In Wales, local government dedicated innovation budgets have been used to deliver specific outcomes.

The Government will publish new guidance for public buyers on how to drive innovation including:

- effective pre-procurement market engagement to ensure there are optimal opportunities for dialogue with potential innovative suppliers on how best to deliver government's requirements or address a policy challenge;

- designing procurement in a way that stimulates innovation through outcome based specifications – allowing for the broadest range of ideas to be proposed and optimises the scope for innovative or alternative solutions;
- including regular “innovation review points” within contracts so that contractors are continually incentivised, through a benefits-sharing mechanism, and the use of contract extensions for positive innovation results, to identify innovative solutions to add value or make cost savings; and
- ensuring intellectual property is held by the party best placed to exploit it (which may often be the supplier).

2. Supporting economic growth through better procurement – the balanced scorecard

The Government is building on good practice adopted in major infrastructure programmes such as Crossrail by encouraging those buying goods and services to take account of social and economic factors when designing their procurements. This should help UK-based suppliers compete effectively for government contracts throughout the supply chain, encourage innovative solutions, and maximise the positive impact of public procurement on strengthening the economy.



We are going further by ensuring that all major government procurement projects are structured in a way that supports productivity improvements, so that UK-based suppliers are in the best position to compete for contracts throughout the supply chain. To do this, we are extending the “balanced scorecard” approach recently developed by the Cabinet Office across all major construction, infrastructure and capital investment projects over £10 million, including those in the National Infrastructure and Construction Pipeline, which was published in December 2016. We will introduce a reporting mechanism to provide assurance that the scorecard approach is being adopted effectively, and to hold departments to account. We will also ensure there is a lead Minister in each department responsible for driving the growth agenda.

The Government has already committed to a challenging target to ensure a third of its total procurement spend is with small businesses by 2020 (directly and indirectly through supply chains). All departments now have small business plans, including reporting

commitments through their Single Departmental Plans. A Small Business Crown Representative has been appointed to help more small businesses supply to government. And we have established a new Small Business Panel to work with senior procurement officials to identify and tackle the remaining barriers to SMEs.

To support this, we will continue to take action to cut out unnecessary bureaucracy in central government’s procurement process. For example, the Government’s central purchasing body, the Crown Commercial Service, is simplifying its tender documents, contractual terms and conditions, and removing the requirement for suppliers to submit the same information every time they apply for a tender. Initiatives like Defra’s 2014 Plan for Public Procurement of Food and Catering Services are opening up the market to more SMEs and local producers.

The Government has also acted to assist small business in public sector contracting by:

- banning burdensome pre-qualification questionnaires in lower value contracts and introducing a standardised approach in higher value procurements;
- creating greater transparency by ensuring that public sector contracts are advertised on the Contracts Finder website; and
- ensuring payment of undisputed invoices in no more than 30 days.

We will also trial the gathering of supplier and product feedback in public sector procurement. This ratings and feedback information would be available to purchasers and users across the public sector, helping them to make better procurement decisions. There is evidence from consumer markets that such mechanisms encourage greater consideration of less well known businesses and SMEs.

3. Procurement in key industries

In a number of sectors, such as health and defence, the Government is often the main customer, as well as the regulator. This presents a unique opportunity for it to drive improved outcomes, particularly around innovation and technology adoption.

Defence

The 2015 Strategic Defence and Security Review introduced a new National Security Objective of “promoting our prosperity”. It also committed the Ministry of Defence (MoD) to: refresh the Defence Industrial Policy; publish a new National Ship Building Strategy; support innovation; take action to enable SMEs and non-traditional suppliers to bid for defence and security contracts more easily; enhance support for exports and train at least 50,000 apprentices in Defence by 2020. We are making progress on all these commitments.

- **Defence Industrial Policy Refresh:** We are currently consulting with industry and will publish this strategy shortly. It will aim to improve the support to growth and competitiveness within the UK industrial base as well as help SME and non-traditional suppliers to bid for defence and security contracts more easily.
- **National Ship Building Strategy:** Sir John Parker has delivered his independent report to the Government. This will inform the UK National Shipbuilding Strategy, which will be published in Spring 2017. The report makes a number of recommendations including a procurement model for the General Purpose Light Frigate where individual ‘blocks’ of ships are manufactured in a number of shipyards around the UK, before assembly in a single yard; and building exportability into Royal Navy ship design.
- **Innovation:** the Defence Secretary launched the Defence Innovation Initiative in September, including the creation of an £800 million, 10 year innovative procurement fund. A new Innovation and Research InSight (IRIS) Unit is being established to look at the implications of emerging technology and innovation to Defence and Homeland Security, and will inform the future MoD Science and Technology programme. A Defence and Security Accelerator is also being set up to match defence and security customers with potential suppliers through marketplaces, bringing together a broad network of research institutions, innovation centres, SMEs, industry partners and allies. It will launch the first call for bids shortly.

- Exports: supporting major export campaigns is now a core task of the MoD and it is leading across Whitehall on strategic export campaigns where the defence relationship is critical, supporting the Department for International Trade on others, and ensuring exportability is considered when taking decisions on future equipment. Through the Defence Growth Partnership – which has seen the creation of a Defence Solutions Centre to encourage collaborative responses to export opportunities at the pre-competitive phase – the MoD is working jointly with industry to develop an exportability training programme, and we will make further announcements on this shortly.
- Apprenticeships and skills: The MoD remains confident of training 50,000 apprenticeships by 2020. The programme has a particular focus on STEM subjects (science, technology, engineering and maths), as well as entrepreneurial skills. A team has been established in MoD to develop a joint apprenticeship scheme with the Department for Business, Energy and Industrial Strategy (BEIS) by April 2017. The Government is also working with industry on a new approach to nuclear skills, with a view to taking a holistic approach to the needs of the Government and industry.
- the creation by NHS England of a strategic commercial unit that works with industry to explore commercial models that help innovators benefit from earlier market access and deliver a better value proposition for the NHS;
- greater capacity and capability within Academic Health Science Networks and major research-led tertiary trusts to support local health economies with adoption of new technologies, and;
- proposals for the NHS to strengthen its capability to take up digital technologies.

The NHS is one of the biggest publicly-funded healthcare systems in the world. It spends approximately £22 billion a year on goods and services, of which £6 billion is on procurement of goods. At present, around 40 per cent of this latter spend is through the central NHS Supply Chain contract. Our current procurement reform programme is seeking to increase this proportion significantly through a new Supply Chain contract (to be introduced in 2018). This will allow the NHS to:

Health

In health, the Accelerated Access Review was published in October 2016 and has recommended a number of proposals to speed the uptake of innovative new diagnostic tools, treatments, and medical technologies by the NHS. These include:

- an ‘Accelerated Access Partnership’ between key organisations to prioritise and streamline the pathway for key innovations;
- be better aware of the market, improving value by taking advantage of long-term volume deals and horizon scanning for innovative products that the NHS should adopt rapidly;
- improve the management of our supplier relationships, creating mutually beneficial objectives for suppliers with a substantial stake in both the UK economy and NHS;
- ensure that there is a strong, UK-based medical supply chain; and
- create an organisation with potential to be a world player in health procurement and logistics.

The Government can also use its purchasing power to bulk buy innovative products, which in turn can improve patient care and deliver savings. Purchasing at scale can secure price discounts and other commercial terms, such as royalties on overseas sales. This will allow patients to get the benefits of innovation more quickly, as well as providing a route to market for early stage companies.

4. Transforming Digital Procurement

Historically, the Government's spending on IT was higher than that of many other governments, but far less efficient. We procured through long-term, exclusive contracts with a limited number of large suppliers. This led to IT projects that were lengthy, expensive, risky and complex.

To address this, we changed how the Government procures goods and services. Through the GCloud – an agreement between the Government and suppliers who provide cloud-based services – we removed the

restrictive practices around bidding for frameworks and contracts. We transformed the procurement process to make contracts easy to read, tenders easy to understand, language clear and explicit. New frameworks helped us to avoid vendor lock-in.

The GCloud enabled companies to join a framework – a preferred supplier list – based on capability, not size. This meant a level playing field for SMEs to compete through fair and open competition.

Over 3,300 suppliers have registered to offer services to the public sector since the Digital Marketplace launched in November 2014. SMEs now make up 91 per cent of all suppliers on the Digital Marketplace.

The Digital Marketplace has so far supported UK public sector organisations to spend over £1.7 billion with digital and technology suppliers. 56 per cent (almost £1 billion) has been with small and medium-sized enterprises.



Improving procurement

Actions under way:

- **The Government has committed to a challenging target to ensure a third of its total procurement spend is with small businesses by 2020** (directly and indirectly through supply chains). All departments now have small business plans.
- **A review led by David Connell is examining how to improve the Small Business Research Initiative (SBRI)** which harnesses innovative ideas and solutions from SMEs to address public policy challenges.
- We have created a £800m **Defence Innovation Fund** and reforms to enable SMEs and non-traditional suppliers to bid for defence and security contracts more easily, as part of the defence industrial strategy.
- We are responding to the **Accelerated Access Review**, which will accelerate the uptake of innovative new treatments in the NHS.

New commitments:

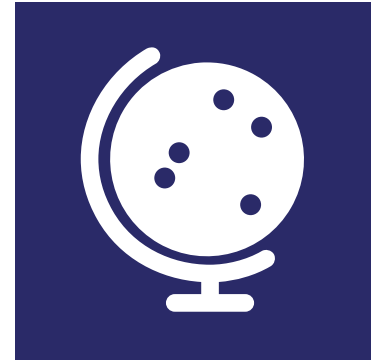
- We will roll out the “**balanced scorecard**” approach recently developed by the Cabinet Office across all major central government construction, infrastructure and capital investment procurement projects over £10 million, including those in the National Infrastructure and Construction Pipeline, which was published in December 2016.
- We will trial different aspects of designing and gathering **supplier feedback** in public sector procurement.

Questions for consultation

23. Are there further steps that the Government can take to support innovation through public procurement?
24. What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government’s purchasing power to drive economic growth?



Encouraging trade and inward investment



The opportunity

The Government is committed to building a truly global Britain; a great, global trading nation that reaches out to old friends and new allies alike. The Government, as one of the firmest advocates for free trade anywhere in the world, can play an important role in supporting trade and inward investment. Trade policy determines market access for importers, exporters and investors. The Government can support exporters by underwriting major deals with export credits which the market would not provide. Its policies can make the UK a more or less attractive place to invest, and Government departments working with local areas can play an active role in attracting inward investment projects to the UK.

A key rationale for government action to encourage trade and investment is that it both drives growth by increasing competition, and brings new ideas and ways of doing things to the UK. For example, Nissan's inward investment in Sunderland in the 1980s did not only create good jobs in the city – it also brought new automated production techniques to the UK from which other companies learned, increasing competition in the industry. Economists describe these effects as productivity 'spill overs' – businesses best equipped to compete in a global marketplace possess particular organisational skills that can diffuse to other companies in the economy.

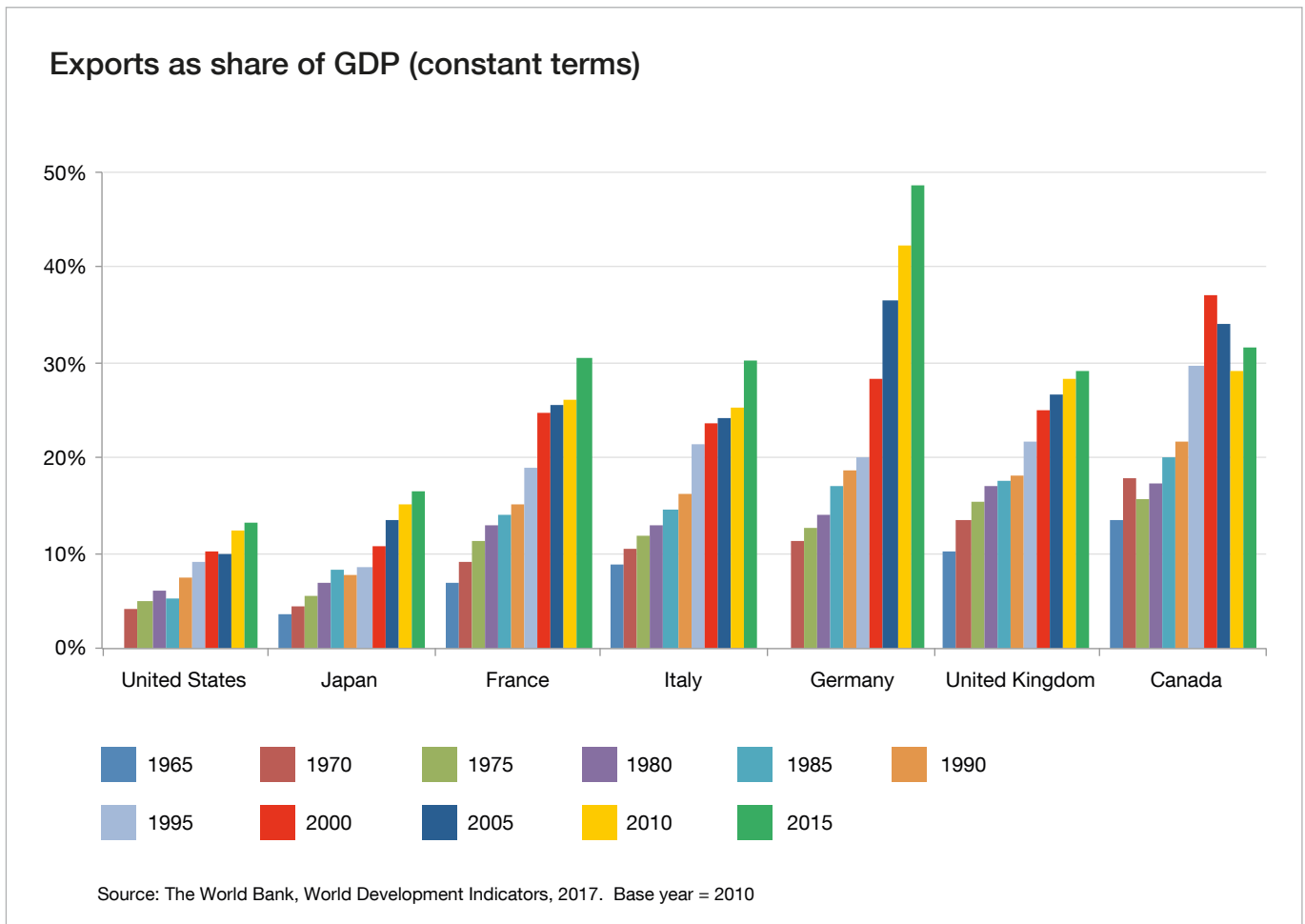
Likewise, we know that businesses which export show stronger employment growth and have higher wages than non-exporters.

This stronger employment performance is underpinned by their higher productivity and stronger business growth⁹⁰. Diversification across export markets also helps to increase business resilience and enable stronger growth to be achieved during periods in which economic conditions in the UK are challenging⁹¹.

The UK starts from a strong position, as the leading location for Foreign Direct Investment (FDI) in Europe. FDI created around 80,000 jobs in 2015/16 alone. Inward investment also supports exports; over half of all foreign-owned companies in the UK are exporters⁹² – a much higher proportion than domestically owned businesses.

Integral to supporting investment and exports – and the UK's industrial success – is ensuring that global trade remains free and open and resisting calls for protectionism. Free trade allows businesses to specialise in the production of goods and services where they are most efficient, allowing UK businesses to globally access cheap and quality raw materials and other inputs they need, and access markets to sell their products overseas.

The creation of the Department for International Trade underlines the Government's commitment to free trade. It is also an opportunity to take a new and more joined up approach to promoting trade and investment, as it provides a strong focus on bringing different services such as export finance and trade and investment promotion together.



The challenge

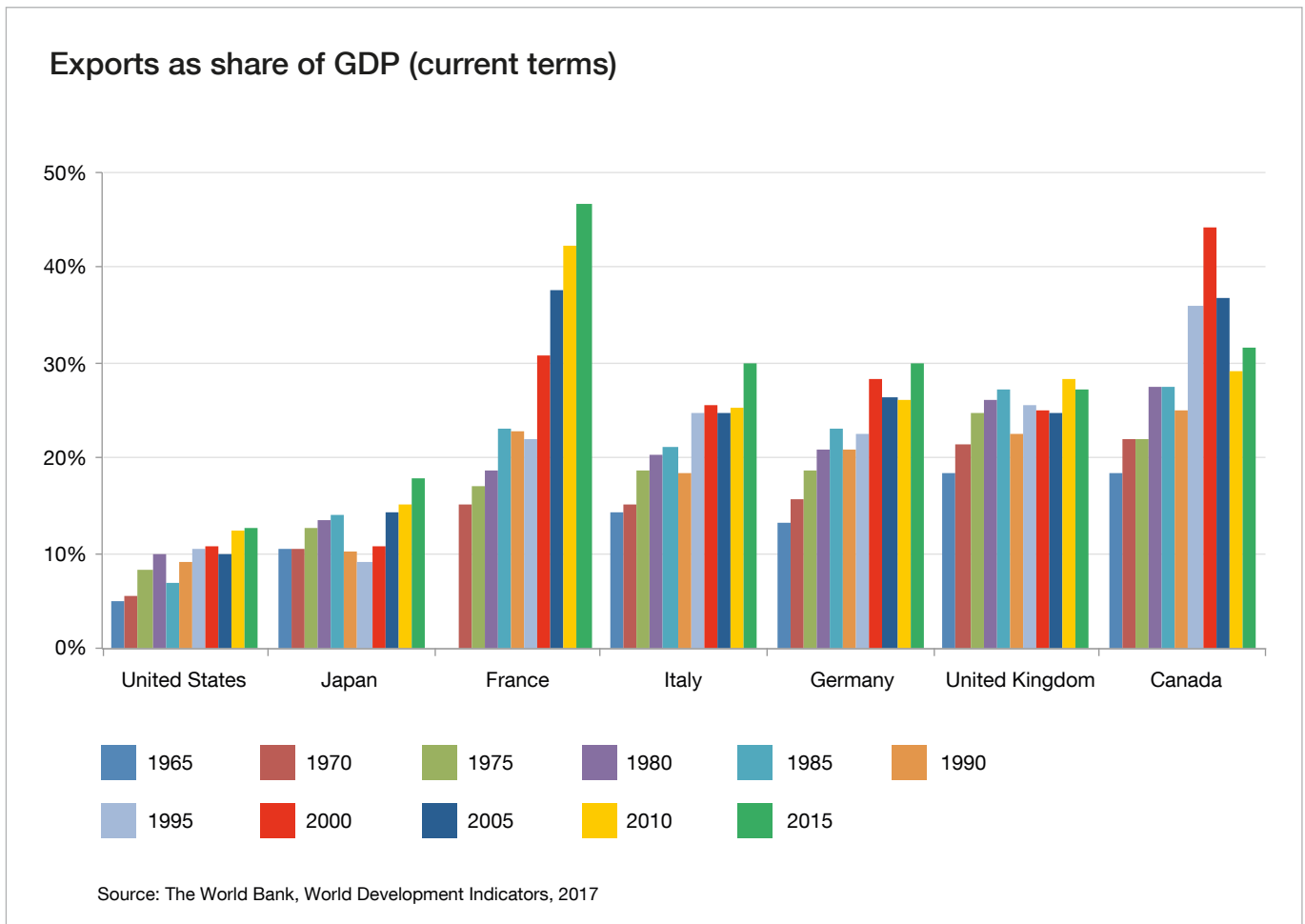
Currently there are too few UK businesses that take advantage of the opportunities presented by overseas markets, with less than 11 per cent of businesses exporting⁹³.

Comparisons with other countries are not straightforward, as the size of different economies, and factors such as whether they have land borders influence trade as a share of GDP. But compared to some other G7 members, UK exports as a share of GDP have grown more slowly in recent decades. Growth has been particularly slow compared to strong performers like Germany. Since 1970, in constant terms, exports as a share of GDP have doubled in the UK, but trebled in France and the United States, and grown four-fold in Germany.

Exporting companies contribute 60 per cent of the UK’s productivity growth⁹⁴, so increasing trade and the number of businesses exporting is going to play a key part in achieving our ambitions to grow the economy. At the same time, we need to take action to retain and enhance the UK’s attractiveness to overseas investors in an increasingly competitive world.

Our approach

The Prime Minister has set out a commitment to “make Britain a global leader in free trade”. The Government will pursue, as a priority, a bold and ambitious Free Trade Agreement with the European Union. But, important though our trade with the European Union is and will remain, we are clear that our departure from the European Union is not the country stepping



back from the world, but an example of how a free, flexible, ambitious country can step up to a new global role in which the UK can trade freely with others.

The Department for International Trade is leading the Government’s work to champion free trade and ensure it helps deliver an economy that works for everyone. The Department leads a whole-of-Government effort to:

- promote and support UK exports of goods and services, including through export finance and insurance;
- maximise opportunities for wealth creation through supporting Foreign Direct Investment and Outward Direct Investment;

- deliver the best international trading framework for the UK to maximise trade and investment opportunities; and
- build the global appetite for British goods and services and encouraging more people to visit, study, invest in and do business with the UK through the GREAT campaign.

In practice this approach means:

Building future trading relationships. We are encouraged that countries such as Canada, China, India, Mexico, Singapore and South Korea have already said they want to discuss our future trading relationships. We have established a series of working groups with key trade partners: for example with India to build the closest possible commercial and economic relationship; with Australia to focus



on scoping out the parameters of a potential future ambitious free trade agreement once the UK leaves the EU; with the Gulf Cooperation Council to examine how we can unblock remaining barriers to trade and take steps to further liberalise our economies for the benefit of our mutual prosperity; and with South Korea to discuss tackling barriers to trade and investment and wider global trade issues. The UK remains committed to pursuing free trade. That includes seeking to achieve continuity in our trade and investment relationships with third countries thereby minimising disruption for business as we leave the EU.

Building Global Prosperity. Through the Government's Prosperity Fund, the Department for International Trade is working closely with the Department for International Development to boost inclusive growth and unlock opportunities

for increased trade and investment with the UK in markets of economic promise. Together we have established a Cross-Government Working Group to guide Government strategy on 'horizon markets' such as Nigeria, Pakistan and Kenya.

Improving market access for exporters.

The Government is working hard to support businesses through discussions on market access issues with third countries, with some tangible wins for exporters⁹⁵.

Creating a more active approach to winning overseas contracts.

The Government has been trialling a 'Team UK' approach to winning major overseas contracts. For example, the Government is establishing a new Infrastructure Exports Leadership Forum (IELF). The Forum will allow the Government and industry to work together to undertake pre-competitive

engagement in new markets, develop a clear demonstration of the UK offer and help target where we concentrate resource. There is also the opportunity to lead bids with a pool of finance backed by UK Export Finance, increasing the appeal of a UK solution. There is also the opportunity to lead bids with a pool of finance backed by UK Export Finance, increasing the appeal of a UK solution.

The Department for International Trade will start work with industry to design the Forum and ensure we achieve the right approach and strongest members, with the first Forum being convened early in 2017.

Increasing defence exports. The Department for International Trade Defence and Security Organisation (DSO) is working with industry on a similar approach, where consortia of UK Defence companies produce a single UK bid for overseas government customers. The UK

Government is then able to provide coherent support to a single UK bid, increasing the probability of success. Sir John Parker's report recommends that future government defence procurement is designed with an eye to future export opportunities, by ensuring ships we procure for the UK are of a type with export potential.

Doubling export finance capacity. The Autumn Statement doubled UK Export Finance (UKEF) capacity to support exports globally, by doubling its Risk Appetite Limit from £2.5 billion to £5 billion. Enabling support to grow toward the £50 billion total portfolio limit. In addition, the maximum permitted exposure limits for individual export markets has doubled to £5 billion, to ensure that UKEF has sufficient appetite to support exports even in high demand markets. As part of this increased reach, the number of countries eligible for guaranteed local currency financing has also



quadrupled, to include many fast-growing priority export destinations. This will be attractive to overseas buyers, who can borrow in their own currency and so protect themselves from foreign exchange risk. This flexibility will give UK exporters a clear competitive advantage, as their customers will know that when they buy British they can pay local.

Making government trade services easier to use for firms. The Department for International Trade recently launched great.gov.uk – a ground-breaking new digital platform to provide integrated access for exporters and investors to the full range of its services. The website matches supply and demand, puts power in the hands of businesses to start exporting or attract investors, and makes doing business abroad as attractive as it is to do business at home. Once registered, companies can promote their goods and

services to international buyers, search hundreds of export opportunities and access preferential deals that we have negotiated with online marketplaces. Our aim is for the site to be the first place businesses think of when they consider business abroad, acting as an aggregator for the complex exporting market but also signposting to other sources of advice.

Joining up trade and inward investment promotion with local areas. We are improving the connection between different places in our trade and investment promotion services, with teams dedicated to the Northern Powerhouse, the Midlands Engine, Greater London and southern England working closely with local leaders – including combined authority mayors once elected, Local Enterprise Partnerships and other devolution partners – to support small firms across the country to export, and promote local strengths to overseas



investors. The Government is running a programme of 40 Northern Powerhouse trade missions up to 2020, with 10 scheduled this year (2016/17). For the Midlands Engine the Government will also run 20 trade missions by 2020. The first was to the US and Canada in September, followed by a mission of 38 midlands companies to Shanghai, leading to a series of partnership agreements and commercial investments. We have helped construct “pitchbooks” of major projects in the north and the midlands, and also radically improved the relationship between Department for International Trade and local areas to ensure the Department responds to local priorities and opportunities. This builds on the creation of the Regeneration Investment Organisation (now the The Department for International Trade Capital Investment Organisation) in 2013, which is improving the marketing of local regeneration projects to international investors.

Strengthening the value from trade shows.

The Department for International Trade will explore how we can maximise the opportunities that a UK presence at existing international trade fairs offers for businesses throughout the country. We will also explore where there are sectors which could benefit from support to create trade fairs, in particular, in emerging sectors such as the innovative technology industries.

Developing a new, more strategic approach to inward investment. We want to focus efforts on strategic inward investment that most contributes to wealth creation for the UK. We will review how we attract inward investment and how we evaluate the impact of successful inward investments. This will, for instance, look at whether there should be a greater emphasis on the effect of investment projects on growth. Project for project not all inward investments have the same impact on growth. Some areas of the UK, such as London, have pioneered a more growth-driven approach to measuring success; we may be able to learn from this. The Department for International Trade is also reviewing what we can learn from the work of inward investment promotion agencies across the globe, including from their strategic or sectoral focus, the way they measure their impact, and the tools they use to attract inward investors.



Encouraging trade and investment

Actions under way:

- **Doubling export finance capacity.** In the Autumn Statement we announced that we will improve the competitive edge of UK exporters by doubling the capacity UK Export Finance is able to provide and increasing fourfold the number of foreign currencies that it supports.
- **We are making it easier for firms to access government support** through a ground-breaking new digital platform to provide digital services to help exporters and investors: great.gov.uk.
- **Joining up trade and investment promotion with local areas,** with area-specific trade missions working with local areas to highlight opportunities.
- **Improving market access for exporters.** The Department for International Trade is working hard to support businesses through discussions on market access issues with third countries.

New commitments:

- **Building future trading relationships.** We are encouraged that countries such as Canada, China, India, Mexico, Singapore and South Korea have already said they want to discuss our future trading relationships. We have established a series of working groups with key trade partners.
- **Creating a new more active “Team UK” approach to winning overseas contracts,** with the Government helping convene consortia of companies to back a single UK bid for major overseas projects. This will enable the Government to provide strong political support and increase the chances of winning major overseas contracts. This approach also applies to increasing defence exports.
- **Developing a new, more strategic approach to inward investment.** The Department for International Trade will review what we can learn from successful inward investment promotion agencies across the globe and it will report in 2017. We will consider whether there should be a greater emphasis on the effect of investment projects on growth.
- **We are also working with behavioural insights experts, to improve our targeting of potential exporters and using HMRC data.**
- We will explore how we can maximise the opportunities that a UK presence at existing **international trade fairs** offers for businesses; and explore where there are sectors which could benefit from support to create trade fairs, in particular in emerging sectors such as the innovative technology industries.

Questions for consultation

- 25.** What can the Government do to improve our support for firms wanting to start exporting? What can the Government do to improve support for firms in increasing their exports?
- 26.** What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?



Delivering affordable energy and clean growth



The opportunity

During the last decade, energy policy in the UK was often discussed through the framework of a ‘trilemma’ – the need simultaneously to find policies that would contribute to meeting climate change targets, guaranteeing security of energy supply and minimising energy costs. Nearly 10 years on from the Climate Change Act, that framework requires updating.

Security of supply is, of course, foundational – and the lack of a long-term energy strategy over previous decades saw the planned closure of energy generating capacity without its adequate replacement being secured. Much progress has been made through the successful launch and operation of Capacity Auctions, as well as Contracts for Difference bringing forward substantial renewable capacity, and more recently the decision to proceed with Hinkley Point C, the first new nuclear power station in a generation.

On climate change, the settled policy position is reflected in the Government’s commitment to meeting its legally-binding targets under the Climate Change Act. How we will continue to meet our legal obligations will be set out, as required, in the forthcoming Emissions Reduction Plan and we have an exemplary record of meeting our obligations.

This means that in the years ahead two important areas of energy policy require a higher priority: the affordability of energy for

households and businesses, and securing the industrial opportunities for the UK economy of energy innovation.

The Government has had a prominent role in energy markets historically, and in recent years it has introduced a range of new levies to fund the deployment of renewables. Some types of energy, such as nuclear power, require upfront investments that are too large for the market alone to deliver. The Government also has a role to play in coordinating markets to enable major changes to our energy infrastructure – such as the potential combination of electric vehicles and smart grids. It can fund basic energy research which is too long-term for the market to deliver, and in promoting the early stage commercialisation of new discoveries that might otherwise be lost to competitors. Such research investment will be crucial to seizing the opportunities that the global shift towards a low carbon economy will present over the coming decades.

While there is a clear role for the Government in energy policy, markets also are crucial in inventing and spreading new techniques for saving energy, new and more efficient means of energy generation and storage, and new ways to finance clean technologies. It is the private sector that will ultimately be the driving force behind our low carbon economy.



The challenge

There are three major challenges for energy policy that our industrial strategy will address.

First, to ensure that the shift to a low carbon economy is done in a way that minimises the cost to UK businesses, taxpayers and consumers.

Second, for the Government – working with the energy industries and regulators – to manage the changes to energy networks required in the transition to a low carbon economy. For example, the roll-out of electric vehicles may require important changes to the way our electricity grid works, including physical upgrades to the infrastructure and new frameworks for charging customers as they either discharge stored electricity into the grid at

peak times, or draw from it at others. Ensuring that our grid is smart and resilient to new demands – and new sources of supply – will be important for energy security, cost and industrial opportunities.

Third, to make sure that the UK capitalises on its strengths in the energy industries to win a substantial share of global markets. These include in manufacturing and services around clean energy, but also making the most of our strengths in areas in which Britain has a lead, such as nuclear decommissioning and offshore oil and gas, including in clusters of excellence such as Aberdeen and other industrial hubs on the east coast⁹⁶. This requires us to be strategic in how we invest in innovation, and in the design of the regulatory frameworks that can influence investment.

Our approach

Affordable energy

The transition to low-carbon – and the securing of our energy supplies – must be done in a way which minimises the cost to business and domestic consumers.

Although energy costs on average account for three per cent of UK business expenditure, the impact is uneven. There are 15 sectors in the economy – including steel, chemicals, glassmaking and ceramics – where energy costs represent more than 10 per cent of total business expenditure⁹⁷.

Industrial gas costs are internationally competitive but electricity costs have moved out of line with other European countries⁹⁸. During the last five years action has been taken to reduce the impact of policies on the electricity bills of eligible energy-intensive industries up to around 80 per cent⁹⁹. This mitigation – including compensation worth around £260 million for 2016 – is paid either by other consumers or the taxpayer¹⁰⁰. The difference between UK industrial electricity prices and those of other European countries is now mainly due to our higher wholesale prices and network costs¹⁰¹. The industrial strategy provides an opportunity to explore ways of reducing overall costs in a sustainable way.

To this end, the Government will set out in 2017 a long-term roadmap to minimise business energy costs. To inform this, the Government will commission a review of the opportunities to reduce the cost of achieving our decarbonisation goals in the power and industrial sectors. The review will cover how best to support greater energy efficiency, the scope to use existing instruments to support further reductions in the cost of offshore wind once current commitments have been delivered, and how the Government can best work with

the regulator Ofgem to ensure markets and networks operate as efficiently as possible in a low carbon system. We will also review the opportunities for growth from the energy sector and the opportunities for the UK.

The industrial strategy will also consider how energy costs can be contained or reduced by increasing resource and energy productivity. Increasing the efficiency of material use across the whole supply chain can deliver huge cost savings and improve the productivity of UK businesses. The Government will work with stakeholders to explore opportunities to reduce raw material demand and waste in our energy and resource systems, and to promote well-functioning markets for secondary materials, and new disruptive business models that challenge inefficient practice. This work will be supported by the Government's 25 Year Environment Plan which will set out a long term vision for delivering a more resource efficient and resilient economy.

Subsidies and other forms of state support have played an important role in creating markets for new technologies and driving down their costs. But it is important that we move steadily to an operating model in which competitive markets deliver the energy on which our country depends.

Changes to energy infrastructure

To address the challenges the low carbon transition will create for our energy networks we are already taking steps to be one of the most advanced economies for mainstream smart grids.

The Smart Meter programme will offer interactive smart meters to every household and small business site in Great Britain by the end of 2020, and the Smart Systems Call for Evidence¹⁰² – recently launched with Ofgem – will report in 2017 on further steps required to

take advantage of the opportunities for a more responsive network. This offers the further prize of bringing prices down by making more flexible alignment of demand and supply – meaning less need for costly permanent stand-by capacity.

The Office for Low Emission Vehicles is leading work across the Government to improve our understanding of the system impacts and opportunities of the shift to electric vehicles. We are also exploring the potential opportunities offered by hydrogen fuel technologies across multiple applications, including heating, energy storage and transportation.

Harnessing the industrial opportunities from new energy technologies

Britain is well-placed to benefit from the transition to a low-carbon economy. In many parts of the energy sector – from

decommissioning to new build – the UK has a depth of expertise and experience that present a major opportunity for domestic employment and export earnings.

The role of the industrial strategy is to make the connections between public policy decisions and industrial opportunity so that the full value can be obtained.

In nuclear, the decision to proceed with the first new nuclear power station in a generation at Hinkley Point is accompanied by a commitment to develop a strong UK supply chain to support the sector, with EDF expecting over 60 per cent of the project’s construction value to be placed with UK companies. In turn investment in nuclear skills – at college and university level – is upgrading both the domestic capacity to provide the labour required and the level of skills and income in the local workforce.



In renewable technologies, such as offshore wind, the long-term certainty of the policy framework has led to important new investments¹⁰³. Siemens' turbine-blade plant opened in Hull in December, creating a thousand new jobs and sustaining a supply chain of smaller businesses servicing the industry.

The industrial strategy – and the combination of the policy portfolio of the former energy and climate change ministry with the business and industrial strategy brief, allows a more explicit strategic set of connections to be made. An example of this is the strong synergy

between our strengths in the automotive sector, in clean energy, and in research and development. This paper commits us to a programme of research and innovation in energy storage and other smart technologies which aligns with the work underway on designing a smart grid and the roll-out of public charging points for electric vehicles, and smart meters at homes and commercial premises. Bringing together these separate strands shows how we can position the UK to benefit from technological transformation that will be in demand across the world.



Delivering affordable energy and clean growth

Actions under way:

- We have acted to **limit policy costs on energy bills** and have reduced such costs for the most energy intensive industries by up to around 80 per cent.
- We have doubled support for **energy innovation**, and are already investing £600 million in support to accelerate the transition to ultra low emission vehicles. Additional funding of £270 million was announced in the 2016 Autumn Statement.
- We are requiring energy suppliers to offer interactive **smart meters** to every household and small business site in Great Britain by the end of 2020.

New commitments:

- The Government will set out in 2017 a **long-term road map to minimise business energy costs**.
- To inform this, the Government will commission **a review of the opportunities to reduce the cost of achieving our decarbonisation goals in the power and industrial sectors**. The review will cover how best to support greater energy efficiency, the scope to use existing instruments to support further reductions in the cost of offshore wind once current commitments have been delivered, and how the Government can best work with Ofgem to ensure markets and networks operate as efficiently as possible in a low carbon system. We will also review the opportunities for growth from the energy sector and the opportunities for the UK.
- We will publish our **Emissions Reduction Plan** during 2017, providing long-term certainty for investors.
- As set out above we will review the case for a **new research institution** to act as a focal point for work on battery technology, energy storage and grid technology, reporting in early 2017.

Questions for consultation

27. What are the most important steps the Government should take to limit energy costs over the long term?
28. How can we move towards a position in which energy is supplied by competitive markets without the requirement for ongoing subsidy?
29. How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?
30. How can the Government support businesses in realising cost savings through greater resource and energy efficiency?



Cultivating world-leading sectors



The opportunity

Much of the proposed approach of our industrial strategy is to identify the underpinning policies and institutions that can help drive up productivity and prosperity across the economy.

But it is also the case that particular sectors form an area of strength or opportunity – with the connections between companies, institutions, and at times, the Government important determinants of their success.

The United Kingdom has some world-leading sectors that have high productivity, competitive advantages at a global level, and growth potential. Sectors such as aerospace, automotive, the life sciences, the creative industries, digital, financial services and professional and business services have generated significant growth in recent years.

In the global economy, one of the most important determinants of the success of an industrial sector is the extent to which a vibrant, competitive supply chain of smaller companies exists to support the major players. Recognising the common interest across businesses, of having a successful supply chain in place, several sectors have taken deliberate steps to create the conditions for a vigorous ecology of suppliers to develop. The supplying firms are, in effect, a common resource, making it easier for larger firms to operate. As well as the existence of supply chains, some sectors have worked deliberately to improve the funding of suppliers and their capacity for innovation.

In other sectors, shared institutions such as those in research and development, training, or standard-setting allow industries to collaborate on projects or underpinning work that could not be undertaken by one company on its own.

Although the requirement for the UK economy to be open and contestable is to be highly prized in this strategy, that is not to say that there are not advantages to the Government being actively engaged with particular sectors. Indeed some of the successes of industrial policy in recent years have been for the Government's work with particular sectors – automotive and aerospace being two examples – to support efforts that can benefit all firms in an industry.

There is an opportunity to open up this approach to new sectors and industries, including challengers to existing sectors. For example, FinTech is a sector in which we have a burgeoning reputation but whose existence is disruptive to established ways of working. Our industrial strategy must be as open to encouraging such sectors as traditional ones.

The challenge

We have significant variations in the productivity of different sectors. Furthermore, within many sectors there are large disparities between the best businesses and the rest.

The challenge for industries, sectors – and government policy – is how to maximise the benefits of collaboration between firms in

a sector, and between the sector and the Government to drive up productivity, innovation and competitiveness either without the Government directing a sector, or unwittingly creating a strategy of incumbency.

Experience in other countries, and in our own, is that it is possible to recognise and benefit from these advantages if approached in the right way.

A number of themes will inform our approach and draw from successful practice in the UK in sectors such as aerospace and automotive and overseas.

- **Business Leadership.** Business should lead the relationship with the Government, rather than the other way round. Sector councils – on which businesses are directly represented – can engage companies but they should be open to smaller and newer, as well as bigger and more longstanding players.
- **Supply chain perspective.** Most modern business sectors benefit from a thriving supply chain which may require propagation and coordinated effort from larger firms.
- **Creation of long-term institutions.** The creation of institutions like the Aerospace Technology Institute and Advanced Propulsion Centre by businesses in the aerospace and automotive sectors has enabled companies to cooperate on research and development projects and the Government has supported these institutions by making them eligible for competitive research funding.

The automotive sector: institutions supporting a developed sectoral policy

A number of institutions support the continued growth of the automotive sector in the UK, and coordinate its relationship with the Government.

Leadership institutions

- **The SMMT** (Society of Motor Manufacturers and Traders) is the industry's trade association that acts as the voice of the motor industry, promoting its position to the Government, stakeholders and the media.
- **The Automotive Council** is a Government-industry body jointly chaired by the Secretary of State for Business, Energy and Industrial Strategy, and an industry chairman. It has its own secretariat, funded by industry, with subgroups working on issues such as supply chains. It was set up to develop a **sector strategy** which led to the creation of new institutions to support research and inward investment.
- **The Department for Business, Energy and Industrial Strategy Automotive Unit** supports the Automotive Council by co-ordinating Government policy affecting the sector.
- **Sub-industry groups** include the **Motorsport Industry Association**, the **Retail Motor Industry Federation** and the **British Vehicle Rental and Leasing Association**.

Innovation and knowledge institutions

- **The Advanced Propulsion Centre (APC)** was created by the industry as a focal point for R&D projects. It is jointly funded by the Government and the sector with half a billion pounds of investment in research over the coming decade. Research projects funded by the APC include cleaner engines, energy recovery systems, and more efficient stop-start diesel engines.
- **The Office of Low Emission Vehicles (OLEV)** works to catalyse the transition towards ultra low emission vehicles. OLEV is delivering grants for electric vehicles, schemes to support charging and refuelling infrastructure, R&D competitions to harness innovation in the UK, and work to ensure the effective integration of electric vehicles into a smarter electricity grid.
- **The Centre for Connected and Autonomous Vehicles (CCAV)** helps ensure that the UK remains a world leader in developing and testing connected and autonomous vehicles. CCAV is a joint unit of the Department for Transport and Department for Business, Energy and Industrial Strategy set up in 2015, and has a research programme worth up to £200 million and further £100m to be matched by industry to establish a testing ecosystem.
- **Major independent research centres.** The Government has created an enterprise zone around **HORIBA MIRA** (originally the Motor Industry Research Association), now a thriving automotive technology park. **Millbrook**, based near Bedford, is another major test facility and technology park. **WMG at the University of Warwick** is another leading automotive research centre and is creating the **National Automotive Innovation Centre** to foster collaboration and cross-fertilisation of knowledge.

Skills institutions

- **The Institute of the Motor Industry** is the professional body for individuals working in the motor industry, setting standards and qualifications.
- **The Automotive Industrial Partnership** through which the sectors comes together to tackle skills challenges.

International investment institutions

- **The Automotive Investment Organisation** within the Department for International Trade, leads on attracting inward investors to invest in the UK, particularly supply chain companies.



Our approach

Many of the policies in this Green Paper are cross-cutting: they apply economy-wide and benefit all businesses. But, as has been described above, in our own experience and in the experience of our competitors, there is advantage in addressing the opportunities in particular industries and sectors – such as helping create conditions for a thriving supply chain, and developing institutions in which companies can share in research and development and training.

In all cases, arrangements must be open to new entrants and challengers to existing incumbents, and be agile so that emerging industries and sectors can avail themselves of cross-industry institutions, not just traditional sectors.

1. Challenging all sectors of the economy to upgrade through ‘Sector Deals’

Businesses rather than the Government are best placed to identify what companies need in order to enhance their competitiveness as a sector.

That is why, as part of the industrial strategy, we propose to set an ‘open door’ challenge to industry to come to the Government with proposals to transform and upgrade their sector through ‘Sector Deals’. This is not about the Government providing additional funding; rather, it would be an open call to business to organise behind strong leadership, like the automotive and aerospace sectors, to address shared challenges and opportunities.

We are looking for businesses to collaborate with other stakeholders, such as universities and local leaders to produce a clear proposal for boosting the productivity of their sector, setting out detailed plans to address challenges such as:

- delivering upgrades in **productivity**, including in supply chains;
- promoting **competition and innovation**;
- facilitating **long term investment and coordination** between suppliers and primes;

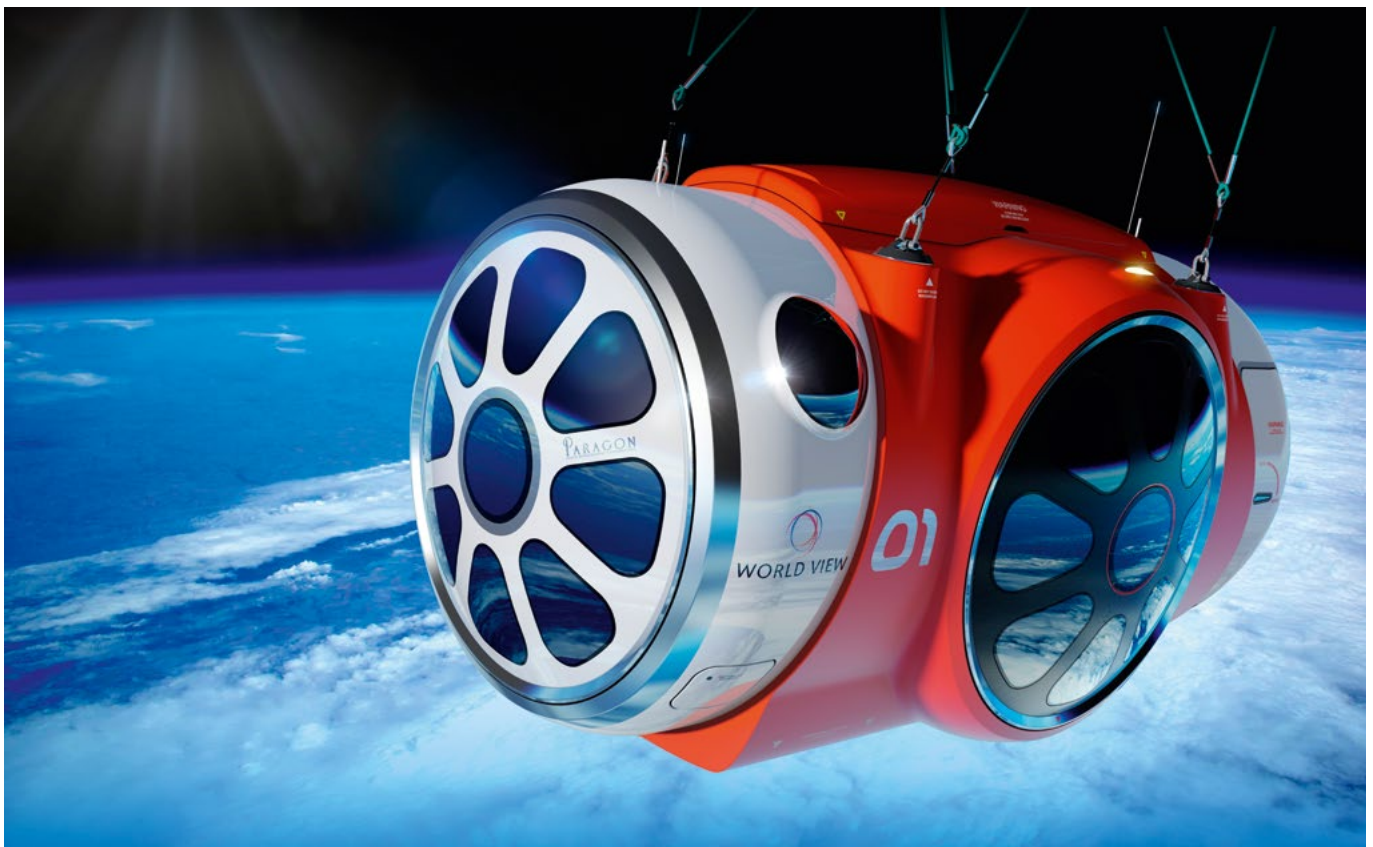
- **accelerating growth across the value chain**, including by identifying where the greatest value can be gained from technology development and investment;
- developing and growing the strengths of particular **clusters**;
- **increasing exports**; and looking at how we can use trade and investment deals to help the sector;
- **commercialising research** across sectors; and
- **boosting skills** and the number of high value, high productivity jobs.

This invitation applies to both established and emerging sectors, and to businesses of all sizes.

To develop a deal with the Government, an industry or sector would need to show how the companies within the sector could take actions

to transform their strategic prospects, and how the Government could increase the prospects of success. This could be by:

- helping align government policies around a sector, including training and skills;
- addressing a regulatory issue or deregulating;
- promoting the creation and diffusion of new technology and good practice;
- ensuring existing sources of funding are used most effectively;
- helping address market access barriers with other countries; and
- supporting the creation of new institutions to support the sector, whether they are institutions to provide leadership, support innovation or raise skill levels





We intend this approach to be UK-wide. We will need to develop approaches to sector deals that work for business and are best aligned with resources in local and central government, and with the Devolved Administrations in Scotland, Wales and Northern Ireland.

Sector deals will not be confined to existing or traditional industrial sectors. The UK already has a number of sectors which are highly competitive internationally from advanced manufacturing to financial, legal and business services to life sciences and the digital and creative industries. There are new or growing industries like artificial intelligence and satellite technology where the UK has a real competitive advantage. Sector deals will enable us to build on our competitive advantages, and enhance emerging areas of strength.

Our experience of negotiating City Deals is that the prospects of creating a compelling proposition are significantly enhanced if there is clear leadership acting as a focal point for the development of proposals.

The Government will respond positively to compelling propositions from a wide range of sectors and industries if they can demonstrate that they can take action to improve the competitiveness of their sector.

The Government welcomes work on early sector deals:

- **Sir John Bell** has offered to lead work on a new strategy to make the UK the best place in the world to invest in **life sciences**;
- **Richard Parry-Jones** will lead work with the auto council to accelerate the transition of auto manufacturing to **ultra low emission vehicles**;
- **Juergen Maier** will undertake a review of **industrial digitalisation** to consider how UK industry can benefit from the accelerated adoption of digital technology across advanced manufacturing;
- **Lord Hutton** will oversee work to improve UK competitiveness and skills in **nuclear**;

- **Sir Peter Bazalgette** will conduct an independent review into how the UK's **creative industries**, like our world-leading music and video games industries, can help underpin our future prosperity by utilising and developing new technology, capitalising on intellectual property rights, and growing talent pipelines.

This is not an exclusive list and the Government is prepared to work with any sector which can organise behind strong leadership to address shared challenges and opportunities.

2. Supporting emerging sectors and innovative businesses

In some cases, industries are too new and too small to have well-developed sectoral institutions, but companies could still benefit from starting to build a stronger partnership with the Government, particularly to overcome the regulatory issues that often affect new industries.

The Challenger Business Programme works with businesses in these areas applying new technologies, innovative products and services, and transformational business models. The programme is founded on collaboration between businesses, regulators, and the Government. It aims to gain a full and rounded understanding of the issues facing businesses operating within emerging sectors and agree a set of actions for different partners to take forward, driving growth and boosting the UK's comparative advantage.

We now want to:

- undertake more deep dives into emerging sectors, and are keen to hear from industry about new areas the programme could look to explore; and
- intensify our efforts on driving through the recommendations from previous Challenger Programmes.

We would welcome views from industry on the Challenger Programme, and specifically new areas to explore, as we shape the next steps in this work.

3. Building on existing sector relationships

Where cooperation between the Government and sectors is already working strongly, we will deepen cooperation. This could involve updating existing strategies, or strengthening existing institutions, making most efficient use of existing sources of funding.

As well as the automotive industry (discussed above), the UK has strategies for a range of sectors from tourism to FinTech, helping remove regulatory barriers to the growth of these sectors. We will also shortly publish the 25 Year Plan for Food Farming and Fisheries and the Digital Strategy.

As noted above, aerospace is an example of a sector where partnership between government and industry is already well developed. The UK has one of most successful civil aerospace industries in the world, but competitive pressures are intense.

The Government is therefore working with the sector on a long term partnership, underpinned by a joint government-industry commitment to funding £3.9 billion of aerospace research and development projects between 2013 and 2026.

Much of this investment is directed towards research on new technologies that will help develop more environmentally-friendly aircraft, reducing emissions and noise. Considerable investment is also being made in new manufacturing processes to raise productivity and improve the cost competitiveness of UK suppliers.

The Government's long-term commitment to work with the aerospace sector in support of research and development and supply chain competitiveness, together with the UK's strong overall business environment, is encouraging world-leading companies like Airbus, Rolls-Royce, Boeing, Bombardier Aerospace, GE Aviation and GKN to invest in new facilities, technology, and skills, positioning the UK to win work on future aircraft programmes.

As part of the government-industry £3.9 billion commitment to the sector, we are jointly investing £14 million with Rolls-Royce and Loughborough University in a collaborative research and technology project to reduce engine emissions. The confidence provided by this type of support has helped Rolls-Royce

to invest £75 million in a brand new facility in Solihull, to design and develop engine control systems. These systems are integral to the production of the company's latest aero-engines, for which they have an order book of over £70 billion supporting thousands of jobs across the breadth of the UK.

This is a prime example of how the Government's approach to industrial strategy – with the Government and industry working together through the Aerospace Growth Partnership – is driving increased private investment in business, including in research and development, and in new, modern facilities, creating and sustaining thousands of highly-paid jobs in the UK.



Cultivating world-leading sectors

Actions under way:

- We are expanding the Challenger Business Programme to remove barriers that stop innovative businesses from thriving in the UK

New commitments:

- The Government welcomes work on **early sector deals**:
 - Sir John Bell on life sciences;
 - Richard Parry-Jones on ultra low emission vehicles;
 - Juergen Maier on industrial digitalisation;
 - Lord Hutton on the nuclear industry; and
 - Sir Peter Bazalgette on creative industries.
- This is not an exclusive list. The Sector deals process will be **open to all** and the Government is prepared to work with any sector that can organise behind strong leadership to address shared challenges and opportunities.

Questions for consultation

31. How can the Government and industry help sectors come together to identify the opportunities for a 'sector deal' to address – especially where industries are fragmented or not well defined?
32. How can the Government ensure that 'sector deals' promote competition and incorporate the interests of new entrants?
33. How can the Government and industry collaborate to enable growth in new sectors of the future that emerge around new technologies and new business models?



Driving growth across the whole country



The opportunity

We have a unique opportunity as a nation. The productivity performance – and consequently earning power – of most places outside London and its surrounding area lags behind the national average, which is itself about 20% below countries like France and Germany¹⁰⁴.

But it doesn't have to be this way. Other countries show that regional cities, towns and areas can be as prosperous as the capital.

For Britain to achieve its maximum prosperity, and for the economy to work for everyone, all parts of the country must be firing on all cylinders.

Simply put, there is considerable potential for cities, towns and areas whose performance has been lagging to close the gap – to catch up.

A modern industrial strategy will have recognition of the importance of place at its heart.

By doing so we can raise standards of living and drive growth not just in these areas but in the country as a whole. So driving growth across the whole country is a challenge and an opportunity for Britain.

There are a number of ways in which Government policy can influence the prospects of particular places.

First, spending decisions by the government can support growth in different areas – not just in terms of total spend, but also its composition. For example, strategic infrastructure investments in transport, housing, flood

defences and cultural assets can all have a substantial impact on how particular places grow.

Second, the government plays the leading role in education, funding schools, colleges and universities. Central government decisions on funding, and its efforts to drive improvement through national reform programmes like free schools or targeted initiatives like the London Challenge and the new Opportunity Areas programme, can make a big difference to attainment, skills and prosperity.

Third, the government is one of the most significant investors in research and innovation. This is not solely about helping to create universities and government laboratories, but how the government and industry co-fund research across the country. All of these types of funding can have a substantial impact on growth in particular places.

Finally, central government can help maximise the particular strengths of different areas by working to create or strengthen local institutions that support their particular economic strengths and specialisms – a subject explored more in the final chapter of this paper.

More balanced growth across the country can enable higher growth for the United Kingdom overall. The revival of underperforming areas can spur productivity in areas with lower costs, cheaper land, less congested infrastructure, and other underused assets.



By building on the strongly-performing areas that exist within every region and nation of the UK, we can make it easier for more people to access new job opportunities closer to them, while staying within reach of friends and family.

This is a moment when new opportunities to rebalance the economy are emerging; our great cities have started to revive, sometimes after a long period of decline; and the digital economy is creating new opportunities to bring well paid jobs to rural areas.

The industrial strategy is an opportunity to make the most of the diverse strengths of all of the UK's cities and regions.

The challenge

While progress has been made towards rebalancing the economy since 2010, the disparities in economic performance between different parts of the UK should not be underestimated. The record of recent decades is one of a gap in productivity and, as a consequence, living standards. The South East, and particularly London, have pulled ahead of much of the rest of the country¹⁰⁵.

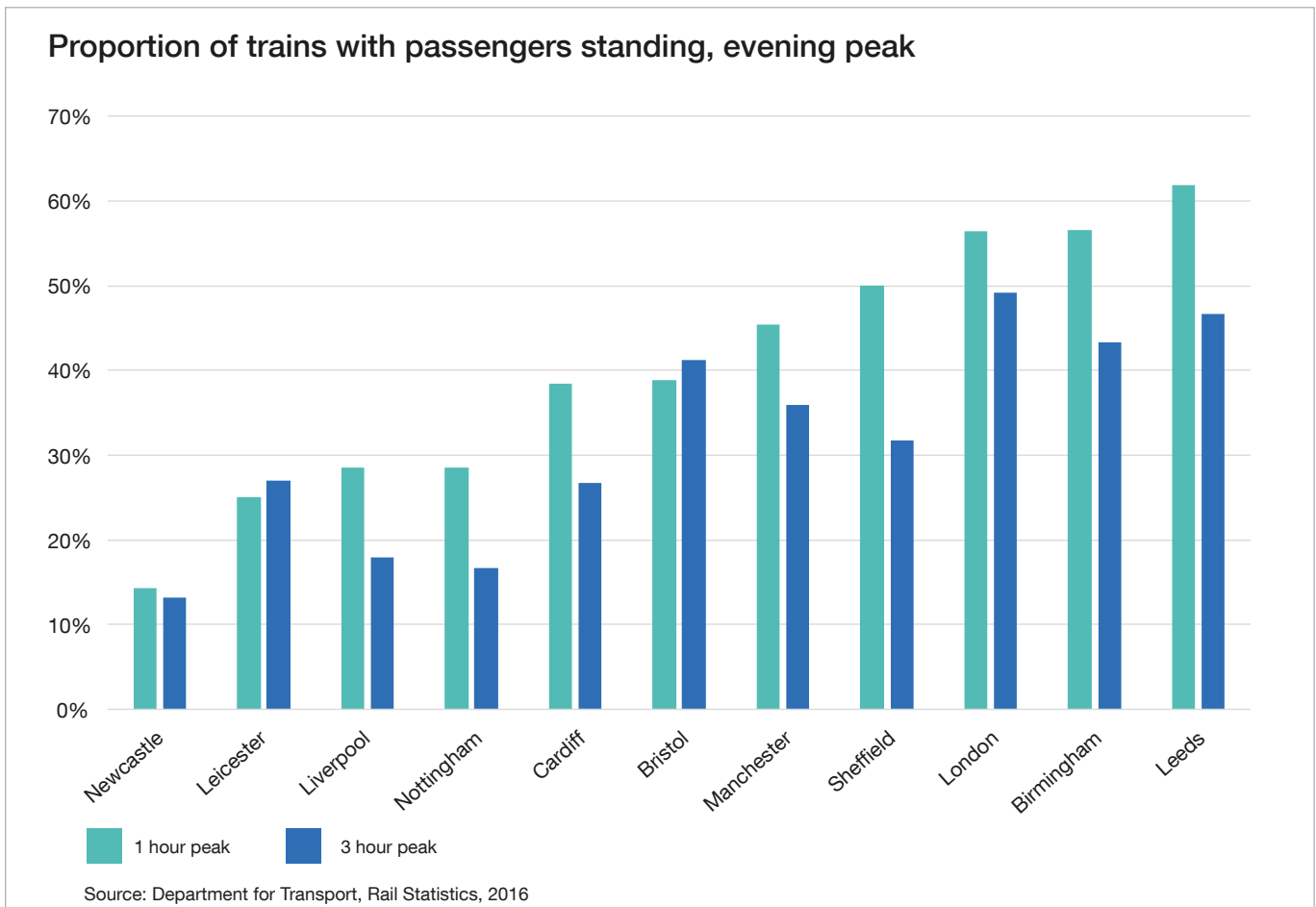
Since 1997, London's Gross Value Added (GVA) per capita has moved from 59 per cent above the UK average to 72 per cent above. This divergence has been driven in part by the underperformance of many of the UK's cities. In England, Bristol has been the only other core

city to consistently enjoy higher productivity than the national average, while city regions in the north of England and the Midlands are between 10 per cent and 17 per cent below average productivity for the UK¹⁰⁶.

This stands in contrast to countries such as France and Germany where most of the biggest cities out-perform the national average in productivity, innovation and other measures of economic performance¹⁰⁷.

Growth has been uneven even within our large cities. The central parts of many of our large city regions have revived remarkably in recent years with the expansion of service industries and higher education. They are now experiencing the challenges common to fast-growing areas, like rising housing costs and transport congestion. But many outlying parts of our large cities have been among the slower growing parts of the country, along with more isolated, coastal cities and towns outside the south east. Every type of place has different challenges and opportunities.

This pattern is not limited to England. While parts of every nation of the UK are thriving – such as the productive economies of Cardiff, Aberdeen and Edinburgh – productivity in Scotland, Wales and Northern Ireland since 1997 has remained below the national average, with a number of city regions within each country falling behind the national average¹⁰⁸.

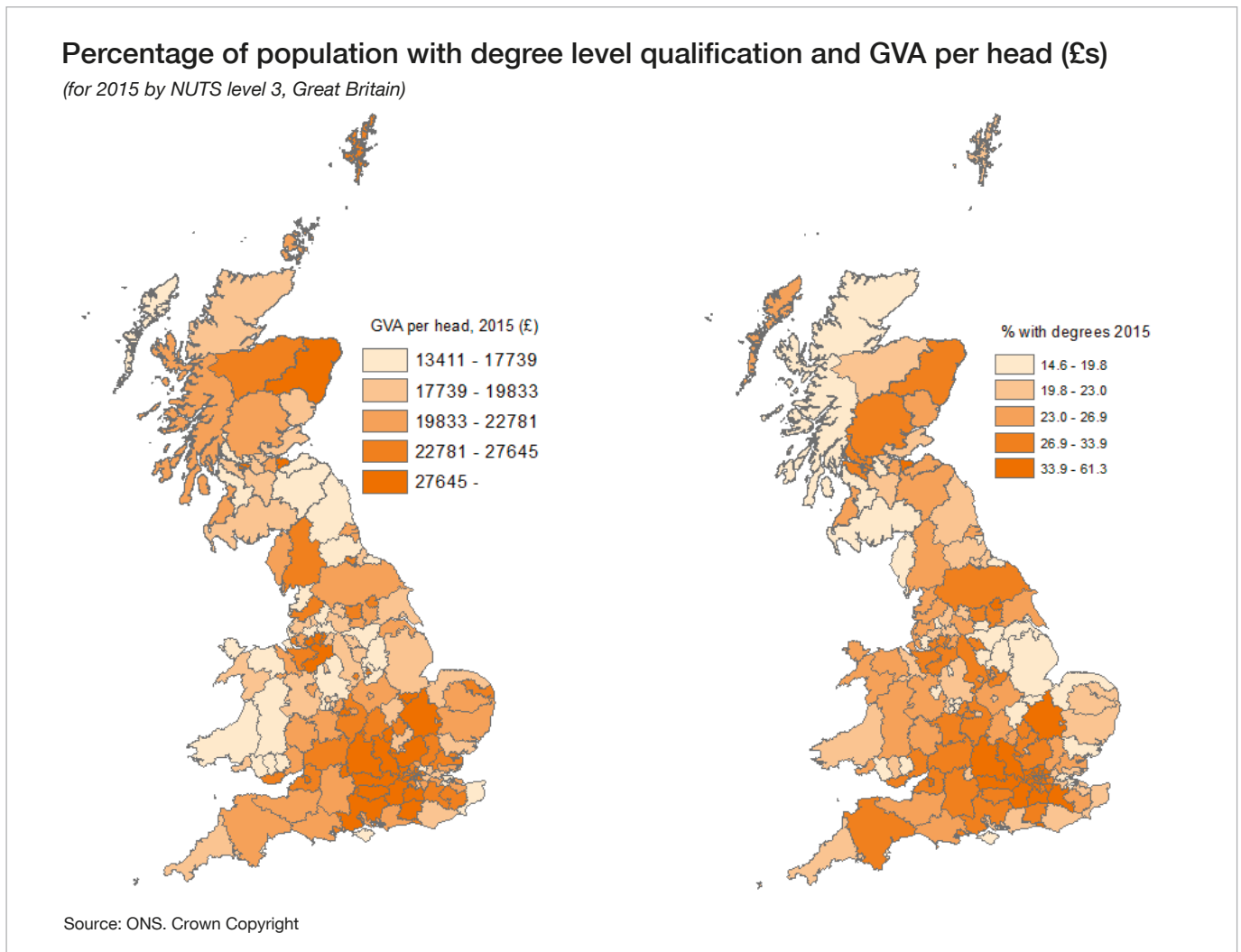


Nor are imbalances just about cities. The residents of towns and rural areas also experience large variations in wages, standards of living and life opportunities. Productivity in rural areas across the country lags behind the UK average¹⁰⁹. If rural businesses in England had the right conditions to grow and the productivity gap lessened, an extra £28 billion per year could be added to the rural economy annually¹¹⁰. Rural businesses face particular challenges and barriers to close this gap, including a shortage of work premises, slow internet connections and a lack of knowledge transfer between business communities spread thinly over wide areas.

The differences in incomes between different parts of the country reflect a number of key factors.

First, weaknesses in infrastructure and connectivity can limit growth in areas with lower productivity. As discussed above (in the Infrastructure chapter), poor transport means a shallower labour market and less choice and competition. It is quicker to travel the 283 miles from London to Paris by train than it is to travel less than half that distance between Liverpool and Hull. Rail congestion in cities such as Leeds and Birmingham is worse than in London on some measures, despite being smaller cities.

Airports outside the South East do not have the connectivity to global markets that some of their competitors have, meaning these areas can miss out on trade-related economic activity and tourism¹¹¹.



Housing is a key factor in driving economic growth. Our forthcoming Housing White Paper will seek to ensure housing supply is more responsive to changing patterns of demand, and flexes as the industrial strategy takes effect.

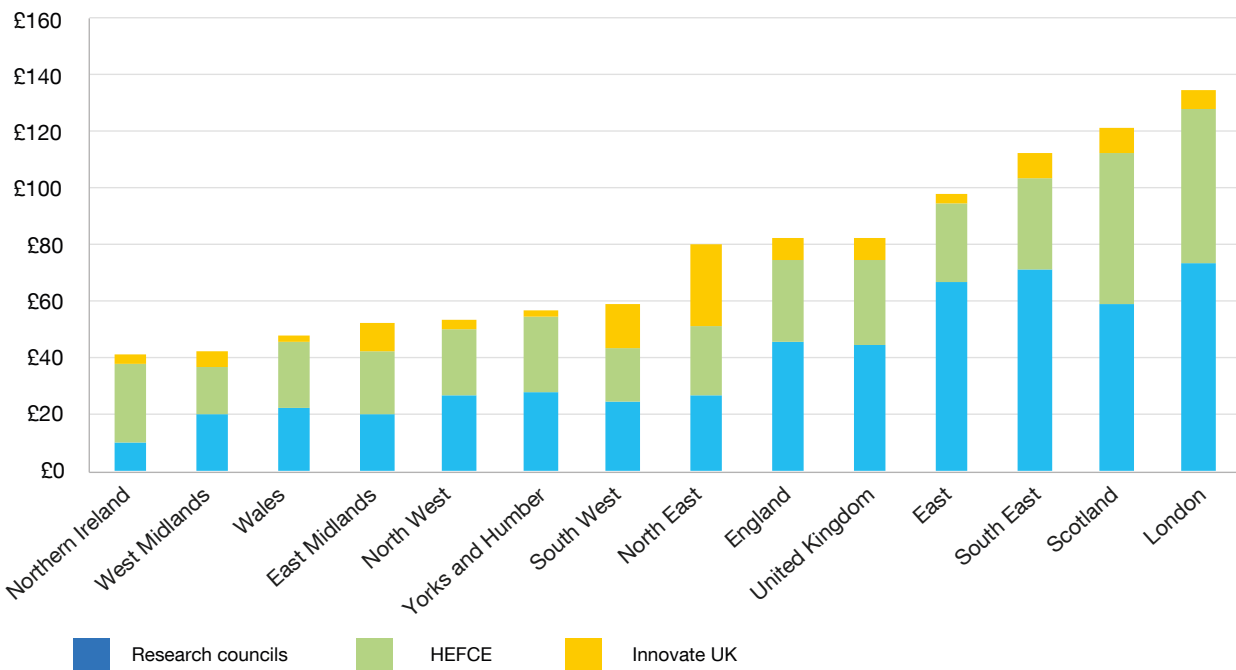
Meanwhile, many rural areas are held back by weak digital infrastructure. The average download speed in urban areas is at least three times faster than in rural communities, limiting people’s ability to seize the opportunities of the digital economy¹¹².

Second, the different qualification and skills levels of people in different places. To boost productivity in the places where it is lower, we

need to increase skill levels there. Places which have experienced industrial change can find they have skills mismatches where people have specific skills which are no longer relevant, so they need to retrain.

How much people in different places earn depends on how highly qualified people they are. And as the maps above show, levels of qualifications vary hugely around the country, with many more people in London and the South East qualified to degree level. Levels of income follow the same pattern¹¹³.

Public research funding per person (2013/14)



Source: BIS (2015): Public research and innovation expenditure: geographic breakdown of public research and innovation expenditure

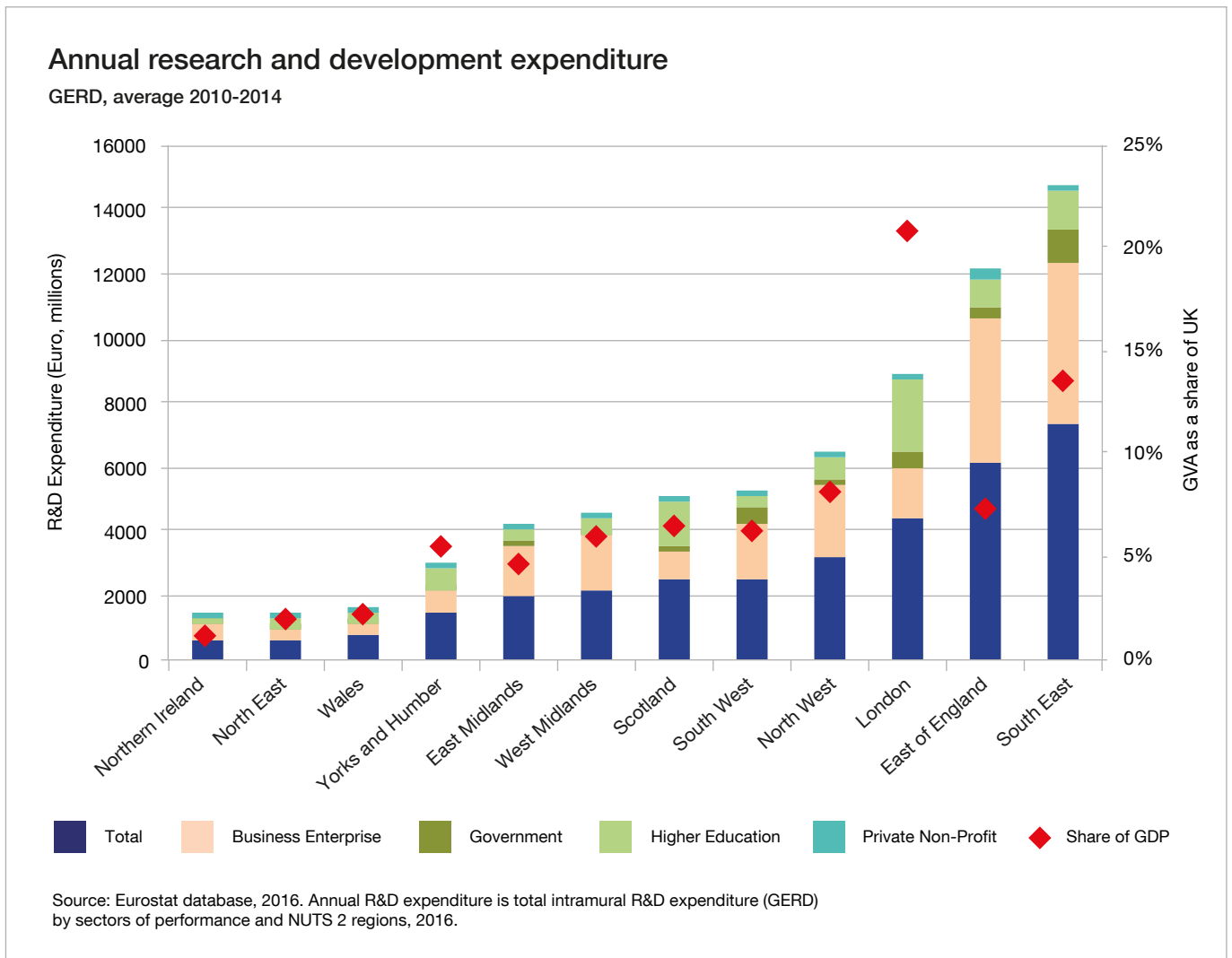
This is partly the result of migration of highly skilled people towards London and the South East. Data shows that large and medium sized cities outside London attract significant flows of skilled young people to their universities, with outflows from both London and more rural areas. Leeds, Nottingham and Sheffield experience the biggest gains. This is an important influx of new skilled people for these cities, but a part of this gain is reversed when they graduate, with London then pulling in a disproportionate share of graduates¹¹⁴.

London is not the only magnet for skilled people, and other strong pulls for graduates exist in every part of the UK. But to raise living standards and drive growth across the country we will need to increase skill levels where they are lower.

Third, overall research and development investment tends to be lower in places with low productivity¹¹⁵.

The “D” in R&D is a particularly important dimension of our productivity opportunity. Only a relatively small number of firms will ever be at the cutting-edge of new technology but many more can invest in ways that reflect what the cutting-edge firms do. Our opportunity lies in encouraging investment that embodies new technologies as well as in funding research that creates new technology.

Spending by Innovate UK is more strongly linked to business investment and less geographically concentrated than research funding through the Higher Education Funding Council for England (HEFCE) and the Research Councils, but is a smaller part of public investment at present.



Increasing our focus on commercialisation and later stage development would be likely to increase the opportunities for catch up in more parts of the country.

Overall, compared to GDP, R&D investment is higher than average in the South East and East, and lower in the North East, Yorkshire, the West Midlands and Wales. Business investment is high in areas where public investment is high, which could reflect the ability of public investment to crowd in business investment. But the patterns vary: the North West has a much higher ratio of business to public

investment, while London has lower business R&D reflecting in part the impact of sectoral mix on R&D intensity.

Finally, we know that local institutional leadership is a crucial element in the success of many areas around the world. The UK is a relatively centralised country and different areas do not always have the strong institutions of different types which could support their growth. Many different types of institutions can play an important local leadership role, which the next chapter addresses in more detail.

Laying the foundations – actions so far

Over the last six years, we have laid the foundations for stronger, sustainable growth in incomes, better shared across the country.

Local Enterprise Partnerships were established in 2011 to make sure that business had a strong voice in directing local economic development.

Through City Deals and Mayoral Devolution Deals, which devolved power from central government, we have enabled places across the United Kingdom to grow, and provided them with the freedom to invest.

In England, the £12 billion Local Growth Fund was established to bring together funds that were previously held centrally to meet the priorities of local places. We have recently announced the award of an additional £1.8 billion of Local Growth Funding.

The Government is providing local authorities in England with new incentives for growth through the full retention of business rates, meaning that local areas see substantial fiscal

benefits when they take action to grow and attract new businesses.

The Northern Powerhouse and Midlands Engine initiatives are driving coordination between local authorities and other institutions over policies like transport, inward investment and skills. We have announced further measures to develop the Northern Powerhouse, including through investment in infrastructure, raising education and skills levels, and ensuring the north is an excellent place to start and grow a business. We will be setting out a Midlands Engine strategy soon.

There are opportunities to develop this regional, more strategic approach further in other parts of the UK. For example, we have established the Thames Estuary Growth Commission to develop a long-term vision for both sides of the Thames. In the South West we are taking steps to improve transport and digital connectivity through our commitments to broadband deployment and upgraded road links.



This approach applies across the whole of the UK. Already, we have committed nearly £1.2 billion to City Deals in Inverness and the Highlands, and in the city regions of Glasgow, Cardiff and Aberdeen to support the strength of these cities.

Negotiations are continuing on deals in the Swansea region, and Edinburgh and south east Scotland. We have also committed to a city deal in Stirling, meaning that every Scottish city will be working towards a deal. The Government will consider proposals for deals with the Tay cities and North Wales when they are brought forward. The Stormont House and Fresh Start agreements provide £2.5 billion of additional spending power for Northern Ireland. We have ensured the Devolved Administrations have the powers they need. The Scotland Act 2016 transfers further significant powers to Scotland, including on Income Tax and borrowing. This is an important power and means the Scottish Government is more

responsible for raising the money it spends; it is accountable to the Scottish Parliament for those decisions. The Wales Bill also seeks to transfer further powers to Wales.

We propose establishing Ministerial Forums on Industrial Strategy with each of the Devolved Administrations. These will bring together all relevant UK Government Departments and the Devolved Administrations to consider how the Industrial Strategy can best address key productivity barriers in Scotland, Wales and Northern Ireland. This is an open invitation to representatives of each Devolved Administration to jointly develop plans with the UK Government to support all areas of the UK, and to closely align our economic plans and strategies.

We will also carefully consider the future of the European Structural and Investment Funds alongside the wider future funding environment following the UK's exit from the European Union.

Our approach

We will ensure the right conditions for growth are present across the UK. Towns, cities and counties can improve their prospects for prosperity and growth if they are well connected and have better skilled people, and with research and innovation activity and the right institutions to support local clusters and specialisms.

This industrial strategy proposes a framework to build on the particular strengths of different places and grasp the opportunities that could enable faster growth in each of them.

1. Backing local connectivity with strategic infrastructure investment.

As set out in the 'Infrastructure' chapter, we are increasing overall infrastructure investment and have created a stronger set of institutions to help plan infrastructure. We are also creating new funding which will improve coordination of local economic plans and infrastructure spending. For example, the new £2.3 billion Housing Infrastructure Fund will allow joined up planning for housing and infrastructure in areas of severe housing need, while councils will be able to bid for £1.1 billion of additional funding for which councils can bid to upgrade local roads and unblock local congestion.

This will ensure that infrastructure investment supports the rebalancing of the economy and we will take account of the balance of

spending per head between different regions when designing future rounds of infrastructure spending. We will continue to prioritise the highest value-for-money projects, as we seek to address productivity weaknesses across the country, and unlock the benefits of agglomeration economies. And we will deliver major infrastructure improvements which will help to drive growth across the country, including supporting the development of proposals for the Midlands Rail Hub and Northern Powerhouse Rail.

2. Raising skill levels nationwide, but particularly in areas where they are lower

The skills chapter sets out our proposals to ensure everyone has the basic skills they need, to build a new high quality system of technical education, and to test new innovative approaches to lifelong learning, and more outreach to people in declining sectors who may want to retrain. All of these national reforms will particularly help in areas where skill levels are currently lower.

But we will go beyond these national reforms and take further actions where skill levels are too low and holding back opportunity and growth.

We will work with local areas to test other approaches to closing the skills gap, which could include:

- Improving pre-school education to close the gaps in achievement which exist between children in different areas even before they start school.
- New schemes to support the retention and attraction of graduates, potentially spreading innovative programmes like Sheffield's RISE initiative, which places graduates in local SMEs.
- Measures to increase the take up of apprenticeships – for example by encouraging prestigious businesses with

oversubscribed apprenticeship schemes to place more of their apprentices into firms in their supply chains.

- Helping businesses work with local colleges to develop the provision they need for apprenticeships, building on initiatives like the Black Country Skills Factory.
- Investing in local science and innovation strengths

As set out in the chapter above on research and innovation, we propose to create new competitive funding streams to support world-class clusters of research and innovation in all parts of the UK, whether they are led by business or universities, and large or small projects. In this way we will use some of the additional R&D funding to back world-class research and innovation, supporting local economies across the country. We will continue to publish regular data on the regional breakdown of public funding in this area.

We will also consider expanding successful mechanisms such as Higher Education Innovation Funding (HEIF) and Knowledge Transfer Partnerships (KTPs), which place PhD students into companies. Expanding these schemes would also allow universities to provide greater support for their local economy and small businesses.

3. Getting the institutional framework right to support local industries

The final chapter of this paper turns to the creation and strengthening of the institutions needed to support local growth.

In some places there may be missing institutions which we could create, be they educational institutions, trade associations or financial networks. In other places particular types of investments are needed to raise skill levels or deal with the constraints holding back growth.



Driving growth across the whole country

Actions under way:

- The Government has announced the **award of an additional £1.8 billion from the Local Growth Fund** for a new set of Growth Deals between Government and Local Enterprise Partnerships.
- We have already set out the next steps in developing the **Northern Powerhouse** by launching a Northern Powerhouse Strategy. We will be setting out a **Midlands Engine** strategy soon.
- We have launched a **Tourism Action Plan**, setting out a comprehensive set of actions to drive growth in inbound tourist spend across the whole of the UK.

New commitments:

- The Government will **use additional infrastructure funding to unlock growth** in areas where connectivity is holding it back by creating new funding which allow better coordination of local economic plans with infrastructure investment.
- **The Government will take account of the varying infrastructure needs and opportunities in different regions.**
- We will **deliver major infrastructure improvements which will help to drive growth across the country**, including supporting the development of proposals for the Midlands Rail Hub and Northern Powerhouse Rail.
- **We will work with local areas to test approaches to closing the skills gap**; from early years education and the retention and attraction of graduates, to measures to drive the take up of apprenticeships.
- **We propose creating competitive new funding streams to back the clusters of innovative businesses across the country.** These could support and develop world-class research and innovation strengths in local economies, and provide commercialisation funding to allow universities to work more with local businesses. In this way we will use some of the additional R&D funding to help stimulate local economies, as well as growing the UK overall.
- **We will work with local areas to identify and help develop industrial and economic clusters of businesses, and local specialisms**, putting in place the right institutions with the right powers to help support local areas of economic strength. This may involve creating new institutions or strengthening existing ones, discussed further below.

- We propose establishing **Ministerial Forums on Industrial Strategy with each of the Devolved Administrations**. These will bring together all relevant UK Government Departments and the Devolved Administrations to consider how the industrial strategy can best address key productivity barriers in Scotland, Wales and Northern Ireland. This is an open invitation to representatives of each Devolved Administration to develop jointly plans with the UK Government to support all areas of the UK, and to align closely our economic plans and strategies.

Questions for consultation

34. Do you agree the principles set out above are the right ones? If not what is missing?
35. What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help encourage growth across the country?



Creating the right institutions to bring together sectors and places



The opportunity

The creation of a modern industrial strategy is the opportunity to ensure that we have the right institutions in place – at both national and local level – to identify emerging areas of strength, and develop policies and targeted investments to support them.

We want to ensure that in every area there are bodies which are capable of doing this, and which are empowered to work with businesses to develop options to support them.

We have never previously had a framework to enable us to create and strengthen the institutions that drive growth in sectors, places and clusters of expertise.

Every part of the UK has strong clusters and particular strengths. From the oil and gas industry of Aberdeen and the digital clusters in northern cities, to advanced engineering networks in the Midlands or cyber security industry in the South West and South Wales, there are world leading businesses in each part of the UK.

The challenge

Different clusters and places need different types of support to ensure businesses are able to employ people with the skills they need, market their goods to the world and develop the products and services of the future.

Each area and sector is different, and each needs different types of institutions to drive forward their economy. Central government must play its part, but it will never have the information it needs to identify the opportunities that emerge in different areas. Nor can central government alone provide the continuity and level of focus needed to develop a strong cluster or specialism over the long term.

Yet key lessons from industrial policy in other countries include the need for consistency and patient effort and the right institutions to support development over the long term – particularly local institutions.

Competitor economies often have better developed sectoral institutions and stronger local institutions than the UK. The creation of a modern industrial strategy for Britain is our opportunity to put this right.

Institutions for local growth

Many successful clusters around the world share certain key features.

Local business and financial institutions

- **Certain 'anchor' businesses** can play a key role in attracting skilled workers to an area, or generating spin off companies. Some anchor businesses can attract a whole supply chain to locate near them, bringing further growth to the area. The Government may be able to help build on this and support the growth of such supply chains in the UK.

Local financial institutions such as local venture capital networks and investment funds attached to specific universities can support growth.

Local leadership institutions

- **Local authorities** can help to coordinate the different things that local industries need to thrive, from planning decisions, transport and skills to investments in culture and the quality of life.
- **Local Enterprise Partnerships** create strategic plans for wider areas, including entire cities, and give businesses a direct role in shaping the future of their local communities.
- Where they exist, **Mayoral Combined Authorities** support regional planning for transport and improvements in skills.



Interest groups and advocacy groups

- **Local business associations** can play an important role in aggregating the interests of local businesses, promoting a particular cluster to the world, advocating on its behalf to government, providing training, and building networks to improve the flow of knowledge and contacts. Chambers of Commerce, other business groups, and entrepreneur networks around universities can help small business find advice and support.

Institutions that support innovation

- **Universities** can have a big impact on local growth and regeneration, including by attracting young skilled people; spinning out firms; and attracting research intensive businesses to locate in the area.
- **Government and research council labs** and other innovation institutions can contribute to the strengths of local clusters in a similar way.
- **Innovation Districts, Science Parks, Catapults and incubator spaces** can help ideas to flow and business connections to be made within a cluster. Government policy can help create these kind of opportunities for clustering.

Cultural, sporting and quality of life institutions

- **Cultural institutions** and regular events can act as a magnet for visitors, promote a cluster and help attract talented people to locate there. Media institutions like the BBC can help to anchor creative clusters, as it has done in Salford.

Connectivity institutions

- **Ports and airports** are major local employers in their own right, but better connections also help to promote trade and create jobs.

Our approach

As noted in the chapter on sectors above, national sectoral policies which have made progress – such as the automotive and aerospace sectors – achieved this through the creation of business-led institutions. We will build on such institutions where they exist, or work with business to create them where they are needed.

Similarly, we will work with local areas to identify and help develop local specialisms, putting in place the right institutions with the right powers to help support local areas of economic

strength. This may involve creating new institutions or strengthening existing ones: be they educational institutions, trade associations or financial networks.

Recognising the importance of local innovation ecosystems, the Government will encourage in particular sector deals with a strong focus on local institutions.

A case study of the institutions that support a cluster: Cambridge

The University of Cambridge and other research institutions, including the nearby Laboratory of Molecular Biology, Cambridge Science Park and Addenbrooke's Hospital are at the heart of a substantial cluster of tech and biotech businesses. The area has been among the fastest growing in the country in recent decades.

But great universities and laboratories do not automatically go on to generate substantial economic growth for an area. Other institutions have played a key role in creating the cluster, and others now support its continuing growth.

Anchor companies have played a critical role. In 1960 Cambridge Consultants was founded, a firm of consultants aiming to “put the brains of Cambridge University at the disposal of the problems of British industry”. It has created numerous spin-outs, which have created spin-outs of their own.

Later companies have continued the approach, seeding numerous other businesses. For example, the early microcomputer company Acorn led to many tech businesses, including ARM holdings. In the biotechnology sector, early British biotech company Enzymatix spawned firms such as Chiroscience, which was later acquired by Celltech. ICI's early work on inkjet printing technology at Cambridge Consultants provided the impetus for a whole cluster of printing businesses in the area today.

Entrepreneurs like Hermann Hauser and Chris Evans who were involved in companies in the cluster have gone on to become venture capital providers to the wider Cambridge tech scene. The university has also worked with financiers to create a £125 million investment fund attached to the university, Cambridge Innovation Capital.



The mature cluster has strong networking institutions for business, ranging from the Cambridge Network which promotes the cluster to sector-specific knowledge networks like Cambridge Wireless and One Nucleus promoting the tech and biotech industries respectively.

Institutions for new entrepreneurs like the Judge Business School have been founded with its postgraduate diploma in Entrepreneurship, the Centre for Entrepreneurial Learning, and “Cambridge University Entrepreneurs” (CUE) – a society for young entrepreneurs. Science parks and incubator centres like the St John’s Innovation Centre promote cross fertilisation of ideas, and make it easier for new companies to find flexible space.

Cambridge University was also one of the first to create a technology transfer office, starting with the Wolfson Cambridge Industrial Unit, now Cambridge Enterprise.

Local authorities in the area continue to work together with the private sector to support growth, including to provide for growing housing needs.

Through the Greater Cambridge City Deal and the recent Devolution Deal for Cambridgeshire and Peterborough, the area is gaining new powers over transport and skills, enabling it to support continued expansion. Work by the National Infrastructure Commission and plans for better road and rail connections through the Oxford-Milton Keynes-Cambridge corridor will also enable the area to improve its connections.



Creating the right institutions to bring together sectors and places

Actions under way:

- **Local Enterprise Partnerships**, established in all parts of England.
- **Mayoral Combined Authorities** have been established as part of Devolution Deals, with the first mayoral elections in May.
- We are fully devolving **business rate revenues** to local authorities in England.

New commitments:

- Where appropriate we will maximise the benefit that anchor companies can bring to an area by developing new policies to support the **growth of UK supply chains**.
- **The Department for International Trade will review how it identifies priority investments**, including with reference to the impact they can make in local areas where productivity needs to catch up. As part of this, the department will consider the role it can play in attracting investment across all regions of the UK.
- Cabinet Office are reviewing the **location of government agencies and arms-length bodies**, and will consider relocating them where they could potentially help reinforce a local cluster and support private sector growth.
- Recognising the importance of cultural and sporting institutions in making different places attractive to people and firms, the review of arms-length bodies will include **cultural institutions**, particularly where cultural assets could be better used to support local areas – for example, the Government Art Collection.
- **The Government will review whether there is more that can be done to leverage government and research council laboratories to drive local growth**. This will include considering their role in supporting wider innovation districts and whether surplus government land or buildings could be used to support innovative businesses around them.
- The Government will support **networks of universities** where they want to come together to improve commercialisation. Regional groups of universities like the N8, SETSquared and Midlands Innovation groups are already working together on projects. Government could help to deepen this cooperation, which could include helping to form joint investment funds covering groups of universities.
- The Government will work with the British Business Bank and ScaleUp Institute **to understand and address the relative weakness of venture capital funding and entrepreneurship networks outside the South East**.

- We have already given local government in England greater freedoms to support growth and are in the process of allowing local authorities to retain 100% of the business rates they collect. **We will work with local government to review how to bring more business expertise into local governance, and improve links between councils and the private sector.** An example might be the creation of a modern “Alderman” type of role within local government.
- **We will explore further devolution deals for our largest cities**, where they will increase economic growth, in a clear signal of belief in our local leaders and local communities to take control of their economic destiny.
- Following the elections for the first combined authority mayors in May 2017, **the Local Government Association will work with new Mayoral Combined Authorities to build up administrative capacity**, for example in transport planning and economic development, which could involve seconding officials from Whitehall to cities.
- **We will work with Local Enterprise Partnerships to review their role in delivering local growth** and examine how we can spread best practice and strengthen them, including extending the support they can receive from the What Works centre for Local Economic Growth. We are determined to help local areas, and national agencies, learn from what works best and where, so that we can together refine and maximise the impacts of the major investments set out in this paper for prosperity and growth.

Questions for consultation

36. Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?
37. What are the most important institutions which we need to upgrade or support to back growth in particular areas?
38. Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

The 10 pillars



Investing in science, research & innovation



Developing skills



Upgrading infrastructure



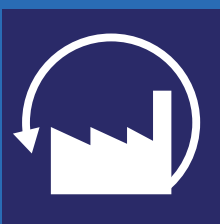
Supporting businesses to start and grow



Improving procurement



Encouraging trade & inward investment



Delivering affordable energy & clean growth



Cultivating world-leading sectors



Driving growth across the whole country



Creating the right institutions to bring together sectors & places

Questions for consultation

1. Does this document identify the right areas of focus: extending our strengths; closing the gaps; and making the UK one of the most competitive places to start or grow a business?
2. Are the ten pillars suggested the right ones to tackle low productivity and unbalanced growth? If not, which areas are missing?
3. Are the right central government and local institutions in place to deliver an effective industrial strategy? If not, how should they be reformed? Are the types of measures to strengthen local institutions set out here and below the right ones?
4. Are there important lessons we can learn from the industrial policies of other countries which are not reflected in these ten pillars?
5. What should be the priority areas for science, research and innovation investment?
6. Which challenge areas should the Industrial Challenge Strategy Fund focus on to drive maximum economic impact?
7. What else can the UK do to create an environment that supports the commercialisation of ideas?
8. How can we best support the next generation of research leaders and entrepreneurs?
9. How can we best support research and innovation strengths in local areas?
10. What more can we do to improve basic skills? How can we make a success of the new transition year? Should we change the way that those resitting basic qualifications study, to focus more on basic skills excellence?
11. Do you agree with the different elements of the vision for the new technical education system set out here? Are there further lessons from other countries' systems?
12. How can we make the application process for further education colleges and apprenticeships clearer and simpler, drawing lessons from the higher education sector?
13. What skills shortages do we have or expect to have, in particular sectors or local areas, and how can we link the skills needs of industry to skills provision by educational institutions in local areas?
14. How can we enable and encourage people to retrain and upskill throughout their working lives, particularly in places where industries are changing or declining? Are there particular sectors where this could be appropriate?
15. Are there further actions we could take to support private investment in infrastructure?

16. How can local infrastructure needs be incorporated within national UK infrastructure policy most effectively?
17. What further actions can we take to improve the performance of infrastructure towards international benchmarks? How can government work with industry to ensure we have the skills and supply chain needed to deliver strategic infrastructure in the UK?
18. What are the most important causes of lower rates of fixed capital investment in the UK compared to other countries, and how can they be addressed?
19. What are the most important factors which constrain quoted companies and fund managers from making longer term investment decisions, and how can we best address these factors?
20. Given public sector investment already accounts for a large share of equity deals in some regions, how can we best catalyse uptake of equity capital outside the South East?
21. How can we drive the adoption of new funding opportunities like crowdfunding across the country?
22. What are the barriers faced by those businesses that have the potential to scale-up and achieve greater growth, and how can we address these barriers? Where are the outstanding examples of business networks for fast growing firms which we could learn from or spread?
23. Are there further steps that the Government can take to support innovation through public procurement?
24. What further steps can be taken to use public procurement to drive the industrial strategy in areas where government is the main client, such as healthcare and defence? Do we have the right institutions and policies in place in these sectors to exploit government's purchasing power to drive economic growth?
25. What can the Government do to improve our support for firms wanting to start exporting? What can the Government do to improve support for firms in increasing their exports?
26. What can we learn from other countries to improve our support for inward investment and how we measure its success? Should we put more emphasis on measuring the impact of Foreign Direct Investment (FDI) on growth?
27. What are the most important steps the Government should take to limit energy costs over the long-term?
28. How can we move towards a position in which energy is supplied by competitive markets without the requirement for on-going subsidy?

29. How can the Government, business and researchers work together to develop the competitive opportunities from innovation in energy and our existing industrial strengths?
30. How can the Government support businesses in realising cost savings through greater resource and energy efficiency?
31. How can the Government and industry help sectors come together to identify the opportunities for a 'sector deal' to address – especially where industries are fragmented or not well defined?
32. How can the Government ensure that 'sector deals' promote competition and incorporate the interests of new entrants?
33. How can the Government and industry collaborate to enable growth in new sectors of the future that emerge around new technologies and new business models?
34. Do you agree the principles set out above are the right ones? If not what is missing?
35. What are the most important new approaches to raising skill levels in areas where they are lower? Where could investments in connectivity or innovation do most to help encourage growth across the country?
36. Recognising the need for local initiative and leadership, how should we best work with local areas to create and strengthen key local institutions?
37. What are the most important institutions which we need to upgrade or support to back growth in particular areas?
38. Are there institutions missing in certain areas which we could help create or strengthen to support local growth?

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