



The Productivity Agenda

A blueprint for how the public and private sector can be better equipped to translate productivity gains into improved living standards

2023

Levelling up
What's next?

Government challenge
Public sector productivity

AI impact
Future trends

Green transition
New opportunities



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Preface: Diane Coyle and Bart van Ark

After at least two decades of slow productivity growth, the UK has seen its productivity gap relative to some of its peers in leading economies, including Germany and the United States, grow even wider.

Although productivity is a term of art for economists – a measure of how much output is achieved for given inputs like labour and equipment – there is nothing more important for the economy's prospects and living standards than turning resources efficiently and effectively into better outcomes. Nearly stagnant productivity growth limits how much people's incomes can rise, meaning tax revenues grow only slowly and public services suffer. In addition, the fact that productivity has stalled makes the British economy less resilient and less able to absorb the impact of economic, social and political shocks.

A succession of shocks including the financial crisis, Brexit, Covid, international conflicts and the energy crisis have already left their scars on the economy. In the next decade firms, workers and places will have to adjust further to the imperatives of structural transformation required by adaptation to climate change and rapid digital innovation.

The essays in this volume put UK productivity under the microscope, looking at the role played by businesses, individual workers and the public sector, and seeking

feasible paths forward in terms of policy with the ambition to raise the UK's long term productivity growth rate. Appropriate productivity-enhancing policies spanning the economy need to be introduced sooner rather than later.

Some of the culprits for the dismal productivity performance will sound depressingly familiar: low investment, including in infrastructure; small and medium enterprises that do not adopt productive practices; too little research and development spending and too little translation of research into commercial success; too little competition in some markets; mismatches between the skills of the workforce and the requirement of employers; public services whose own productivity suffers because of budget squeezes and that consequently fail to support the private sector adequately. However, the exploration also includes the cross-cutting themes of the green technology transition and the extreme spatial inequalities of the UK economy, related to the political and institutional framework in which relevant decisions are made.

In addition to documenting these findings of Productivity Institute researchers and others, this volume identifies the follow-on questions. From the perspective of people, firms and places, these centre on a core issue: the UK's dysfunctional

policy framework. As has been noted in other areas of policy, there is extreme policy-generated uncertainty as politicians overturn previous decisions to have a new 'announceable'. There is also too little co-ordination in Whitehall and Westminster across areas of policy, which still operate in silos, and too little co-ordination across levels of government. English regions and local authorities in particular lack suitable powers to manage their economies.

For this reason, the final chapter makes the powerful case for an independent growth and productivity institution, and sets out a blueprint for its design. The UK has such frameworks for monetary and fiscal policy and for competition policy, all independent and authoritative bodies. The evidence from Australia and New Zealand is that such an institution can help improve productivity. The case for institutional reform is all the greater given the UK's poor performance and immense challenges. Many other countries have now established such bodies.

The UK's dismal productivity requires an urgent and comprehensive policy agenda, embracing businesses, public services and infrastructure, workers and communities. Politicians and policy-makers across our nations owe it to all of us to act on the clear lessons from research and from experience elsewhere.



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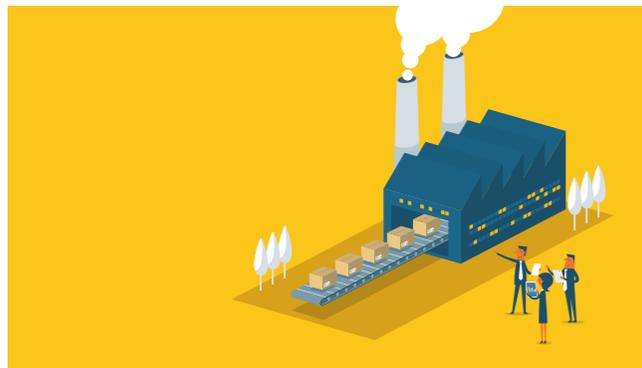


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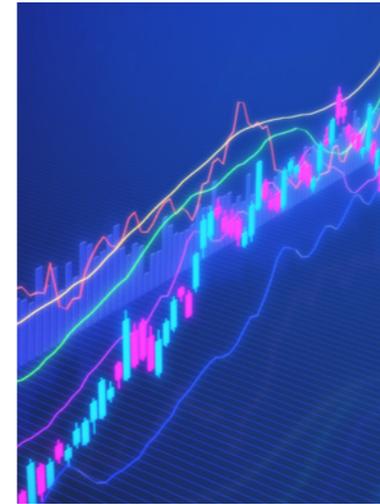
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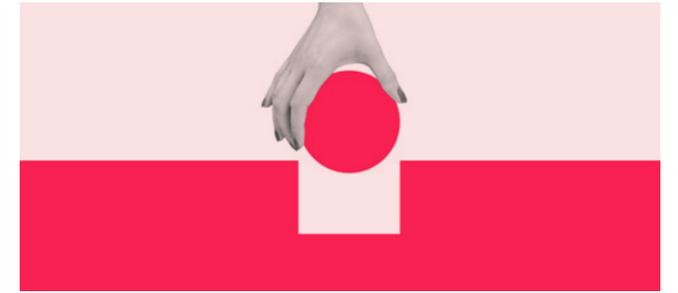
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The UK's productivity challenge: people, firms, and places

CHAPTER ONE

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"The low productivity trap is seriously affecting the resilience of the UK economy, making it more vulnerable to economic shocks."

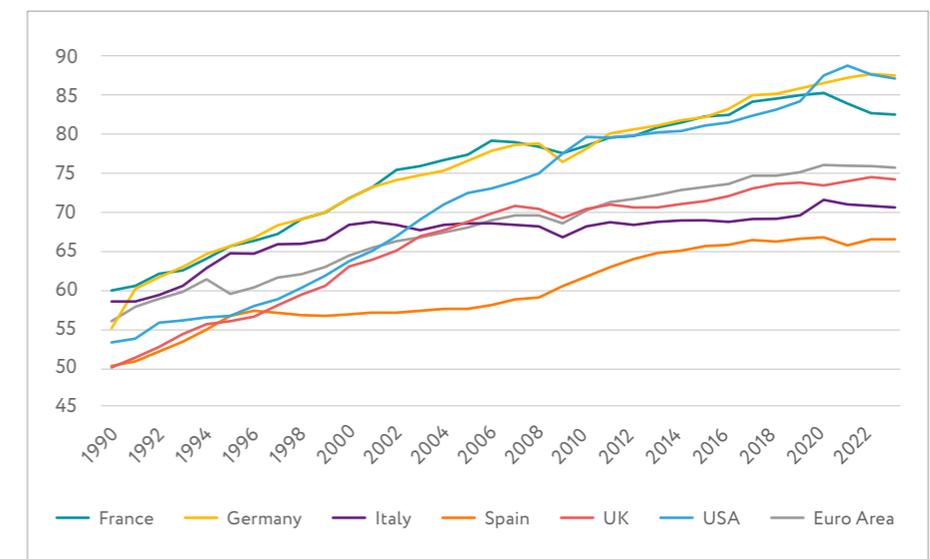
The UK faces a tough productivity challenge. With its productivity growth slowing for the past 15 years, additional working hours have been contributing more to GDP growth than better productivity. Many UK firms have been following an unsustainable low wage, low investment, low productivity path. Tackling the challenge will require co-ordinated action under three pillars: people, firms, and places.

From 2010 to 2022 the annual average growth in UK GDP per hour was just 0.5 per cent. Taking just the last few years, which have been dominated by the pandemic, high energy prices and inflation, as well as domestic and global political turmoil, the trend in productivity growth has not improved. While a slowdown in productivity growth has been prevalent across most advanced economies, the UK has performed particularly poorly compared to our nearest economic comparators (see Figure 1).

The recent slowdown in productivity growth threatens the much-needed revival of economic growth and improvement in living standards and well-being. In the UK this is exacerbated by the persistently low relative level of productivity as the country finds itself in the bottom half of the rankings in the OECD.

This low productivity trap is therefore seriously affecting the resilience of the UK economy, making it more vulnerable to economic shocks. Some regions and places are severely underperforming relative to their own history and compared to comparable places in other countries. Many firms in the bottom of the productivity distribution are not resilient and adaptive, and are barely surviving the economic pressures they are facing. And many people who are often low skilled and (if working at all) employed in relatively unproductive jobs are struggling to get by on a day-to-day basis.

Figure 1: GDP per hour (in US\$, PPP converted), 1990-2023



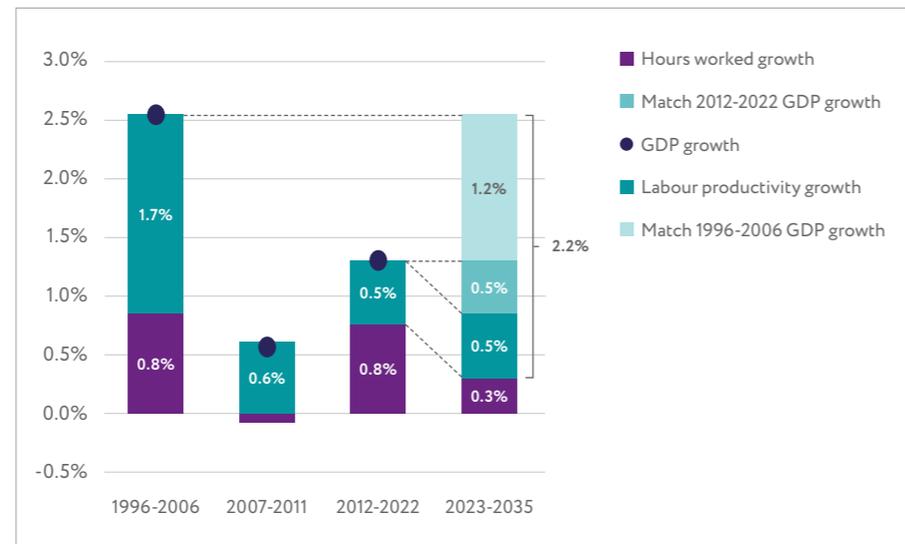
Source: The Conference Board, Total Economy Database, April 2023

Challenge

The challenge for the next decade is daunting because of slower population and labour force growth. Except in the unlikely scenario of a sharp increase in immigration, productivity growth will need to accelerate. Indeed, if the current trend in productivity growth were to continue for the next two decades, it will not be possible to sustain current living standards, let alone deliver sustainability and improved well-being.

For instance, even doubling the current productivity growth rate (from 0.5% to 1% a year) over the next 12 years will only be sufficient to achieve the same rate of GDP growth as in the past decade (Figure 2). To strengthen improvements in people's living standards in future, productivity growth would therefore have to more than double.

Figure 2: GDP Growth Decomposed into Total Hours and Labour Productivity, United Kingdom, annual %, 1996-2035



Note: Labour input growth (total hours worked) is projected to slow to 0.3% per year between 2023 and 2035. Staying at the average productivity growth from 2012-22 would leave GDP growth from 2023-2035 at just over 0.8% per year. To achieve the same GDP growth rate from 2023-2035 as from 2012-22, would require a doubling of productivity growth from 0.5% to 1.0% per year. To achieve the same GDP growth rate from 2023-2035 as from 1996-2006, would require productivity growth to be raised to 2.2% per year.

Source: [Until 2022: Office for National Statistics, July 2023](#); [2023-2035 projection of total hours worked from The Conference Board, Global Economic Outlook, 2023.](#)

"If the current trend in productivity growth were to continue for the next two decades it will not be possible to sustain current living standards, let alone deliver sustainability and improved well-being."

The three key challenges

Why the UK has experienced slower productivity growth than elsewhere remains the subject of intense debate. But it is agreed that three fundamental issues need to be tackled urgently to close the gap relative to the pre-financial crisis growth performance and compared to the countries which have performed better since.



ONE:
Chronic and broad-based underinvestment in the UK economy

The UK has experienced a slowdown in investment growth in recent decades that is broad-based, as Chapter Two sets out. It includes physical, human, and intangible capital – both public and private.¹

The underinvestment is also chronic, not just a problem of the past ten years but ingrained in the UK's economic system for decades.² However, there is evidence that the austerity measures from 2010 in the wake of the global financial crisis have particularly contributed to weakened public investment,³ while emerging evidence also indicates an impact of Brexit on private investment.⁴

The weak investment is broad-based across industries too, but especially notable in manufacturing, finance and insurance, and business services. Capital investment is also unequally distributed across the UK regions, just like economic activity and employment, with significant variation both between high- and low-productivity level regions of the UK and also with large variation within regions.⁵



TWO:
Inadequate diffusion of productivity-enhancing practices between firms and places

While the UK is very active at the frontier of science and knowledge creation – indeed one of the most innovative nations, ranking fourth in the latest Global Innovation Index⁶ – its presence in its main areas of specialisation (notably artificial intelligence, quantum technology and synthetic biology) is rather narrow and involves relatively few companies.⁷

Productivity does not primarily arise from creating new inventions at the frontier, but rather from improving processes and bringing new and better products and services to market. Broad-based application and commercialisation of new technologies requires their widespread diffusion across the economy.

In part, widespread diffusion and adoption of technologies has been hampered by stagnant foreign trade, changing patterns in FDI (Foreign Direct Investment) and the UK's lack of deeper integration in (global) supply chains.⁸ Compared to many other comparator countries, the UK does not have thriving innovation eco-systems in specific places or regions, nor does it have effective investment zones and networks of R&D and innovation institutions.⁹



THREE:
Institutional fragmentation and lack of joined-up policies

The UK is characterised by a dichotomy in policies and institutions that affect productivity. On the one hand, many productivity policies are highly centralised, including education, innovation, transport, planning, and regional development.

On the other hand, the institutional landscape of productivity-supporting institutions is highly fragmented in terms of function and location, ranging from local and combined authorities to devolved nation governments, and including city deals, town funds, local enterprise partnerships, and local skills improvement plans.¹⁰

A major shortcoming of the UK's political governance remains the lack of a regional government structure across England, in addition to the devolved structures in Northern Ireland, Scotland and Wales.

In other countries 'mid-level' governments typically have substantial devolved responsibilities for policies with a big impact on productivity – in particular infrastructure and planning which are characterised by large externalities (positive and negative) between places.

This means that in the UK it is difficult for any national government policy to be translated into effective local policy – the levers at the centre have nothing to attach to. At the same time local governments are under-resourced and lack the authority to develop and implement a place-specific and integrated investment strategy.

Much of The Productivity Institute’s research programme so far has been focused on understanding the diversity in productivity performance across sectors, firms and regions.

Sectors

A stark trend is that even some of the UK’s most productive sectors have been faring worse than in the past. The slowdown in productivity growth since the global financial crisis has been primarily driven by three major sectors, namely financial and insurance services, manufacturing, and the information and communication sector.¹¹ Within manufacturing, transport equipment, ICT goods, and pharmaceuticals have contributed most to the slowdown.

Firms

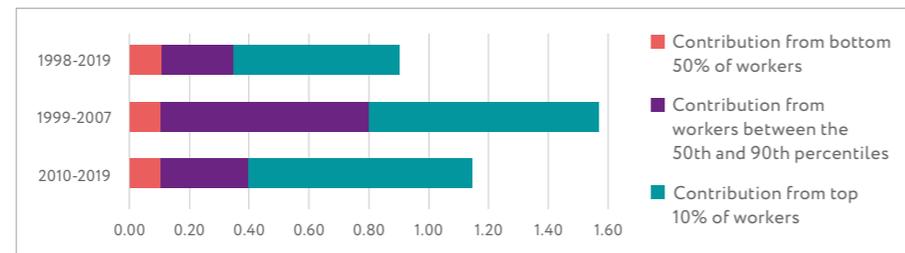
Firm-level data from the Office for National Statistics show that the productivity growth contribution from UK firms for the non-financial business economy in the top decile of the distribution of firms’ (level of) productivity is very strong. It also has not shown any sign of dropping off and is now contributing the bulk of current productivity growth (Figure 3).

The UK business landscape is characterised by a relatively long tail of less productive firms,¹² even though the degree to which the UK deviates from other countries in this respect has been challenged.¹³ In any case the 50 per cent of firms in the lower half of the productivity distribution (those with productivity levels below the median, most of them small firms) only contribute one-tenth of a per cent to aggregate productivity, and their contribution has hardly changed. Nevertheless, the underperformance of many small firms is a concern from a social and well-being point of view, especially in regions that do not have many of the most productive firms.

Finally, perhaps the most surprising finding to be obtained from this analysis is that firms with above-median productivity levels (in the 6th to 9th decile of the distribution) have accounted for the lion’s share of the productivity slowdown in the non-financial business economy since the financial crisis.

This means that firms already known to have significant potential for being productive have not been able to continue to do so for the past decade and a half. It also suggests that the diffusion of technology and innovation from the most productive companies to the most (rather than the least) productive laggards is not working well.

Figure 3: Contribution of firms with different worker productivity levels to change in average productivity growth, non-financial business economy, 1998-2019, %

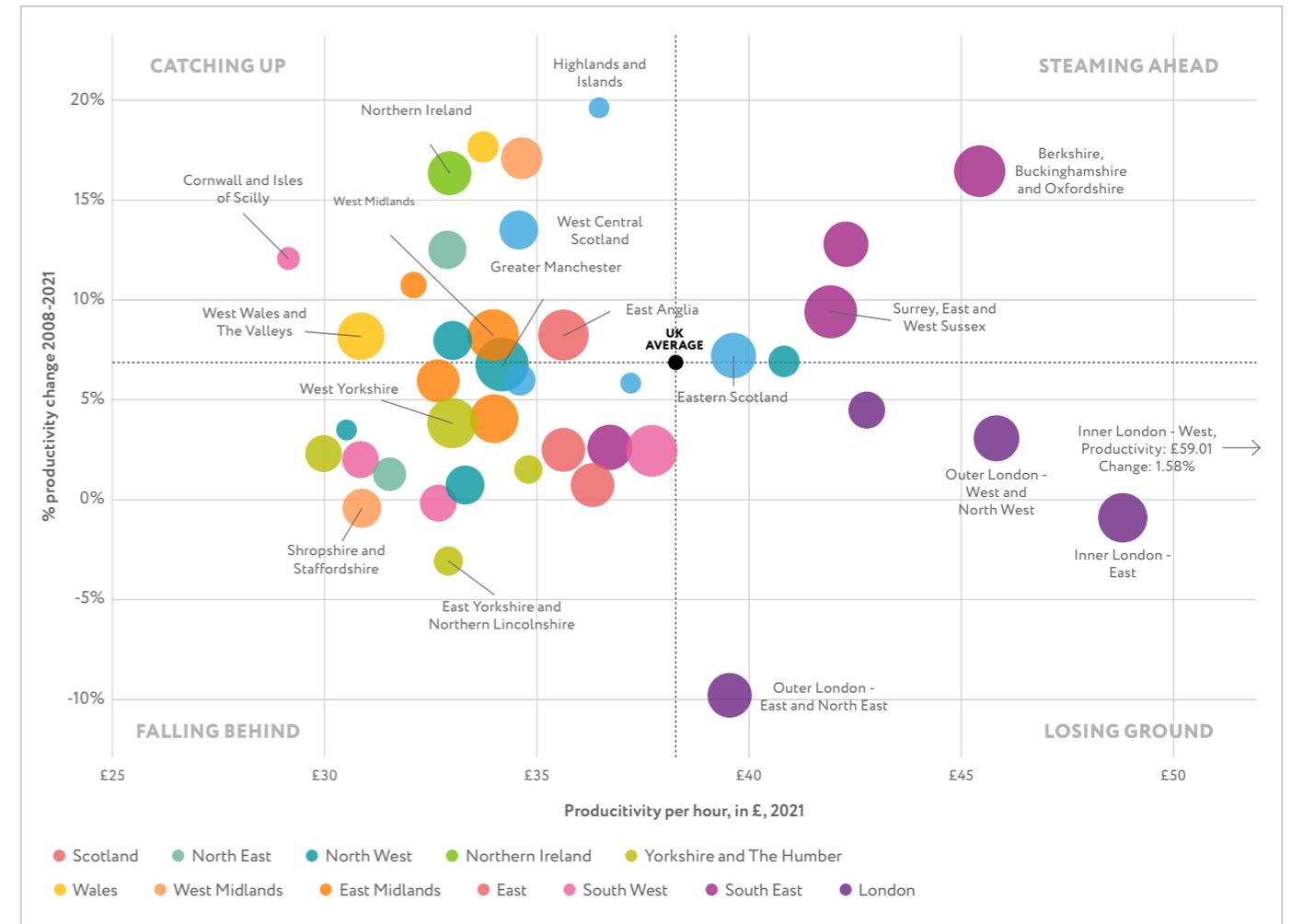


Note: the two sub-periods (1999-2007 and 2010-2019) excludes the financial crisis years (2008-2009) during which productivity fell at 1.8 per cent

Source: ONS, Firm-level labour productivity measures from the Annual Business Survey, UK: 1998 to 2019, 2022

"Firms already known to have significant potential for being productive have not been able to continue to do so for the past decade and a half."

Figure 4: UK ITL 2 regions - 2021 Nominal smoothed GVA per hour, vs.. 2008-2021 productivity change



Notes: Marker size indicates total 2021 population. Inner London West removed as an outlier.

Source: TPI visualisation, based on ONS Subregional Productivity June 2023 release

Regions

There are persistent and relatively large gaps in regional productivity in the UK which have hardly reduced over the past ten to 15 years. Even though some of the UK’s largest regional economies - including the West Midlands, Greater Manchester, and East Anglia - have slightly caught up towards London’s productivity levels, their gap with the South East has widened (Figure 4).

Major second-tier cities such as Birmingham, Manchester and Glasgow still show large productivity gaps not only relative to London but also have productivity levels well below those of peer cities in Europe. In some cases the UK cities have productivity a fifth or nearly a third lower than comparable cities elsewhere. The examples of turnaround cities which have faced similar challenges from post-war deindustrialisation suggests the journey has been made more difficult in the UK because of a lack of devolved government, coordinated policy making and sustained funding.¹⁴

Three productivity pillars



How can the UK accelerate investment across a wide range of areas across the whole of the country, including skills, intangibles, and in the net zero transition? How can the diffusion of productivity-enhancing practices between firms, places and people be strengthened? And how can the UK overcome its fragmented policy and institutional landscape at all levels?

There is no simple solution to the UK's productivity problem. Indeed, the 'productivity puzzle' can be imagined as a complicated 1,000-piece jigsaw. Nevertheless, there are important insights from research and past experience. Later chapters of this publication cover the elements of the solution in more detail. Here we set them out under three headings: people, firms, and places.



Many UK firms are trapped in a low skill, low wage, low productivity mode. This reduces the opportunities for high quality jobs that deliver productivity benefits to employers as well as material and intangible benefits to employees.¹⁵

This 'low equilibrium' trap has created a vicious cycle where, once the demand for high-level skills evaporates, so does the incentive to supply such skills through education and training. This helps explain the declining trend for firms to provide training as they lack an incentive to take steps such as developing advanced skills modules via Further Education (FE) colleges and other providers.¹⁶

The trap also means the supply of skills tends to concentrate in areas where the best job opportunities are available. Added to this, weak labour demand for graduate level skills in underperforming regions reinforces problems on the supply side of the labour market in those regions, causing a decline in the wage premium for highly skilled work, except in London.¹⁷

Skill mismatches

As Chapter Six describes, such spatial skill mismatches reinforce persistent regional inequalities. While the demand for graduates with 'tech-related' skills (in particular digital skills) is highly concentrated in some of the most

productive regions in the UK, notably the 'golden triangle' (London and the Oxford-Cambridge arc), the job demand for non-graduate tech skills is much more equally spread around the country.

The policy implications are numerous. For example, more tech graduates may migrate to the golden triangle where wages are higher, while firms in other regions facing a shortage in tech skills may therefore rely on non-graduates, highlighting the need for good FE provision.

Regional ecosystems

Vocational training and technical qualifications that better meet the needs of companies can play a key role in local and regional ecosystems that can boost productivity, not only providing skills, but also as a conduit for innovation strategy.¹⁸

This skill sorting between places contributes to the UK's extreme regional differences in the mix of skills, productivity and living standards. A different policy architecture of education and training would contribute to higher productivity in many regions, springing the low productivity trap.

There is also evidence of lower employer demand for skills in the UK as compared with the US, linking the people dimension of productivity to the weak productivity performance of many firms.¹⁹

Health and well-being

Skills are not the only important people dimension for productivity. There is plenty of evidence of a strong relationship between health and well-being and the productivity of employees.²⁰

However, the link appears increasingly broken, especially at the lower end of the skills and income range because of lack of job and livelihood security due to the rise of precarious employment.

Concerns about workforce well-being are also growing as new technologies may make current skills increasingly redundant and require retraining and development of new competencies.

Mental health issues in the workplace are widespread, and have likely increased since the pandemic, to the detriment of human capital and productivity.²¹

Home working

Three years on from the pandemic it is now clear that working from home, at least for part of the work week, is clearly beneficial for the well-being of many employees whose jobs make it possible to work away from the office.

However, the productivity effects of hybrid work models depend on the response of firms. For instance, organisations need to strategise about how to manage hybrid work from the perspective of the firms and the workers to avoid detrimental effects on productivity.²²

The rise in hybrid working may also be related to the debate about the introduction of the four-day week, which is being trialled by some organisations.²³ In order to maintain productivity with a fifth less working time, or even secure productivity gains (enabling a rising hourly wage to maintain income levels), it is critical for firms to look at the combination of skills, (digital) technology and the organisational model that would enable a hybrid approach.

Ageing

Meanwhile more attention also needs to be given to the impact that the UK's ageing workforce will have on productivity. The debate needed about the extent to which companies are adequately training and incentivising employees to stay in work has barely begun.



One way to think about firms' productivity performance in the economy is in terms of a pyramid. Not only are the characteristics of firms in the top, middle and bottom segments of the productivity distribution important in themselves, so is the interaction between firms in different segments, and their mobility across them.

As we noted, firms in the top decile of the distribution account for the lion's share of productivity growth –almost two thirds (Figure 3). Yet surprisingly, many of these top performing firms are operating in sectors that have experienced a slowdown in productivity growth, including manufacturing, digital, and finance and insurance. There are fewer large and innovative firms in the UK achieving world excellence, as reflected in the declining market capitalisation of such firms.²⁴ As Chapter Two documents, the investment performance of UK businesses (as well as public investment) has been too low for too long.

Underperformance

Another major concern, which comes into focus in Chapter Three, is the underperformance of firms that are above the mean in terms of productivity levels but not at the top, i.e. in the 6th to 9th deciles, accounting for the entire slowdown in aggregate productivity in the non-financial business economy since 2010.

For the large number of firms operating below the median productivity levels (1st to 5th deciles), those that have opportunities for growth have often lacked the support and incentives they need. Too few of these companies can scale up to become growth businesses. Some are not investing because of continued economic uncertainty and a lack of long-term vision hampered by short-termism and policy churn. Others are suffering from a lack of diffusion of productivity-enhancing practices.

Technological change

The rapid technological change in several areas, especially digital, makes the slowdown in productivity growth all the more worrying and puzzling. The UK has some advantages in terms of leading technologies, but as Chapter Four points out, there is a need for science, innovation and growth policies to be better integrated to attract global knowledge-intensive companies and strengthen the diffusion of innovations among businesses.

Ill-designed institutions and policies discourage the diffusion of technologies and innovation, and weaken firms' absorptive capacity. Institutions focused on the adoption of new technologies often do best in environments where the public and private sectors co-ordinate to complement their innovation activities.

Power of new technologies?

As Chapter Five discusses, one reason for the disconnect between technology and productivity might be that new technologies are simply not as powerful in terms of driving productivity as those of a generation ago. Twenty-five years ago, as internet adoption took off, there was scope for significant productivity gains as companies first adopted digital tools. Today there is a different landscape of virtually universal internet and mobile use.

On the other hand, that earlier digital wave also took a decade or more to be reflected in productivity growth. The new digital technologies in data

analytics, robotics and AI are still in their early days of deployment. The need for complementary investments in worker skills, management competencies and other organisational improvements is likely to contribute further to a time lag in adoption. The market dominance of major technology companies may also hinder speedy adoption elsewhere.

Competition

In some sectors markets are insufficiently competitive, blocking new entry and growth. Competition policy is therefore a key tool for enabling business dynamism and bringing innovations to market, but the evidence of indicators such as market concentration is that the UK economy remains less competitive than before 2008, while mark-ups of price over costs have continued to rise.²⁵

Globally, competition authorities have begun to take a more active stance toward enforcement, which must continue as new technologies evolve rapidly and net zero transition leads to restructuring in key sectors of the economy (see Chapters Five and Eight).

Management skills

Technology and innovation also requires improvement in management skills, which need to be more sophisticated when it comes to technology-intensive businesses, and also to strengthen access to finance especially for scale-up companies. This requires broadening the range of funding vehicles available (including venture capital, angel funding and private equity).

Twin transition

Meanwhile business challenges around the transition to net zero, discussed in Chapter Seven, are especially large. The short-term impact on productivity could be detrimental. New technologies involve risk and will need some time to come to pay a return. At the same time some trends, such as the rise of circular

business models reducing materials and energy usage and waste, can have a clear positive short-term impact on productivity.

A twin transition, focusing on how firms can use digital technologies and capabilities to innovate for environmental sustainability, could be a powerful force to co-ordinate tipping points in market growth, accelerate implementation and realise productivity gains faster. But this business opportunity will require co-ordinated and consistent government policies, whereas the UK is losing its early lead in setting appropriate net zero policies and sticking to them.

Brexit

Finally, although not a focus here, the impact of Brexit needs to be better mitigated from the perspective of productivity. Trade patterns with Europe have become distorted since Britain left the EU.²⁶ The nature of inward foreign direct investment post-Brexit has become more motivated by the desire to acquire knowledge rather than to lever technology or knowledge into UK markets.²⁷

This matters because a combination of innovation with exports plays a critical role in driving a firm's productivity performance, while engagement through FDI can be an important source of knowledge diffusion into the UK.

"A twin transition, focusing on how firms can use digital technologies and capabilities to innovate for environmental sustainability, could be a powerful force to realise productivity gains faster."



While people and firms offer two lenses on the UK's challenges, place runs through the productivity problem too.

People and firms are located in specific places, the economy is not an abstraction. There is overwhelming evidence that firms which underperform on productivity are concentrated in less-well performing regions,²⁸ which clearly links to the wider point about persistent productivity underperformance in areas outside London and the South East.

Second-tier cities

One UK specific feature is the significant underperformance of major second-tier cities. They have low productivity levels relative to London and also compared to comparator cities across Europe.²⁹ This means the UK is flying on just one engine, London and the South East, whereas most other countries have multiple engines.

Second-tier UK cities account for around two-fifths of the UK population. Raising productivity levels and growth around the country will raise the national performance, and will reduce the burden on London to support the rest of the country. Productivity is not a zero-sum game.

The deindustrialisation of cities such as Birmingham, Manchester, Liverpool, Belfast and Glasgow has undoubtedly played a part in their current

situation. In general, the UK is in need of a long-term regional development policy. Multiple studies have stressed the importance of long-term stability in terms of regional economic policy. Chapter Nine sets out the scale of the regional disparities, discusses what has contributed to this unwelcome UK distinctiveness, and highlights the policy shortcomings that contribute to it.

Underinvestment in regions

The UK has not only systemically underinvested in its regions, but also frequently changed the regional economic growth structures. The 2012 abolition of Regional Development Agencies that were set up in 1999 and introduction of Local Enterprise Partnerships, to be abolished in 2024, is a particular case in point.³⁰

The different aspects of regional policy need to be joined up too. Co-ordination across policy areas can be easier at levels of government below the centre, although there is also too much fragmentation of responsibility sub-nationally.³¹

In terms of structure, the mayoral combined authority model is clearly gaining traction, especially in Greater Manchester where the ten local authorities have a long track record of working effectively together. But long-term questions remain, not least the continued absence of meaningful tax and spending powers for devolved assemblies.³²

Public sector

Improved productivity in the public sector can contribute significantly to better performance of places beyond London and the South East. As discussed in Chapter Eight, a productive private sector needs a productive public sector to deliver healthy and skilled workers, provide infrastructure, co-ordinate across the economy and make fundamental investments.

Policy implications

The decisions made by people and firms matter for productivity outcomes, but the government's role is central. The UK's productivity problem is a problem of governance and policy too. The UK needs to develop an integrated range of pro-productivity policies, commit to them for the long term, and co-ordinate with businesses and public sector organisations, and with workers, in implementing and executing productivity-enhancing practices.

This report ends (Chapter Ten) with a proposal to establish a new institution to better coordinate policies on growth and productivity, both horizontally across policy domains and vertically from central and devolved government to local and combined authorities.

Managing trade-offs

While productivity is primarily a positive notion, it sometimes has negative connotations. Cost-cutting and efficiency drives, which focus on using

fewer resources to do as much as or more than before, may create concerns about jobs and workforce well-being. They may involve the depletion of other resources, including nature and the environment. And they can reduce the quality of the outputs.

Such negative effects from productivity efforts, which often arise in the short-term, need to be well-managed by policy makers and business leaders, and be outweighed by long-term gains.

Inclusive growth

Amid the many questions and challenges thrown up by the UK's productivity problem, we should not lose sight of the fact that productivity matters not only to boost economic growth, but also to sustain and improve people's living standards over time and ensure that the benefits of a vibrant economy are shared.

This is why it is important for as many people and firms as possible to have

access to the resources and opportunities they need to engage in the effort to improve productivity. This effort cannot be something that is done to them by others, who then get the lion's share of the benefits. Improving productivity is for all the UK's people and firms, wherever they are located. If growth is not inclusive, with the ultimate goals of well-being and sustainability, the UK's ambition of raising productivity will fail.

If we use resources more efficiently and effectively to create better outcomes, organisations will be more successful in what they do, people will experience higher living standards and well-being, and places will become more attractive to live, work and do business in, and create inclusive growth.

Inclusive economic growth means there is broad based access for people, firms and places to all productive resources, to enable these to be transformed efficiently and effectively into outcomes, with benefits distributed widely across society.

"If growth is not inclusive, with the ultimate goals of well-being and sustainability, the UK's ambition of raising productivity will fail."

Key takeaways

The UK needs to develop an integrated range of pro-productivity policies and commit to them for the long-term.

Pro-productivity policies need to address the performance of people, firms and places.

The key challenges to address are for the country to invest again, improve knowledge diffusion and join up institutions for growth.

Pro-productivity policies need to be co-ordinated vertically between national, devolved nations, regional and local governments.



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Investing for the long-run



CHAPTER TWO

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"Low investment is the proximate cause of low productivity and the UK's weak growth performance. But low investment itself is due to many factors, implying that no single reform is sufficient to resolve the problem while many may be necessary."

Investment lies at the root of economic growth and prosperity. When an economy channels funds into capital, it creates the building blocks for a higher level of productivity in the future, and more diffusion of ideas and innovation that underpin technological progress and higher wages.

The British economy has suffered from chronic levels of underinvestment compared to those economies that have delivered greater improvements in living standards over the past quarter of a century. The puzzle of underinvestment is all the greater considering the sharp fall in the cost of capital and in the relative price of many capital goods.

This chapter explains how investment matters for productivity and economic performance, while also exploring the possible reasons for this persistent underinvestment. We also outline directions for policy reform, discussing the steps that need to be taken to raise the quantity and quality of investment required for the UK to keep up with comparator nations.

Economic performance

A country's long-run economic performance is crucially dependent on investments that build the stocks of physical assets (such as structures, equipment, and infrastructure), knowledge assets (technology and work practices), and human skills.

Looking at the process of economic growth in the context of the industrialisation of the UK since the 18th

century, the critical role of investment becomes very clear. Indeed, this role has formed a blueprint for emerging economies around the world. There are three main channels through which investment in these assets determine performance and well-being.

The first is that these assets support the services that are critical to households and our day-to-day well-being. Housing, utilities such as electricity and water, the transport system, and the broader provision of public services all depend on stocks of equipment, technology, and knowledge. Much of this infrastructure is supplied by the public sector and is closely related to the degree of state capacity and the ability to raise revenue.

The second is that investment is necessary to create jobs. The labour force is growing, and there is inevitable turnover of firms and of people within firms. Creation of new jobs requires investment to provide accommodation, equipment, and working environments for new employees. Typically new, increased investment leads to better jobs at the productivity frontier with higher wages. The need to match each worker with a greater level of capital is critical.

And third, investment puts new technologies into use. Low investment means living and working in environments with old, outdated and possibly unreliable equipment and techniques. As new technologies appear they are generally embodied in – and often only accessible through – new equipment. This applies to new 'hard' technologies (machinery, structures, ICT hardware), and often also

to 'soft' technologies (business models, ways of working, and computer software).

It also certainly applies to the technologies that will be required to attain net zero, as Chapter Seven will discuss. Getting close to the technology frontier requires a continual process of investment. Low and stalling levels of investment are consistent with lagging behind the frontier and a fall in national income per head relative to other OECD economies. This has become the UK story, especially since the global financial crisis.

Low investment rates

In recent decades the UK has had low investment rates in many of these assets. This secular pattern has been associated with 'short-termism', where society has tended to choose consumption over long-term investment, as well as impose high rates of discounting the future. So the UK's capital stock has fallen relative to that typically found in other advanced economies.

This preference for consumption over investment has become a central concern, as it has also resulted in a secular decline in the UK's net international investment position, the fall in the government's net financial worth, and an increase in indebtedness.

UK Investment: the facts

Looking at the composition of output in the UK over the past half century or so, Figure 1 shows the deviation of the shares of consumption, investment, and net exports from their average values over the last 50 years. From the period of financial deregulation in the 1980s onwards the share of consumption has trended up while both net trade and investment have, if anything, trended the other way.

These facts underly the observation that the UK has the mix between consumption and investment wrong.

Accordingly, the overall investment rate in the UK fell from a high of around 23% of GDP in the late 1980s, to around 17% from 2000 onwards, i.e. falling to just three-quarters of its previous share. Investment rates in other G7 countries remained largely in the range of 20% - 25%, as can be shown in Figure 2.

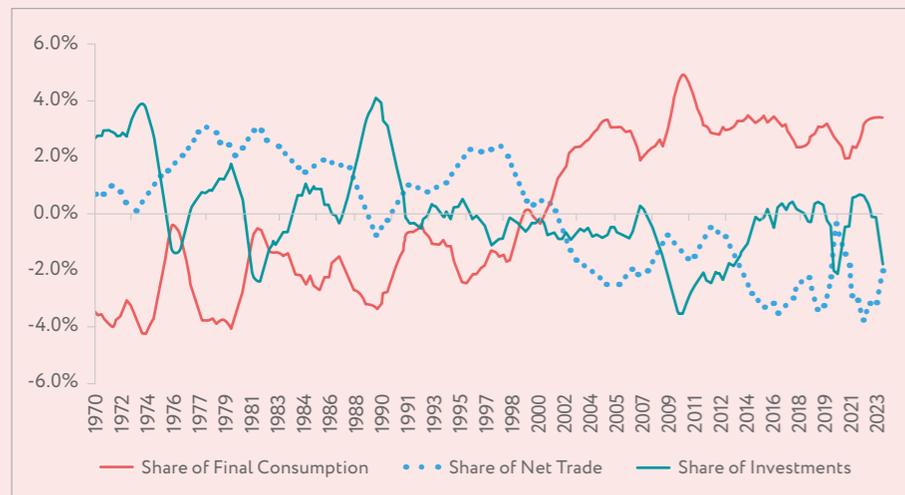
Equipment and machinery

This decline was dominated by a fall in investment in equipment and machinery (including ICT equipment), falling from around 8% of GDP in 1987-97 to less than 4% from 2009 onwards, the lowest share in the G7.¹ Much of this consists of business investment, the total of which fell from around 12% of GDP to 9% in the three and a half decades.

Much investment is now in hard to measure intangibles – the stocks of knowledge, patents, brand value and goodwill – created or acquired by companies. A large component of this is intellectual property, broadly constant at around 4% of GDP, so slightly increasing its share in investment as a whole. However, having been above the average for G7 countries in the 1980s, the UK is in this respect also now well behind the share in the US, Japan and France.

"From the period of financial deregulation in the 1980s onwards the share of consumption has trended up while both net trade and investment have trended the other way."

Figure 1: Consumption, trade and investment shares to GDP (% point deviation from mean) (1970-2023)



Source: Chadha and Samiri (2022)

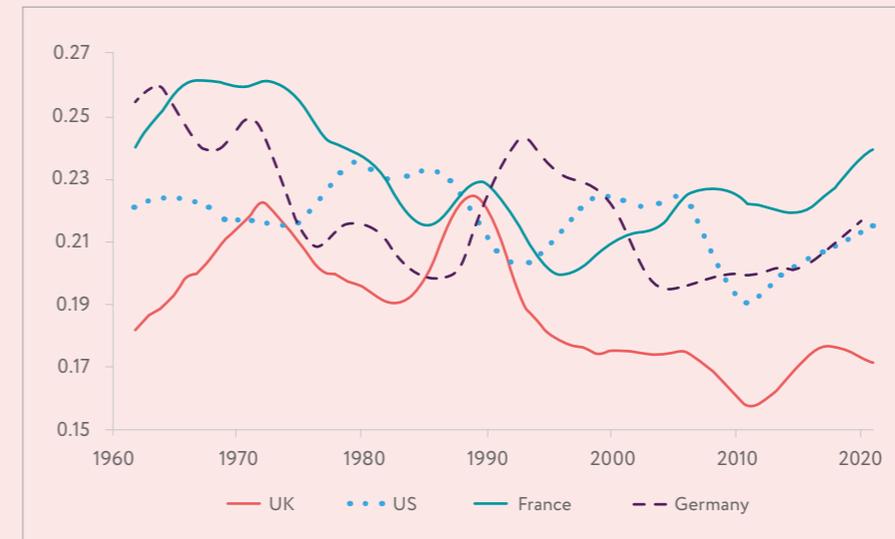


Figure 2: International comparison of investment as a percentage share of GDP (1960-2021)

Source: Chadha and Samiri (2022)

Technological progress

In the long-run the main drivers of productivity are technological progress and innovation, as described in Chapters Four and Five. These are embodied in new investment and are fostered by investment in research and development. Most of the new technologies employed in any one country like the UK have been developed in other countries, but an active domestic R&D programme is important, both to produce technologies required for UK firms to be internationally competitive, and to facilitate the absorption and adoption of technologies developed elsewhere.

Over the past 30 years the share of R&D expenditures to GDP has been falling in the UK, to below 2% of GDP. While R&D data is currently under revision (see Chapter Four), it suggests that the UK is relatively low compared to other G7 countries, with Japan spending 3.5% of its income on R&D and the US and Germany spending approximately 2.8%.

Accessing credit

The uncertainty and high risk linked to R&D investment constrains firms in accessing credit, and they cannot generally take into account the positive externalities that are generated by such investments when making business investment decisions.

This suggests that current levels of R&D expenditure in developed economies are less than desirable and that long-term growth prospects could be significantly increased if public policies focusing on enhancing R&D expenditures were to be introduced (IMF Chapter 2, 2016). In the UK more than 45% of R&D projects are funded by business enterprises while 33% comes from the public sector. The data also shows a positive relationship between public R&D and private R&D which suggests the two are complements, not substitutes. Government intervention should not only consist in reducing market frictions. Public funding supports investment projects along the whole innovation process.

"The data also shows a positive relationship between public R&D and private R&D."

Public and private sector investment

The share of GDP accounted for by net public investment dropped from 4.5% of GDP on average between 1949 and 1978, to 1.5% between 1979 and 2019. A considerable part of this decline can be explained by the privatisation programme of the Thatcher administration. The subsequent disappointing investment performance and investment by utilities and the transport network raises questions about their regulation.

It also seems that attempts to control public debt, especially since 2010 and the establishment of the Office of Budget Responsibility (OBR), may have created an incentive to trim public investment at successive fiscal events. The remit of the OBR, which is focused on short-term output and debt projections, does not allow for such investment to feed through into the supply side of the economy and hence drive up income, the denominator of the debt to GDP equation.²

Green Book

A move to what is termed 'dynamic scoring' may also point to the need to reconsider how the Treasury's Green Book appraises potential investment projects and ultimately how the UK manages large scale infrastructure projects. These typically run late and tend to be very expensive.

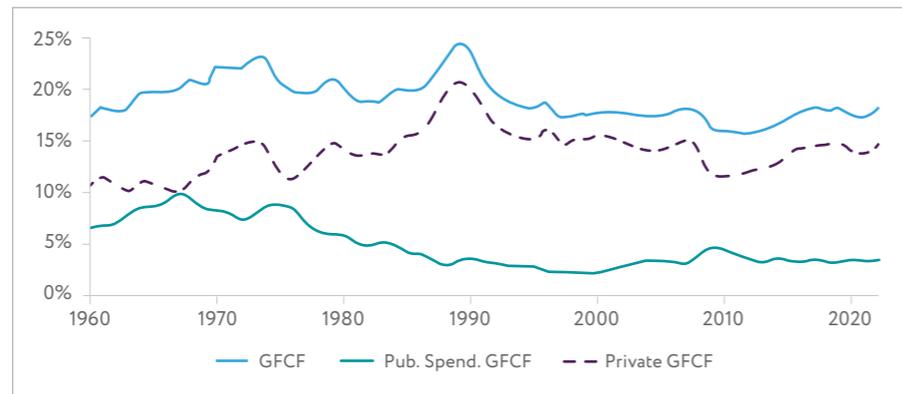
If we compare the typical UK project that does not have a credible commitment attached to it with the example of East Germany's reconstruction, which had both huge funding attached and a long run commitment that outlasted any parliamentary cycle, there are important lessons to learn.

Specifically, the East German process was built on a national consensus to build incomes in the East following re-unification with some €2 trillion spent over 1990-2014.³ Indeed the key programme, Aufbau Ost, was launched contingent on the agreement that it would only end

when the task had been completed, and not against an arbitrary timescale. This compares favourably with the stop-start process we typically see in the UK where ongoing project management is subject to new political or financial hurdles that create uncertainty and delay, ultimately affecting the private sector's willingness to invest in complementary assets.

To the extent that the public sector should be reducing uncertainty for the private sector with well-designed public investment, which is likely to have the largest multipliers on overall economic activity, the UK has a problem. Crucially, public investment should play a role in improving the environment for business, and so support a higher level of private investment. This will occur particularly if there is a general sense that the investment will go ahead and be delivered. Uncertainty over completion, underlined by successive cancellations of parts of the HS2 project, limits the positive response of the supply side.

Figure 3: Total investment (% of GDP) split by public and private (1960-2022)



Source: Chadha and Samiri (2022)

"Brexit has also raised the cost of exporting, and has been particularly damaging to functioning within Europe-wide supply chains."

Private sector

Private investment decisions depend on the balance between the costs of undertaking a project, and the future benefits expected to accrue to the investor. There are, at risk of oversimplification, three factors that tip this balance in favour of a firm making an investment.

The first is an expectation of growing domestic demand for the products or services it provides. The second is the prospect of using the investment as a base to supply export markets or participate in global value chains. This is particularly important for multinational firms engaged in foreign direct investment (FDI) which supply many markets and have a wide range of possible locations from which to operate. The third is simply cost reduction - even if there is little prospect of growing the firm it may be profitable to install new technology, replacing old equipment or more costly workers.

Austerity and Brexit

The first two of these motives have been undermined by events of the last 15 years. Austerity, in both its post-financial crisis and current forms, leads to expectations of low growth of domestic spending, and this in turn discourages investment. And Brexit, elevating levels of uncertainty, has also raised the cost of exporting, and has been particularly damaging to functioning within Europe-wide supply chains.

Much of the UK's past inward FDI has been described as 'export platform', for example as Japanese firms use the UK as a base from which to supply the European Single Market, a motivation that is now much reduced. While these two factors are likely to have depressed investment, and to continue to do so, the timing suggests that they are not a full explanation of the UK's investment record. What other underlying factors might be at play? There are many suspects, having a combined impact, rather than a single striking cause.

The cost of investment

Is it more difficult, or more expensive, to undertake an investment project in the UK than a similar project in other countries? Evidence here is fragmentary, covering many aspects of the obstacles to, and costs of, new investment projects. Land is expensive (in some places) and planning procedures often slower and more burdensome than elsewhere. Efficiency in the construction sector varies widely, and the lack of domestic capacity for undertaking major projects has reduced competitive pressure and raised construction prices.

Some evidence suggests that the combination of land and building regulations and construction costs creates significantly higher project costs in the UK than elsewhere. Upgrading equipment – for example, ICT services – may also face relatively high costs. Studies of the adoption of new digital technologies often point to the shortage of skilled workers able to install and operate the new tools as obstacles to investment in them (Chapter Five).

Private returns to investment

We have already referred to the importance of reaching markets (international or expanding domestic markets) in shaping the benefit firms expect to reap from investment, and suggested that austerity and Brexit have damaged prospects. The competitive environment also matters. If firms face too little competition then their most profitable strategy might be to restrict output and raise prices, rather than lower costs or improve quality in order to grow market share.

What about investments designed principally not to expand capacity but to reduce operating costs? There are two sides to this question. One is that some costs in the UK are already low, so the pay-off to reducing them further is small. If low-skilled labour in the UK is cheap (and flexible, with flexible contract terms) why bother to invest in equipment that might replace labour?

The other side is that some elements of costs in the UK are high, and are outside firms' control even if they do invest. This is particularly the case for complementary public investments. Poor transport infrastructure (for moving goods to market and people to work), high regulatory burdens, high energy costs, high housing and rental costs, and high costs of skilled workers make the UK a less attractive place for internationally mobile investment, and may also reduce the return on investments more broadly.

Capital and finance

There is an extensive literature on the difficulties faced by firms in raising necessary finance. The venture capital market in the UK is deeper than in other European countries, although regionally concentrated in the South East, and much thinner than that in the US. On the other hand, there are frequent and long-standing claims that firms, SMEs in particular, are constrained by the difficulty of raising funds for long-term investment.

Intangible investments are particularly hard to finance as they lack the collateral provided by tangible assets, and Chapter Three discusses further the constraints on investment by firms, especially SMEs.

Larger firms can have their own bias to short-termism, as the tenure of top managers is often short, and financial markets may create pressure to deliver short-run financial results designed to maximise share prices. In the US and UK the role of private equity is often viewed as a damaging aspect of 'financialisation' as debt is loaded onto companies to finance short-term payouts. In the Scandinavian model, however, private equity has been used to fund long-term growth, with beneficial effects for both firm expansion and profitability.

Uncertainty and short-termism

Uncertainty deters investment - it causes plans to be postponed, and the additional risk contributes to a high hurdle rate of return required to initiate a project.

A particular area in which the UK has created a high degree of uncertainty is in government policy. We noted above the decline of public investment, but the uncertainty problem extends to fiscal matters (including corporate taxation), to strategy to particular sectors, and to regulation more broadly.

The government-related uncertainty in UK industrial policy is documented by Coyle and Mukhtar (2023),⁴ who point to a lack of coordination between different parts of government and other stakeholders, and an acute lack of consistency. Industrial strategies and regulatory measures have been subject to frequent change, creating uncertainty and preventing government from learning from experience over time.

An important aspect of policy uncertainty is the tax treatment of investment. Can capital expenditure be offset against future revenues? The UK regime has been through multiple changes, adding an unwelcome level of uncertainty. Although the current UK system is relatively generous, it has gone through at least 18 and as many as 24 changes since 1984 and that complicates long-term planning.

Finally, there is the issue of management quality and ambition. This varies hugely between firms, although there is evidence that UK management quality is low by international standards. In smaller firms managers may be overwhelmed by day-to-day running of the operation, or preoccupied with ensuring survival of the firm. Both of these factors create 'short-termism'. The strategic thinking about the long-run that is needed for investment is absent, and where it does take place it might be based on criteria that are biased towards short-term projects (e.g. the pay-off period criterion rather than the full value of a project over its lifetime).

"In smaller firms managers may be overwhelmed by day-to-day running of the operation, or preoccupied with ensuring survival of the firm."

Policy implications

The failure to undertake one particular investment project that would – under other conditions – have been profitable, means a loss of this profit but has little wider effect, except perhaps in the local economy.

Importantly, though, failure to undertake many projects – and aggregating up to the national level – does not just mean profits foregone, but means lower wages (and tax revenues), and indeed lower income per head. If a place is a desirable location for investment and one where productivity is being rapidly upgraded by the use of new technologies, then its international competitiveness and employment prospects improve. As this happens so wages rise, transmitting the benefits to wider society.

Low investment impact

Rough estimates of the effects of low investment on income can be derived from aggregate level data. If the UK capital stock is around 25% lower than comparator countries, this reduces the amount of capital per worker, which translates into around 8% lower per capita income. If it results in older capital stock and hence less up to date techniques, then this might be expected to cost around a 7-10% loss of income.

Research by the Resolution Foundation⁵ suggests that almost all of the 15% gap between the hourly productivity of UK workers and those in France is accounted for by lower capital per worker. Additionally, growth accounting exercises that attribute growth outcomes to the different inputs suggest that more

than a third of the slowdown in labour productivity growth since the global financial crisis can be accounted for by capital shallowing.

Low investment is the proximate cause of low productivity and the UK's weak growth performance. But low investment itself is due to many factors, implying that no single reform is sufficient to resolve the problem while many may be necessary. Priorities for change lie in three directions.

REDUCE THE COSTS OF UNDERTAKING LARGE INVESTMENT PROJECTS

One aspect is the simplification and speeding up of planning, land use, and other regulatory obstacles to the design and implementation of investment projects. Another is to build the skill base required to install and operate a modern capital stock, and the competitive supply chain that can deliver projects effectively. Bottlenecks in finance need to be identified and addressed.

CREATE A STABLE AND EXPANSIONARY SET OF ECONOMIC POLICIES

Allow businesses to formulate long-run plans with a reasonable degree of confidence. One aspect of this is at the macroeconomic level, to nurture expectations of both growth and financial stability. The other aspect is the micro-economic policy environment for industrial strategy, R&D, tax, and trade policy. Confidence needs to be built in the quality and stability of the new policy structures erected.

RECOGNISE THAT INVESTMENT BEGETS INVESTMENT

High quality infrastructure and skills, or the firm expectation of such, makes a country, region or city, more attractive for private sector investment. And private sector investment projects create spillover effects – through knowledge and skills development and by growing firm-to-firm supply chains – that attract further investment.

Investment should therefore be high in public spending priorities and policy design, not subject to capriciousness that we have seen repeatedly in the UK and so have come to expect. The methodology of the ex ante assessment of public investment projects needs to be carefully examined, and the management of projects once commissioned needs to be far more effectively focused on final delivery.

Each of these priorities is made more important by the transition to net zero carbon emissions, as public investment, support for private investment, and regulatory policies need to combine to create the appropriate trajectory for the scale of private investment required in the transition.

The achievement of the momentum required to lift us out of the low investment trap – in a coordinated and consistent manner – will ultimately require institutional reform, as discussed in Chapter Ten's case for a new, independent growth and productivity institution in the UK. The UK needs its leaders to find political will to set long-term objectives and stick with them. The tinkering will have to stop.

Key takeaways

Investment should be high in public spending priorities and policy design.

Reduce the costs of undertaking large investment projects.

Create a stable and expansionary set of economic policies.

Investment policies crucial to achieving transition to net zero.



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* The views contained in this chapter do not necessarily reflect those of the National Institute of Economic and Social Research.

The changing landscape of firm-level productivity – anatomy and policy implications



CHAPTER THREE

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"What drives productivity growth in a Cambridge spin-out will be very different from a Hebridean weaver."

It is widely recognised that average levels of labour productivity in the UK lag those in many of our international competitors. But how meaningful or helpful are these comparisons of averages? And what do they actually tell us about what is going on in companies, given that productivity varies widely within, as well as between, specific industries?

The productivity disparities between the best firms and the rest have widened in recent years.¹ Other studies have also suggested marked – and perhaps unexpected – differences in sectoral productivity trajectories in the UK.^{2&3}

This chapter focuses on the firm-level factors which have contributed to the recent productivity performance of the UK. However, sectoral and regional disparities, and the contrasting productivity performance of frontier and non-frontier firms, mean that this cannot be a single story. What drives productivity growth in a Cambridge spin-out will, of course, be very different from a Hebridean weaver. Even within the same sector, the productivity drivers for an international law firm in London will inevitably be very different to a high-street partnership in Halifax.

The situation will be further complicated in future by changing work patterns, which bring uncertain implications. A 2022 CIPD survey, for example, suggested that 41 per cent

of firms implementing home working said employees were more productive, but 19 per cent thought they were less productive.⁴

Changing landscape

The next section describes the changing landscape of business productivity in the UK, and this is followed by a review of the data and evidence on some of the factors which may be shaping this landscape. This suggests that the productivity gap between the 'best' and the 'rest' is also reflected in innovation and, potentially, firms' ability to adopt new technologies (see Chapter Five).

I then focus more specifically on the 'rest', looking at productivity drivers at and behind the productivity frontier. The perspective taken is that of the economist or policy maker measuring productivity as either value added per employee or total factor productivity (TFP).

Neither of these measures commonly feature in boardroom discussions of business growth or performance, so I then consider the challenges this raises, while the final section considers the policy implications of the productivity and innovation gaps.

The changing productivity landscape

Recent studies, based on sectoral tangible and intangible investment data, find that the slowdown in UK labour productivity and TFP growth has been greatest in the more intangible, knowledge- and digitally-intensive sectors.²

“Overall, we find that the TFP slowdown in intangible-intensive industries ... almost entirely explains the aggregate TFP slowdown ... consistent with the hypothesis that the slowdown has occurred at the technological or knowledge frontier,”²

Their emphasis on intangible-intensive, high-value sectors, and ‘within-industry’ drivers, is consistent with earlier evidence.³ But why is this pattern emerging? Goodridge and Haskel identify three potential mechanisms:

“There is evidence that the difference between firms within sectors, particularly in the service sector, is increasing over time, and that diffusion of ideas, technologies and business practices is not diffusing from the ‘best to the rest’ as quickly as it once was, meaning that the best firms are accelerating away from the rest.”

Firstly, reduced knowledge spillovers or diffusion (knowledge accumulation) linked to weakness in intangible capital services limiting firms’ absorptive capacity. For example, the York and North Yorkshire Local Enterprise Partnership (LEP) in their evidence to the TPI Productivity Commission suggested:

Secondly, the lasting impacts of the 2008 financial crisis making access to capital more difficult for firms, particularly in intangible-intensive industries. This effect, intensified by the subsequent impact of Brexit, Covid-19 and rising costs, “has contributed to lower investment growth and slowed efforts in innovation and research and development.”⁵

Policy since 2008 may also have exacerbated this effect, with low interest rates (until recently) leading to investment more strongly oriented to growth than productivity.⁶ “Monetary policy is found to significantly reduce the cost of capital for firms pursuing strategies of rapid expansion, while more stable productivity focussed firms would have only benefited indirectly.”

Thirdly, increasing concentrations of market power within intangible-intensive sectors which may be reducing effective competition and increasing barriers to entry.^{7&8}

Figure 1: Productivity (GVA per employee) dispersion in the UK: Domestic and foreign firms



Source: Firm level productivity estimates 1998-2019, ONS

Different sectors

Each factor may of course be important in different sectors, leading Coyle and Mei³ to suggest a need for more firm-level or plant-level analysis to explore distributional patterns or ‘common structural shifts’ within sectors.

One potentially important aspect of within-sector structure relates to ownership. Coyle and Mei (2023, Figure 18),³ for example, illustrate very different productivity growth trends for UK-owned firms, multinationals and those firms which were subject to take over.

Bournakis et al., (2019)⁹ consider the impact of ownership on regional TFP across the UK and demonstrate that both R&D and intangible investment by multinational enterprises (MNEs) have stronger impacts than that by domestic firms, suggesting this underlies “the superiority of MNEs’ organisational and managerial practices in promoting local development.”

More recently, Fingleton et al., (2023)¹⁰ consider the negative effects of Brexit on UK regional productivity, identifying smaller negative effects in London than elsewhere.

Variations within sectors

There is also longstanding evidence of variations in firm productivity within sectors,¹¹ and a widespread view that the UK is distinctive in having a particularly long tail of low productivity companies which drags down the overall average.

This morphs into the view that large British companies are excellent but are let down by their smaller counterparts, unlike in competitor countries like Germany.⁵

Rehill et al., (2021)¹ examine the firm-level evidence for Ireland and suggest that post-financial crisis productivity recovery by firms in the top decile (‘frontier firms’) had been stronger than elsewhere in the productivity distribution, indicating ‘a widening in the productivity gap between the best and the rest’.¹

This echoes the findings of OECD research which emphasises the widespread international experience of growing performance gaps between frontier and non-frontier firms.¹²

Frontier firms

Similar increases in dispersion are also evident in the UK if we compare productivity frontier firms (those in the top decile of the productivity distribution) with those towards the bottom (the 25th percentile) in the distribution of labour productivity (see Figure 1). Referring to this data, Chiara Criscuolo (OECD) suggested to the Productivity Commission that “the gap between the top and worst performing firms is much larger in the UK compared to other countries.”⁵

How much does this dispersion matter? In Chapter One we emphasise that the slowdown in aggregate productivity growth post-2010 is primarily due to a sharp fall in growth in firms in the 5th to 9th decile of the productivity distribution. It is this group of firms ‘behind the frontier’ which therefore must improve their performance if future productivity growth is to be improved.

Productivity dispersion can also have wider economic and social consequences, through increasing divergence in wages between the most and least productive firms. This in turn has been linked to growing inequality and divergence.¹³

A capital approach to productivity drivers

What might explain this pattern of a bigger productivity growth slowdown among intangible-intensive or high value sectors but a growing gap between the frontier firms and the rest (which implies increasing dispersion among firms within sectors)?

Martin and Riley (2023)¹⁴ provide a good overview of the range of factors usually included in seeking to explain firm level TFP or labour productivity – and what we might be missing:

"Capital services that are often accounted for in these calculations include tangible capital services such as machinery and equipment, but there is a slew of other capital assets that might also be included. ... Capital assets that are often "missing" from TFP calculations include natural, social, intangible and human capital,"

(Martin and Riley, p.5).

Management scholars would extend this list of missing factors to include related organisational or intangible factors such as the quality of management and leadership, training, innovation, work

organisation, workplace well-being and, increasingly, digitalisation.

Reviewing the evidence on the drivers of UK productivity, NIESR (2022)⁵ considers this long list of productivity drivers, alongside more structural explanations. Driffield et al. (2021),¹⁵ however, argue that the balance of influence of structural and more intangible factors on productivity is changing rapidly. Their analysis of OECD firms across all regions and sectors suggested the decreasing importance of structural factors (size, location, sector and ownership) to firm productivity, and the growing contribution of organisational and intangible factors (among other things) to increasing productivity differentials.

Younger firms

For example, it is often argued that smaller and younger firms face specific barriers to borrowing related to risk, asymmetric information and a lack of collateral, which may be limiting their ability to make productivity enhancing investments.¹⁶

Notably, Motta also finds that lower productivity SMEs are most likely to be rejected when seeking external finance. UK SMEs may also have been disproportionately impacted by economic instability. For example Martin Sartorius, giving evidence to the TPI productivity commission, emphasised stability and policy certainty as key to making investment decisions:

"Looking internationally, the UK has been going through kind of quite a volatile period over the last six years or so. And that does stand out from other international peer countries. And it comes up all the time when we kind of speak with businesses."

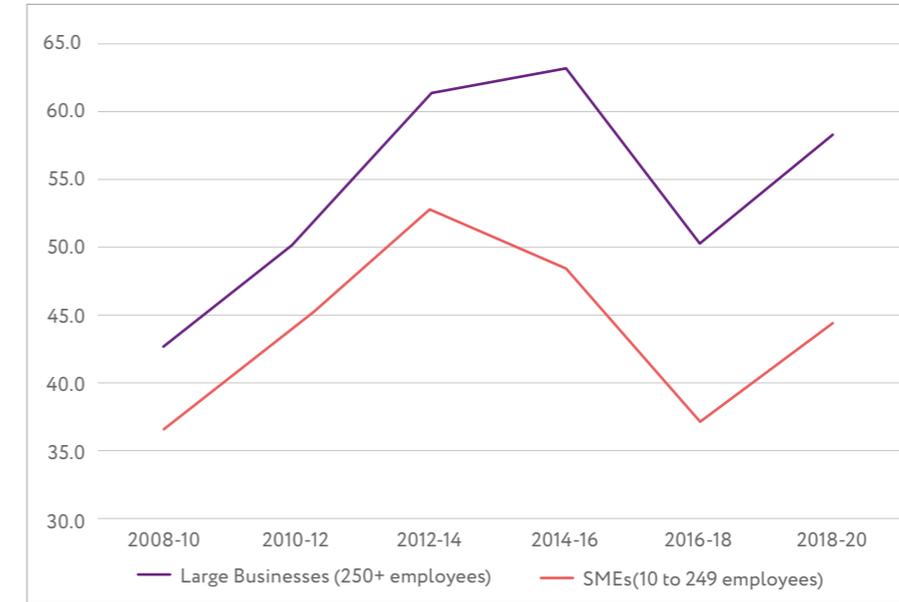
(NIESR 2023, p. 13).

This type of effect seems likely to have intensified during the recent surge in costs for businesses, and weaknesses in SME investment (both in tangible and intangible capital) continue to be linked to concentrations of lower productivity in firms and regions. Jordan and Turner (2021),¹⁸ for example, discussing the persistent productivity deficit in Northern Ireland, identify persistent under-investment in R&D as a key issue for that region.

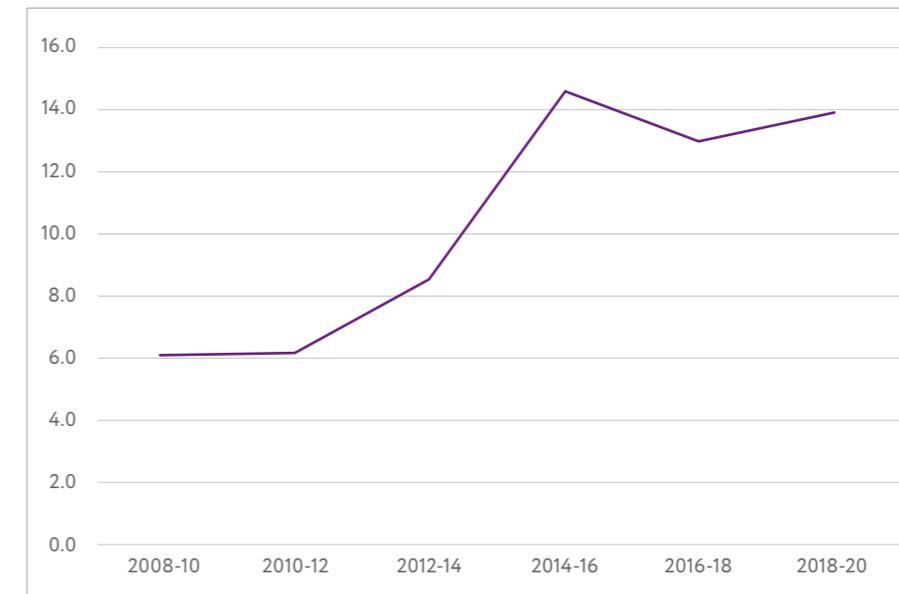
More generally, the increasing divergence in terms of productivity is also reflected in other, related firm-level metrics. For example, over recent years although levels of innovative activity have varied among UK firms (see Figure 2a), the gap between the proportion of large firms and SMEs engaging in innovation across the UK has increased consistently.

Figure 2: Percentage of UK firms which are 'innovation active'.

A: % of businesses which are innovation active



B: Difference in % of innovation active firms (large firms less SMEs)



Source: UK Innovation Survey. Innovation active firms are those engaged in some aspect of innovative activity undertaking R&D or any form of product, process or business model innovation.

Lack of diffusion

While the growing gap between innovation by large and small or medium firms could reflect changes in the introduction of novel products or services, it might also capture issues related to the lack of diffusion of new technologies, which has been linked to growing productivity differentials (see Chapter Five).¹²

In academic studies, firms' ability to identify and adopt new technologies – known as absorptive capacity – is typically related to skill levels and firms' in-house R&D capacity, both of which may be more limited in SMEs.

It is notable too that in the Global Innovation Index UK firms' knowledge absorption capacity is one of the lowest ranked elements of the UK's profile – ranked 34th overall – compared to the overall rank of 4th for the whole UK innovation system.¹⁹

Management practices

Another potential contributor to divergence in productivity, supported by strong international evidence, relates to firms' management practices.²⁰

Here, small firm size and family ownership are both linked to lower levels of adoption of productivity enhancing management practices.²¹ Ownership also proves important, with fewer good management practices adopted by UK-owned than foreign businesses. More granular analysis by ONS suggests that some specific management practices have particularly strong correlations with productivity such as continuous improvement practices, the number of key performance indicators (KPIs) monitored by the business, the performance bonus of non-managers related to targets, promotion practices for managers, and training practices for non-managers.²²

Productivity drivers at, and behind, the frontier

Bartelsman et al. (2015)²³ consider the drivers of productivity at, and behind, the productivity frontier with a specific focus on human capital and innovation. Using data for large numbers of German and Dutch companies, their results suggest that the productivity benefits of product innovation are – perhaps unsurprisingly – greater in already more productive firms.

Similar to the UK results of Coyle & Mei (2023)³ and Goodridge and Haskel (2023),² sectoral variations are evident in the productivity returns to human capital which are higher closer to the frontier in low technology sectors and lower in high technology sectors. Ownership also proves important in Bartelsman et al., (2015)²³ with firms which were part of a

group experiencing higher productivity returns to human capital and innovation.

Firms behind the frontier

So, what shapes productivity growth in firms behind the frontier? Jibril et al. (2020)²⁴ examined the drivers of productivity growth among UK SMEs over the 2016-18 period using a combination of quantitative and qualitative methods.

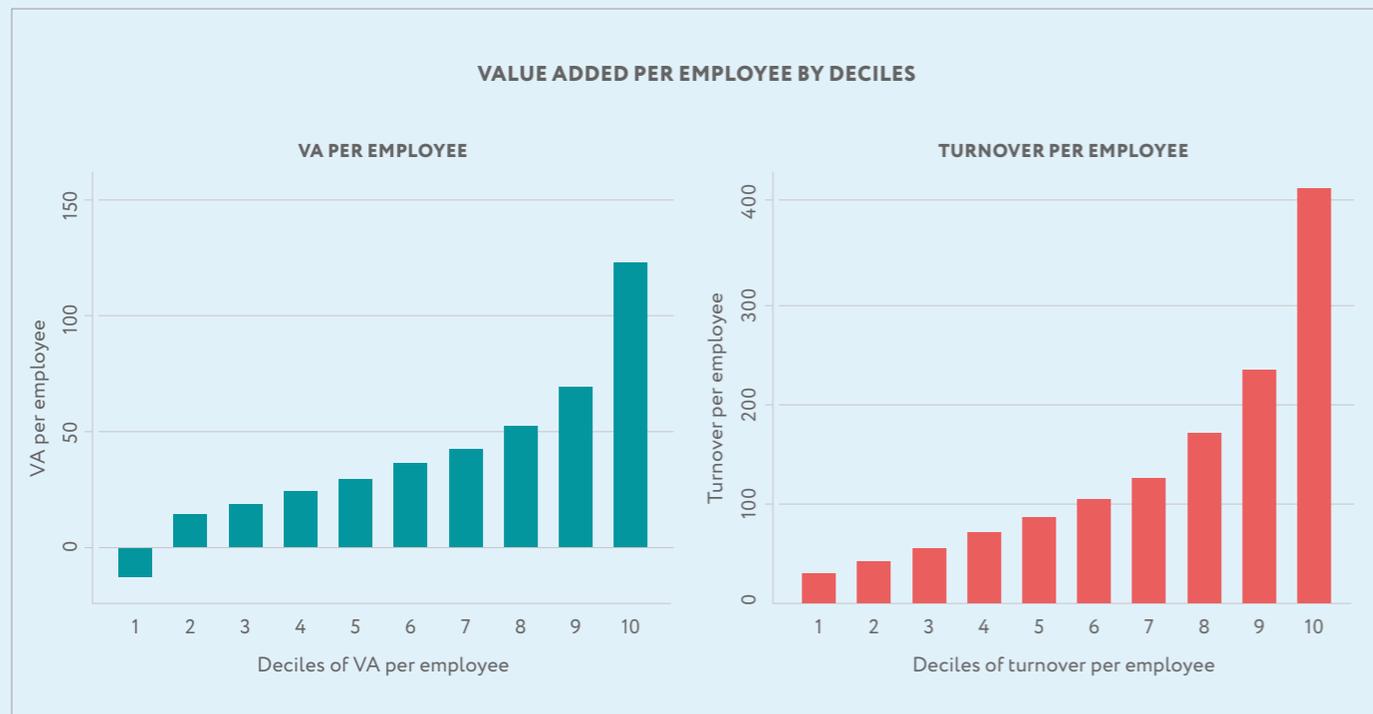
Contrary to previous findings which show that the most productive firms in the economy - frontier firms - grow productivity faster than other firms, for SMEs they find no consistent relationship between firms' initial productivity level and subsequent productivity growth, a pattern

which was evident in both manufacturing companies (see, for example, Figure 3).

Moreover, reflecting Driffield et al. (2021)¹⁵ and Bartlesman et al. (2015, Table 6),²³ Jibril et al. (2020)²⁴ find no strong relationship between productivity growth and the size of the firm, its age, its number of subsidiaries or its fixed investments.

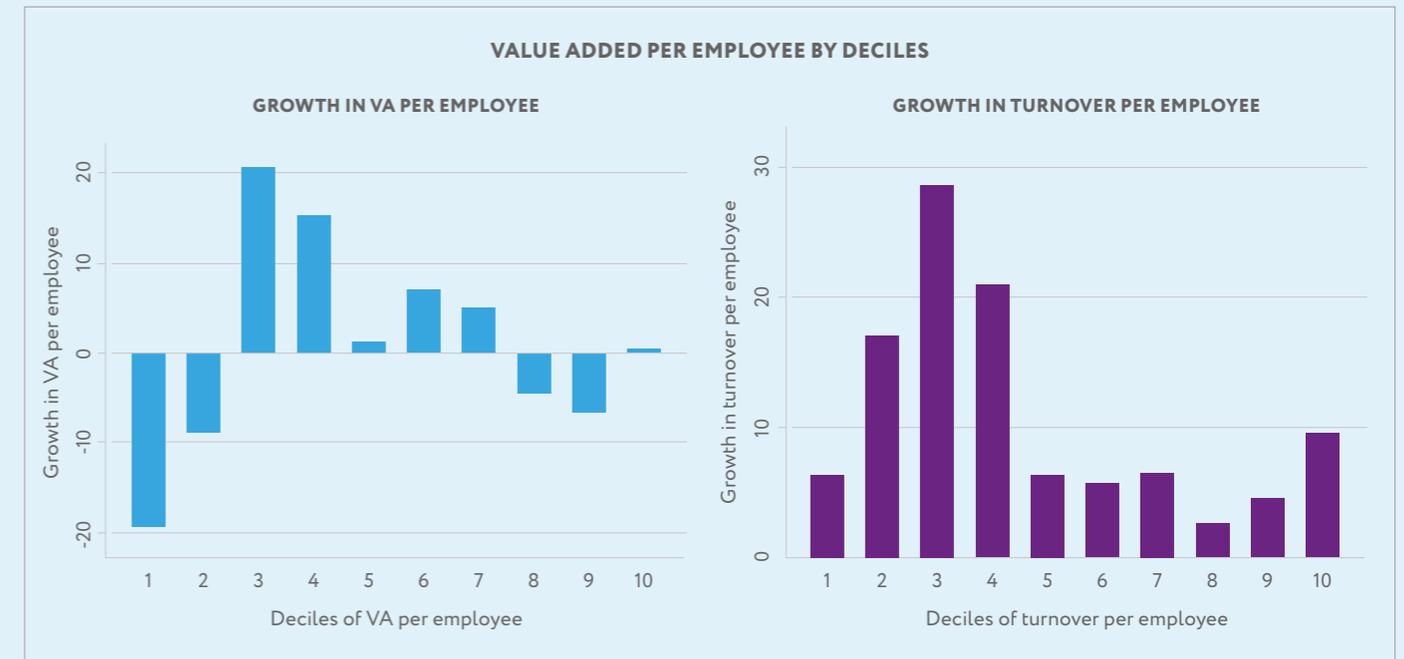
Seeking to understand the results, qualitative analysis suggested a number of factors which characterise high performing SMEs such as inspirational leadership, people management, data-driven operational management processes, strategic investments, and product, market and tactical innovation. Few of these factors are sector specific, although there are variations in how they are implemented.

Figure 3: Productivity levels and growth: Manufacturing sectors



Source: Jibril et al. (2020)

Figure 3 continued: Productivity levels and growth: Manufacturing sectors



Source: Jibril et al. (2020)

Re-thinking 'productivity'

The productivity landscape among UK firms is changing as the performance of previously high-productivity growth sectors weakens, and as productivity differentials between frontier and non-frontier firms grow.

A comprehensive explanation for these patterns remains elusive, and necessarily includes both factors internal to the firm as well as the effects operating through business eco-systems. Moreover, the weight attributable to drivers of productivity may differ markedly between sectors.

ERC (2019),²⁵ for example, sought firms' views of what determined 'productivity' in six UK sectors, emphasising very different drivers. In the oil and gas sector the oil price was said to play a dominant role in shaping

both returns and value added per employee. Other factors highlighted were technology (innovation), management/ leadership skills, regulation, geography and geology.

In the beverages sector competition was seen as a key driver of operational efficiency, while regulation and regulatory changes (e.g. sugar tax, reduction of plastic packaging, deposit return) were seen as raising costs and potentially impacting on margins and productivity.

KPIs

Across each of these sectors, however, and the others included in ERC (2019)²⁵ - pharmaceuticals, transport equipment, banking and insurance - firms were more

focused on industry or firm specific KPIs related to financial returns or operational efficiency rather than 'productivity' as measured by value added.

Increasingly, firms are also seeking to balance financial, operational, environmental and, potentially, pro-social goals. Recent survey evidence, for example, suggests that cost reduction remains most firms' key concern, with 69 per cent of UK SMEs citing this as a priority. For around half of SMEs, the 'introduction of new products or services' and 'reducing environmental impact' was also a business priority.²⁶ Just under one in four UK SMEs said that "generating social and community benefits for people" was a priority for the business in 2022.

Policy implications

Improving levels of innovation, and the adoption of new technologies and management best practices, by UK firms operating 'behind the frontier' provides a focus for policy intervention to support long-term productivity growth. This will require a shift in policy thinking, however, as much current policy focuses support on leading-edge innovation, most often undertaken by frontier firms (see Chapter Four).

If technology diffusion was working effectively these frontier innovations would then indirectly support productivity growth in non-frontier firms. However, as much of the earlier discussion has suggested, there seem to be significant barriers to widespread best practice adoption among many UK firms, particularly in the important 5th to 9th deciles of the productivity distribution. Improving the knowledge available to these firms through *promoting collaboration, and upgrading their capabilities to innovate and adopt new technologies* is the priority for raising their productivity.

Collaboration

There is strong evidence that promoting collaboration between firms, and between firms and knowledge creators such as universities, can promote both innovation and the wider adoption of new technologies. Such collaborations also provide an opportunity for learning, helping organisations to develop their internal capabilities to innovate and grow their productivity in future.

Direct measures can promote networking and knowledge sharing between co-located firms. For example, supported by the Growth Hubs, the BEIS Peer Networks Programme (which operated from 2020-22) created 'action learning' cohorts of SMEs to provide mutual support for productivity

improvements. The earlier CBI 'M' Clubs and the current Knowledge Transfer Networks provide a similar forum for medium-sized companies and those in specific sectors.

Eligibility requirements for public support can also be used to encourage or mandate collaboration. For example, focused on development in the automotive sector, the Advanced Propulsion Centre requires larger firms receiving grant support for their development projects to collaborate with SMEs. This type of requirement could be extended across the UK Research Councils when they provide support to larger or frontier firms. Another well-understood intervention is the 'innovation voucher', which encourages university-SME collaboration.

Local clusters

Another aspect of promoting collaboration relates to the potential for supporting local innovation ecosystems, or clusters. Recent developments such as the Innovation Accelerators and Launchpads seem useful although limited in scale and scope. Giving more weight to localised support for productivity enhancing innovation, particularly where it requires collaboration, may help to address specific local market failures.

Recent evidence suggests both the strong business performance benefits of devolved innovation support,²⁷ and the strength of local spillovers from investments such as the Catapults.²⁸

Investment gaps

As set out in Chapter Two, there are longstanding gaps between *levels of investment* by UK SMEs and their international competitors. These

investment gaps apply to training and other intangibles as well as to fixed assets such as equipment. Changing firms' investment practices and priorities may be a long-term project, as Chapter Two documents, but there are well-established and effective mechanisms for *boosting absorptive capacity in the short-term*.

For instance, the Teaching Company Scheme places graduates with firms – many of them SMEs – to undertake business transformation projects, many of which have a productivity focus. Scaling this scheme, perhaps through considering alternative funding models, could both contribute to strengthening university-to-business collaboration and create a step-change in SMEs' capabilities.

Business support

Finally, it is clear that enhancing policy support for collaboration and capability will only be effective if there is widespread awareness and take-up of such support by SMEs. In England the business support framework has become increasingly confusing in recent years, making it difficult for firms to navigate what support is available.

It is a different picture in Scotland, with Scottish Enterprise and Highlands and Islands Enterprise giving local firms a single point of access to the public support network. For Scottish Enterprise firms at least, this system, supported by effective client management, has yielded proven productivity gains.²⁹ A simpler and more stable policy environment in general would be beneficial for UK firms' productivity, and in particular streamlining multiple support schemes could encourage SMEs to access them.

Key takeaways

In England the business support network has become increasingly confusing. A simpler and more stable policy environment would be beneficial for UK firms' productivity, while streamlining multiple support schemes could encourage SMEs to access them.

Larger firms could receive grant support for development projects in order to collaborate more with SMEs.

Direct measures are needed to promote networking and knowledge sharing between co-located firms.

Give more weight to localised support for productivity enhancing innovation.



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"The productivity disparities between the best firms and the rest have widened in recent years. Other studies have also suggested marked – and perhaps unexpected – differences in sectoral productivity trajectories in the UK."

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Productivity, Innovation and R&D

CHAPTER FOUR

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The long-run history of economic growth is a history of the development, adoption and diffusion of new technologies.¹ But economic growth depends on social innovations, as well as technological ones, and the idea of research and development (R&D) as a systematic way of innovating is one of these. But the link from R&D to productivity growth is not straightforward.

Indeed the policy questions facing the UK concerning the relationship between the UK's past record in R&D and its current productivity performance go beyond the question of what the total amount of R&D investment should be. In addition to how much R&D a country does, it is also important to consider what kind of R&D is being done, where in the country it happens, and in what kinds of institutions. The UK can improve on all these counts.

Over the last 40 years the proportion of the UK's national resources devoted to R&D has changed significantly with a significant drop in the 1980s and 1990s, a plateau through the 2000s and early 2010s, and then recent signs of some recovery. This decline to a persistently low level is one instance of the general tendency of the UK in recent years to underinvest, as Chapter Two described.

New technologies

New technologies have led to entirely new products that people value such as bicycles, automobiles, refrigerators, televisions, and mobile phones, to name just a few. New technologies also allow existing products – such as steel or staple foodstuffs – to be made more efficiently and at lower cost. Technological innovations have also underpinned new systems and infrastructures, like railways and the internet, that have facilitated trade and exchange, both of physical goods and of ideas. In broad terms, the connection between technological progress and economic growth is clear.²

But economic growth also depends on social innovations. Indeed, one such set of social innovations was central

to the technological progress we have experienced over the last century. This is the idea of R&D itself as a systematic way of creating new knowledge, devising new inventions, developing them and bringing them to market. While the general link between economic growth and technological progress seems beyond question, though, there are some complications that stand in the way of making a direct connection between R&D inputs and productivity growth.

Adoption

Firstly, it is not the invention of a new technology that drives productivity growth across a whole economy, but rather its widespread adoption and, often, its subsequent adaptation in use. The very fact that economic productivity is uneven between and within nations tells us that innovations do not diffuse without frictions, even if the knowledge that underpins them is in principle widely available.

Secondly, as technological progress is not uniform across sectors, the relative prices of different goods and services can change dramatically, which complicates the long-run measurement of productivity. For instance, think about how the cost of computer power has fallen by orders of magnitude over the last 50 years, meaning that activities that depend on one-to-one human involvement have increased in relative terms.

"It is important to consider what kind of R&D is being done, where in the country it happens, and in what kinds of institutions. The UK can improve on all these counts."

Research, innovation and the R&D landscape

What is the difference between research and innovation? As one old saying has it: "Research is turning money into ideas, but innovation is turning ideas into money".

In the context of the productivity puzzle it's important to ask whether the UK's R&D landscape is optimally configured to deliver the outcomes we want – to turn ideas into money, as well as to turn money into ideas. In particular, how has its shape evolved over time, and how might it be better configured?³

It is through the *process of innovation*, the building on research, that more economic value is created from a given set of inputs, thus directly leading to increased productivity. One can distinguish between 'process innovation', which finds improvements in existing ways of making things or delivering services, and 'product innovation', which develops new goods or services to meet an unmet market demand or, indeed, to create that demand (see Chapter Five). Both process innovation and product innovation often depend on the development part of R&D – the deployment of new technologies, the improvement of existing technologies, or the combination of existing technologies in novel ways. These are usually the product of formal research and development.

R&D also requires *inputs of resources*. It needs inputs of highly skilled labour in the form of researchers, and of capital equipment and consumables. Invention and discovery are themselves characterised by efficiency improvements arising from the division of labour.

Many different kinds of activities are bundled into the category of R&D, with different goals. And these activities are carried out in different kinds of institutions, motivated by different incentive structures. Different aspects of the R&D process can also be classified in different ways and

these classifications are problematic.

One way of classifying R&D has become particularly important, as it is codified as the basis for the collection of national statistics, in the OECD's Frascati Manual.⁴ This distinguishes between *basic research*, *applied research*, and *experimental development*.

The linear model

Lurking behind such classifications is the spectre of the *linear model* – the idea that the R&D that results in a new product or process proceeds in a single direction, from basic research, through applied research, to the development of a marketable product.

The linear model is perhaps a strawman in the sense that no serious student of innovation believes, or has ever believed, that it captures the reality of the process of technological development.⁵ Nonetheless, unexamined assumptions of linearity have a ghost-like presence in many discussions of research and innovation policy.

One example of the way that linearity is made explicit in policy discussions is in the idea of *Technology Readiness Levels*,

a concept that is frequently used to determine eligibility for funding by UK government agencies, and is codified as part of EU state aid rules.

Another even more fundamental distinction is between science and technology. Science is about knowledge, while technology is about the useful arts, about the machines, tools, and the systems that put these to work to create valuable outcomes. Technologies may sometimes result from the systematic application of new scientific knowledge, but very often the relationship works the other way. Working technologies have often been developed well in advance of the scientific knowledge that would explain how they work.

This more complex relationship between science and technology is implied by the idea of *technoscience* – a term used in a slightly different sense and from different perspectives by sociologists of science,⁶ philosophers of science,⁷ and innovation practitioners.⁸ In any use, though, it always implies a more complicated offset of interactions between science and technology than the linear model implies.

"The linear model is perhaps a strawman in the sense that no serious student of innovation believes, or has ever believed, that it captures the reality of the process of technological development."

Different forms of R&D

What does all this mean in the context of productivity? The variety of different forms that R&D takes is reflected in the variety of different institutions in which it is carried out, different ways it is funded, and different incentive structures that influence the directions it takes. All of these influence the turning of ideas into money, or economic value and productivity.

Most R&D in developed countries takes place in the private sector and the UK is no exception. Private sector R&D shades, with blurred boundaries, into activities classified in other ways. On the one hand there are activities like routine testing and quality assurance, that rely on the existing stock of scientific knowledge and employ scientifically trained people. On the other, activities such as market research and identification of potential new markets, or product development using existing technology, are not classified as R&D, even though they may lead to economically significant innovation. What's more, R&D may itself be supplied as a service to other companies by contract research firms.

Private sector R&D

Private sector R&D may be paid for from retained profits from the existing business, and this accounts for much of R&D expenditure in large corporates. In spin-outs that have yet to achieve profitability, R&D is supported directly by venture capital. More generally, however, it may be difficult to fund R&D through borrowing because it is hard to use the intangible assets created (such as patents) as loan collateral.⁹ Additionally, R&D that takes place in the private sector is often partially funded by the state, either directly in

"Most R&D in developed countries takes place in the private sector and the UK is no exception."

the form of grants for particular projects, or through fiscal incentives such as R&D tax credits.¹⁰

What kind of R&D is carried out in the private sector? Naturally, the emphasis will be on experimental development rather than basic research. However, historically some major corporate laboratories – such as Bell Labs in the USA – have made important fundamental discoveries. In the UK large corporate laboratories in the post-war period included those of ICI and GEC, in chemicals and electronics respectively. It has been argued that these corporate laboratories, integrating basic science and technological development, were particularly powerful institutions for accelerating 'technoscience'.

Research labs

However, corporate laboratories have substantially withdrawn from more fundamental research since the 1980s,¹¹ with remaining institutions of this type concentrated in the large US tech firms such as Alphabet and Microsoft.

University research labs are usually thought of as the domain for basic research. However, they are also important in terms of training the future scientific workforce to PhD level. Other expectations of university research include collaboration with industry, clinical research carried out in collaboration with teaching hospitals, and the production of intellectual property which can subsequently be licensed or used as the basis for spin-out companies.

University research is supported by governments both through direct funding and through competitive funding from government agencies for individual projects. In addition, some research is supported by contracts with industry, and much is underpinned by cross-subsidies from other university income.

Governments also support research institutes developing and applying the science and technology that is needed to underpin strategic functions of the state, including defence. For instance, historically the technology needs of the armed forces have been an important motivation for national laboratories.

The UK's changing R&D landscape

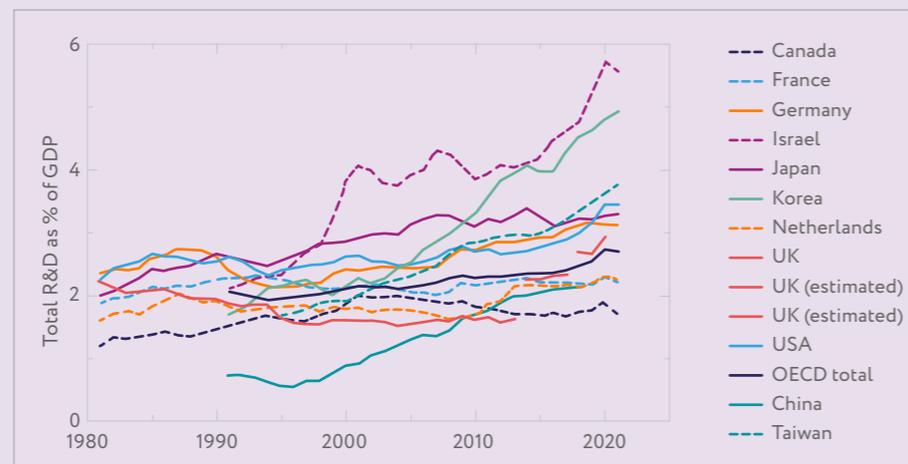
The result of all this is a patchwork of different institutions that constitute the UK's R&D landscape. To work effectively, the relative scale of the different parts of the landscape needs to be appropriate, and they need to be linked up effectively. A landscape which focuses entirely on basic research will not have the capacity to turn ideas into the new products and process improvements that underlie productivity growth, while a landscape focusing entirely on experimental development will lack novel ideas.

In the technoscience framing described above, if the direction of growth of the stock of scientific knowledge is not sufficiently driven by the questions arising from the attempt to extend technological capability, that technological growth will stall.

Figure 1 shows how the R&D intensity of the UK economy has changed over the last four decades, as compared to other countries. In 1981 the UK was one of the most R&D intensive countries in the world. It was, with the USA and Germany, one of the three world leaders in terms of R&D intensity. Before 1980 government research laboratories accounted for about 60% of public sector R&D, with 40% taking place in universities. Defence-oriented R&D has remained a large proportion of government R&D.

Between 1980 and 1995 there was a significant fall in the UK's R&D intensity, associated with the shifting ideological perspective of the Thatcher governments. In particular, the late 1980s and early 1990s saw a significant decline. This was associated with a sharp shift in science policy away from government support for near market research, with more emphasis on "curiosity driven" research in the public sector.¹² This was associated with the turn to the free market and the view that government support for applied science 'crowded out' private sector R&D. As Figure 2 (see right) shows, this theory

Figure 1: R&D intensity of selected countries since 1980



Source: Gross Expenditure on R&D, OECD Main Science & Technology Indicators. The UK data includes two recent breaks in methodology, whose significance is discussed in the text.

was falsified by what then happened. By 1996 government R&D intensity had halved, but business R&D, instead of rising in response, also fell significantly.

Decline stabilises

The decline stabilised between about 1995 and 2010, though the composition of R&D expenditure changed significantly over this period. Moreover, while the UK's R&D intensity remained roughly constant, R&D intensity in other countries significantly increased during this period, particularly in the rapidly developing countries in East Asia.

The post-1997 Labour governments recognised the problem of falling business R&D intensity, responding in 2004 with a ten-year Science and Innovation Framework,¹³ setting a target for business R&D intensity of 1.7% of GDP by 2014. This was a supply side policy which assumed that if spending on basic science was increased, and a supply of skilled people was assured, increasing business R&D would follow.

As Figure 2 shows, there was a substantial increase in R&D spending in UK universities in the late 1990s and 2000s. However, this was balanced by a continuing drop in R&D investment by the rest of the UK government, driven partly by a post-cold-war fall in defence spending, and partly by the continuation of a policy to privatise public sector research establishments. The net result was rather flat overall public sector R&D intensity.

The low point of UK business R&D intensity was 2005. A number of factors may have contributed to its weakness. These include a shift to more short-term attitudes by firm managers and owners in response to the 'shareholder value' movement,¹⁴ more general pressure on the manufacturing sector due to an uncompetitive exchange rate, and an emerging ownership structure in the privatised industries that emphasised sweated current assets rather than investing. For example, in 1994 in the privatised utility sector as a whole (comprising electricity, gas and water supply), £170 million was spent on R&D, but by 2005 the total was down to just £15 million.

Recent trends in R&D

The second half of the 2010s saw a real increase in government R&D spending, as part of the more explicit industrial strategy introduced by the May government. This was directly linked to the need to improve the UK's poor productivity performance. In fact, between 2010 and 2020 the UK's R&D intensity significantly increased. There is some uncertainty about the comparability of these figures, both across countries, and in time, since there are two breaks in the UK data series due to changes in methodology, and these figures are still provisional, for reasons to be discussed below.

Figure 3 shows the evolution of government R&D spending in the 2010s, showing the significant real increase in funding after 2016, and the introduction of UK Research and Innovation, a new agency combining the research councils, Research England, and Innovate UK. Direct government spending on R&D increased by 14% in real terms between 2016 and 2021.

But, as the figure makes clear, the really significant increase in government support for R&D came through the R&D tax credit scheme. Its cost had increased to nearly £7 billion by 2021 – nearly half as much as the government's total direct spending on R&D.

This substantial increase poses a statistical puzzle. The way in which business R&D has been measured by the Office for National Statistics is through a survey of businesses (the BERD survey). Over the 2010s a substantial gap between the R&D identified by the BERD survey and R&D tax credits opened up, reaching £16.8 billion in 2018. The growth in R&D tax credit claims has been concentrated largely in SMEs.

In the light of this discrepancy, ONS has revised its methodology,¹⁵ hence the uplifts in recorded business R&D which underlie the discontinuities in UK total R&D shown in Figure 1. ONS identifies the systematic under-sampling of SMEs in the BERD survey as a major reason for the discrepancy, and has provided corrected

estimates in recent data to account for this, before improving its survey sample for future data collection. This under-sampling could arise from a combination of the identification of an existing, but previously unobserved, population of R&D active SMEs with a rise in activity by new R&D intensive active spin-outs.

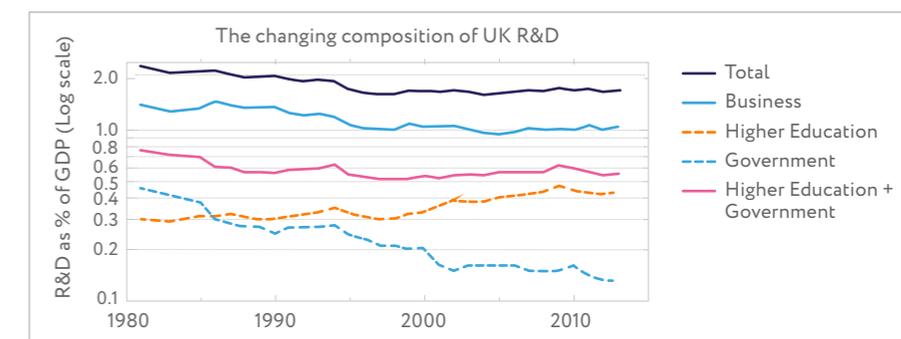
In partial support of the latter hypothesis, the new equity raised by UK university spin-outs increased from £387 million in 2013 to £2.73 billion in 2021 – a significant uplift, though still not enough to explain the whole of the uplift.¹⁶

On the other hand, the generosity of the R&D tax credit scheme presents

an obvious temptation for companies to exploit the grey area in the definitions between R&D and normal business expenditure, and this may be exacerbated by the rapid growth in agents who are incentivised to maximise claims.

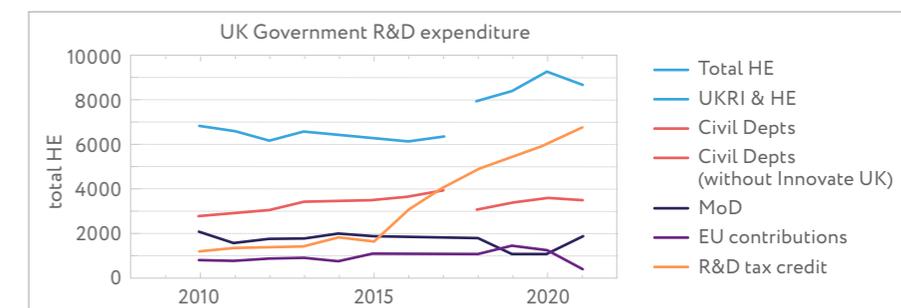
HMRC has recently increased its estimate of the rate of error and fraud in the 2021 figures from £336 million to £1.13 billion,¹⁷ comprising 24.4% of the total for SMEs, and 3.6% for claimants for the large company scheme. This is based on a total of £6.8 billion of spending which does not, after all, fall into the definitions of R&D. So there remains some uncertainty about current R&D levels.

Figure 2: Composition of UK R&D by sectors of performance



Source: OECD Main Science & Technology Indicators

Figure 3: UK government R&D spending by department, in constant (2021) £ millions



Sources: ONS Research and Development expenditure by the UK government, 2021, March 2023 release; HMRC Research and Development Tax Credits Statistics 2022 (corrected for inflation using GDP deflators). Prior to 2018, Innovate UK funding was included in BEIS expenditure, from 2018 it is included in UKRI.

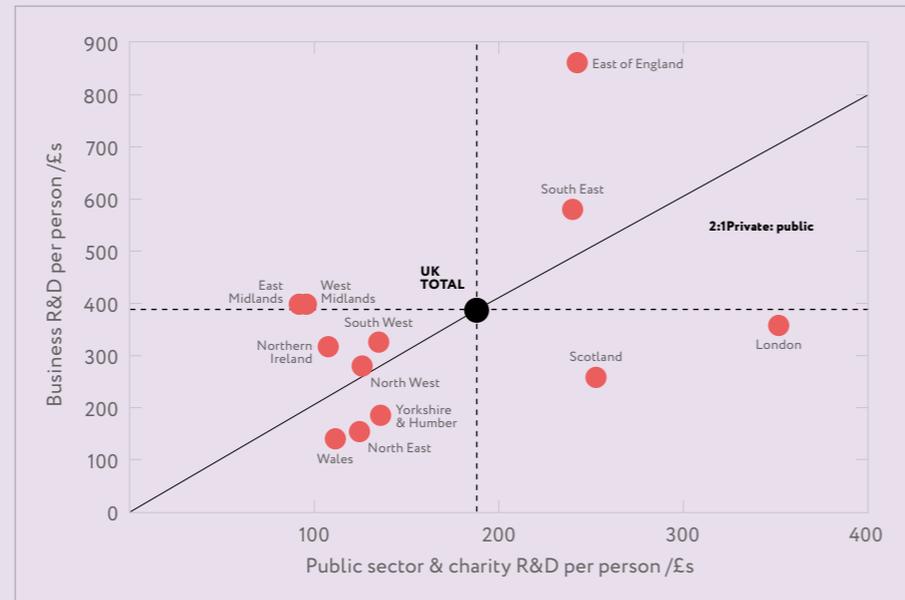
The geographical dimension

Public sector R&D in the UK is highly concentrated in London and the South East, the most productive parts of the UK, so to the extent that public R&D spending is intended to support productivity growth, it is currently acting as an anti-regional policy.

Figure 4 shows that there is a mismatch between where the public and private sectors make their investments. In the East of England and the South East, high public sector investments lead to even higher private sector investment, and these are successful innovation economies where the public sector and private sector mutually reinforce each other.

On the other hand, in London and Scotland relatively high public sector investment does not seem to be matched by private sector funding, while in the Midlands high private sector funding co-exists with low public sector funding. This mismatch between public and private sector investments may be impeding beneficial interaction between public and private R&D in these areas.¹⁸

Figure 4: The distribution of public and private R&D in the UK



Source: R&D data from ONS, Country and regional breakdown of expenditure on R&D in the UK: by sector of performance, 2019, with population taken from ONS mid-2019 population estimates. Note that this, the most recent available data for regional R&D, does not use the revised methodology so may be subject to revision.

"There is a mismatch between where the public and private sectors make their investments. In the East of England and the South East, high public sector investments lead to even higher private sector investment."

Policy implications

To summarise, the UK has experienced a long period of disinvestment in R&D by the UK, especially in the business and government sector, with business R&D intensity reaching a low point in 2005. This should be viewed in the light of a wider slowdown in public and private investment discussed in Chapter Two.

This history of declining R&D expenditure in the UK has occurred in the context of the marked slowdown in productivity growth since the mid-2000s. There has been some recovery in R&D intensity, especially from 2016 onwards. It appears that there has been a particularly strong uplift in private sector R&D, particularly in SMEs, but measurement issues are still not resolved. This recovery in R&D intensity cannot, at least not yet, be associated with a recovery growth. There could be a number of reasons for this:

- Many other factors could have been suppressing productivity growth in the UK since 2016, and this could outweigh any positive benefits that might be arising from an increase in R&D intensity.
- There is some evidence that R&D in general, across the world, is suffering from diminishing returns.¹⁹ As Figure 1 shows, R&D intensity has been increasing in many developed countries, while productivity growth in a number of those countries is also slowing. There are some sector specific issues which may have a particular relevance to the UK. Pharmaceuticals, for example, is one of the most R&D intensive sectors in the UK, yet a slowdown in productivity growth in this sector is a significant contributor to the UK's overall productivity slowdown.²⁰ This reflects a worldwide trend of decreasing productivity of R&D in the pharmaceutical sector.²¹

- As not all R&D is the same, it may be that the UK's R&D landscape has changed in ways which make the UK's overall R&D effort less effective in leading to productivity growth. For instance, it is possible that there's been an overemphasis in the public sector on university-based science, rather than research carried out in laboratories more focused on applied or strategic science. It has long been recognised that the UK's intermediate R&D institutions, positioned to bridge a gap between basic research and private sector development, remain subscale, despite the positive impact of the Catapult Network of sectoral technology and innovation centres. In the private sector, the UK has few examples of R&D intensive small firms scaling up into corporations with larger-scale development, compared to comparator countries.

There is still much to understand about the links from R&D to productivity growth, distinguishing between different types of R&D, the different institutions in which it is carried out, and the way these all interact to produce productivity enhancing innovations.

The R&D landscape has changed substantially over the last 40 years and it is unlikely, given the UK's productivity stagnation, that it is in good shape.

A better landscape would reflect the existing sectoral mix of the UK economy, recognising both the role of R&D intensive sectors such as manufacturing and ICT on the one hand, and determining how best to support innovation in currently less R&D intensive service sectors. It must also anticipate the opportunities offered by new and emerging technologies.

Challenges

Crucially, the national R&D landscape needs to respond to the challenges the nation currently faces, not all of which are directly connected to the productivity challenge. As Chapter Seven discusses, the transition to a net zero energy economy will be a wrenching economic change, and innovation at scale is required to lower the system-wide costs of a low carbon economy.

The UK's health and social care system is under severe strain, and innovation is needed to improve outcomes in an affordable way, as Chapter Eight argues. And a worsening geopolitical outlook will increase the attention given to R&D for defence. It is possible that in these areas of innovation, productivity will benefit from spillovers but this is by no means automatic, so new institutions and funding mechanisms will need to be carefully designed to maximise them.

The UK's decades of low R&D investment – part of a pattern of lack of wider investment, both by public and private sectors – needs to be corrected. But in rebuilding the infrastructure for the UK's innovation economy there needs to be as much focus on translation and innovation diffusion as on discovery.

In particular, to help correct the UK's regional economic imbalances, especially the underperformance of the UK's second-tier cities as described in Chapter Nine, we need to incorporate the role of R&D in rebuilding local innovation ecosystems and in promoting technology diffusion. The international environment, and the challenges the UK faces, have changed, and the UK's R&D landscape must change in response.

Key takeaways

The UK has experienced a long period of disinvestment in R&D, in both state and private sectors. But in rebuilding the innovation economy there needs to be as much focus on translation and innovation diffusion as on discovery.

The national R&D landscape needs to respond to national challenges such as the transition to net zero and stresses in the health and social care system.

The innovation ecosystems in economically lagging regions need to be rebuilt, strengthening institutions for R&D and innovation diffusion.



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"In 1981 the UK was one of the most R&D intensive countries in the world. It was, with the USA and Germany, one of the three world leaders in terms of R&D intensity."

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Why isn't digitalisation improving productivity growth?

CHAPTER FIVE

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Innovation of new products and processes is the engine of long-term productivity growth. This puts the current wave of innovations at the heart of the productivity puzzle. From biomedicine to advanced materials to AI, there is astonishing scientific progress, and yet this is not showing up in overall productivity growth.

This paradox echoes Robert Solow's famous 1987 comment: "You can see the computer age everywhere but in the productivity statistics." Some economists argue that digital technologies are simply less important than past waves of innovation. Yet a minority of firms are using them successfully to enhance their productivity. The real puzzle is why the majority of firms are so slow to adopt the new technologies.

Pace of innovation

Digital technology is everywhere, and the pace of innovation if anything seems to be increasing with the latest advances in generative AI. This highly visible technological progress makes the poor productivity performance in the UK and other OECD countries all the more puzzling.

There are competing explanations for this digital paradox. One is that current digital innovations are simply less valuable than older ones such as electricity.¹ Another view is that it always takes time for businesses and consumers to adopt a new technology,² and that diffusion and adoption are slower with current technologies because they involve complex software.³

As digital innovations and data are enabling a minority of already high-productivity businesses to pull further ahead of others in their industry,⁴ such that their productivity is growing faster, and their market shares are increasing, the balance of evidence is tilting toward the latter explanation. But this in turn raises further questions about how adoption might be speeded up and what the barriers are to using digital tools to drive faster productivity growth.

"Digital technology is everywhere, and the pace of innovation if anything seems to be increasing with the latest advances in generative AI."

Are new ideas getting harder to find?

Modern economic growth, leading to steadily rising living standards and improved health and longevity, came about because of new ideas and discoveries. New technologies, from famous inventions such as the railways and steam engines to less well-known innovations such as the Bessemer process for mass producing steel, or the use of steel hulls on ocean-going ships, drove increases in economic output per person at historically unprecedented rates.

More important than the ideas and inventions, however, is firms turning them into innovations – practical applications that diffuse through the economy and are taken up by businesses and consumers.⁵ The economic value of the ideas lies in how useful they are.

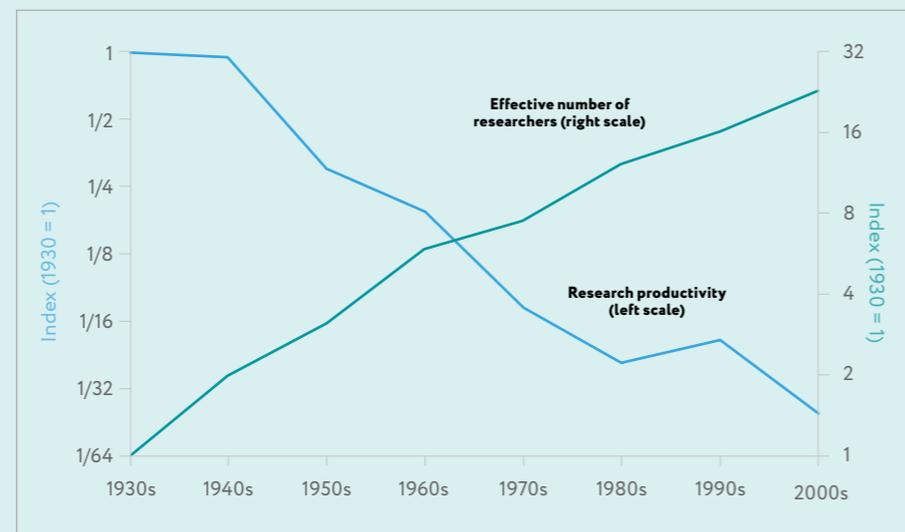
One reaction to the fact that the most recent wave of digital innovations is not translating into productivity growth (more economically valuable output produced using the available inputs of labour, capital and materials) is that they are simply not as useful as previous innovations.

Robert Gordon in his book *The Rise and Fall of American Growth (2016)* has argued that new technologies such as smartphones and social media cannot be compared in their economic value to early 20th century technologies including electricity, indoor sanitation and modern transportation. This line of argument has gained support from a high-profile empirical study of how

much output has resulted from the effort put into research and development across a range of technologies.⁶

Their answer to the question posed in the title of their paper – Are New Ideas Getting Harder to Find? – is yes. Whether looking at specific examples such as computer chips (where Moore's Law seems to have broken down) or grain yields, or looking at how much more slowly TFP (Total Factor Productivity) per researcher has increased since the 1930s, there seems solid evidence of a slowing down in the arrival of economically valuable new ideas (see Figure 1).

Figure 1: Slowdown in research productivity



Source: Bloom et al (2020)

"More important than ideas and inventions is firms turning them into innovations."

The productivity J curve

The counter argument is that it takes time for innovations to be widely used and for people to recognise their value. In a famous 1990 case study the economic historian Paul David traced the spread of electricity use in the United States in the early 20th century.

The productivity benefits took around 50 years from the original late 19th century scientific discovery and inventions, with the electricity generation, transmission and distribution networks having to be built. For businesses to use electricity in production also required new low-level factory buildings because each machine was operated by a dynamo, in contrast to multi-storey steam-powered factories using one, or a few, steam engines driving many machines from a drive shaft.

Consumer use needed homes to be wired and consumer devices to be invented, and these came down in price slowly as the market grew.

A large academic literature has explored how inventions diffuse, dating back to a classic Griliches (1957)⁷ study looking at the spread of hybrid corn seed use by farmers through the American Midwest.

The typical S-shaped (or logistic) pattern of diffusion is now well-known - the spread is slow, then very fast, then slows down again as saturation level approaches. The timing of the acceleration in the early stages depends, among other things, on the cost structure of production (how high the upfront fixed cost is) and on how quickly prices fall as the market grows.

More recent tools such as generative AI are still in the early stages of adoption, but the emerging evidence confirms that the use of AI is strongly associated with higher productivity.

With digital technologies there is generally a high upfront cost (developing the code) and low marginal cost (copying software is essentially free for example), so it can take a long time to get to the critical mass. But then usage grows dramatically, especially if there are network effects whereby all existing users benefit more, the more new users there are (as in a telephone network). Other influences matter too. For example, personal networks and face to face contact can help spread the technology.⁸

Adding in the fact that it takes time to learn how to use new digital tools effectively, there may even be a reduction in firms' productivity at first, followed by a later acceleration. This has been labelled the 'productivity J-curve'.⁹ If this is correct, the productivity dividend from recent digital innovations will eventually arrive. For example, it might take the form of digitally discovered new drugs or materials, or improved prediction and reduced inventories as firms adopt AI tools.

Since the arrival of the smartphone, 3G and beyond mobile networks, and the explosion of data use and the apps market since 2007, there has been a dramatic change in both consumer behaviour and business models.

Most of us spend hours a day online, and many firms have adopted a digital platform model or become part of a production network or ecosystem enabled by digital communication. It would be hard to understand why this structural change had come about if businesses and consumers did not find the technology economically useful.

A number of studies^{10 & 11} have estimated the value consumers assign to digital services they do not have to pay for directly, and have found that the stated values can be high. For instance, search and email stand out as particularly highly valued.

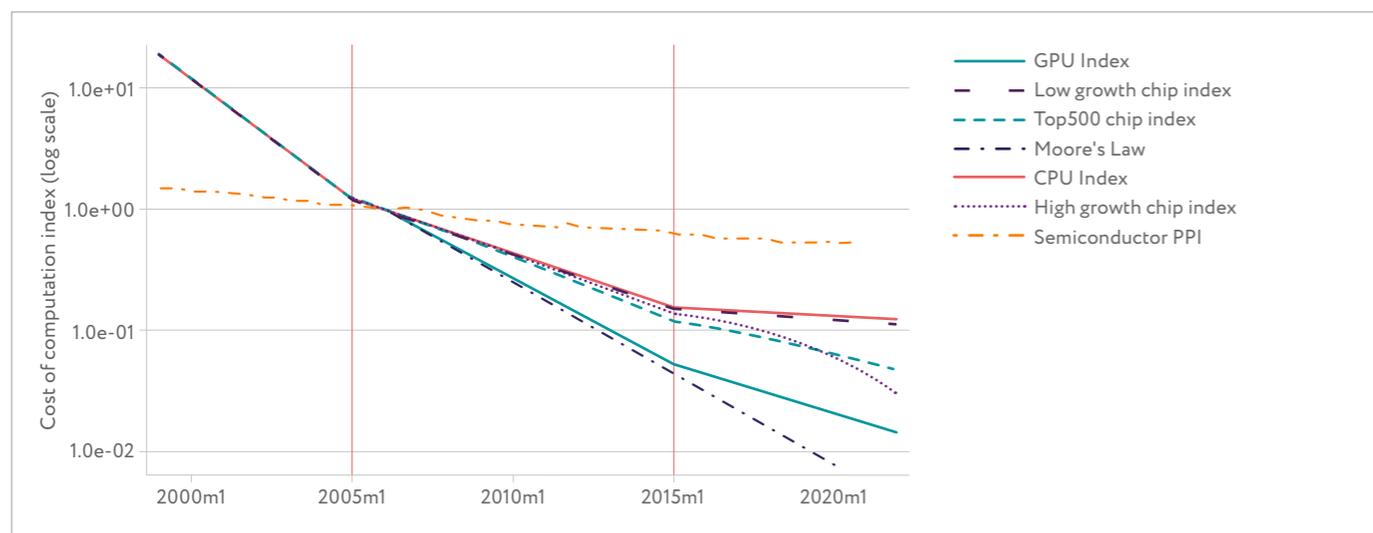
There might also be some artefacts of the way output is measured that mean the productivity gains from digital have

been underestimated. For instance, the price index for telecommunications services in the UK has been revised following research showing that their prices had been falling substantially faster than the previous official statistics.^{12, 13 & 14}

Similarly, it seems likely that official data have understated the speed with which software prices have been declining.¹⁵ Similarly, the cost of computation using successive versions of chips (see Figure 2) has continued to fall so rapidly that it is not a binding constraint on using digital technologies, and it has certainly fallen faster than the official price index for computer chips.¹⁶

There may also be other measurement challenges not yet uncovered. While these might not add up to a large impact on measured productivity, they help chip away at the puzzle.

Figure 2: The cost of computation



Source: Coyle & Hampton 2023

Where are digital and AI enhancing productivity?

There are some businesses already successfully adopting digital tools to enhance their productivity. Indeed, a striking phenomenon of the productivity puzzle since the mid-2000s is the increased dispersion of productivity among different firms (see Chapter Three).

The top five or ten per cent in terms of performance have pulled further and further ahead of the average and this phenomenon has been observed across the OECD economies (See Figure 3).¹⁷ Some researchers have linked this to increasing concentration and market power in many industries, with the consequent decrease in competition itself reducing productivity growth on average.^{18 & 19}

One possible explanation for the diverging fortunes of the best and the rest is that the high productivity firms are precisely those which are using digital technologies. For example, one study found that US manufacturing firms using big data for predictive analytics had significantly higher sales and productivity than others – as long as they had made

appropriate complementary investments in hardware, skills and workplace organisation (Brynjolfsson et al, 2021).

Again for the US, Acemoglu et al (2022) found digital automation was associated with about 11% higher firm level labour productivity. Cathles et al (2020) also found that the use of digital tools such as robotics or 3D printing characterised high productivity EU firms. Similarly, among UK firms, higher productivity is linked to the use of digital tools and skills, and the more so for those using more than one digital technology and combining this with in-house skills.^{4 & 20}

Impact of AI

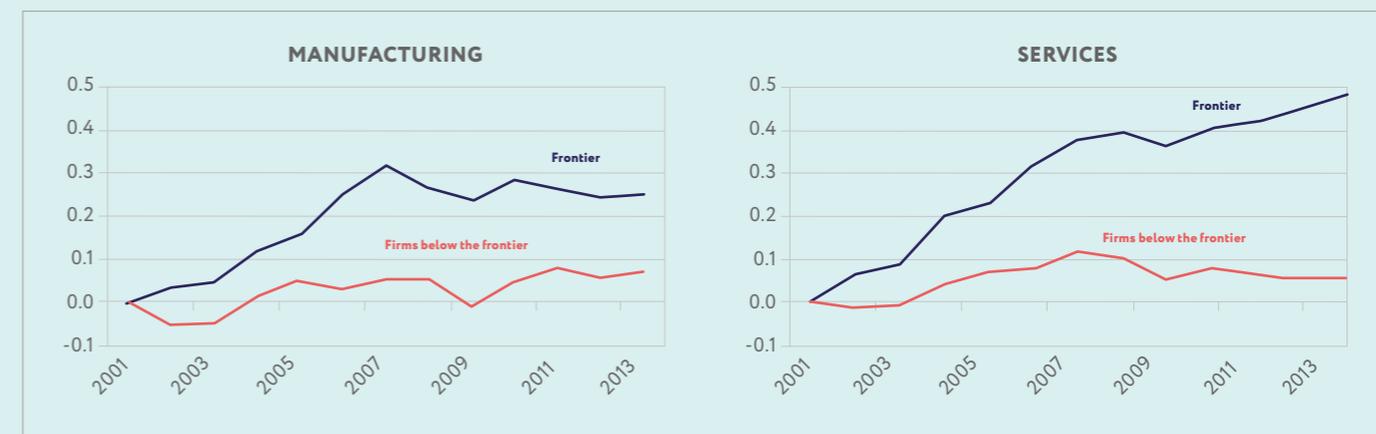
More recent tools such as generative AI are still in the early stages of adoption, but the emerging evidence again confirms that the use of AI is strongly associated with higher productivity. For example, Czarnitski et al (2023)²¹ use survey data on German firms to demonstrate this, with good evidence that it is a causal relationship.

Calvino and Fontanelli²² use data (from Calvino et al 2022) for businesses in 11 OECD countries (Belgium, Denmark, France, Germany, Ireland, Israel, Italy, Japan, Korea, Portugal and Switzerland) to uncover some of the characteristics of firms using AI. They found that, firstly, these firms tend to be larger and/or younger. And secondly, the ICT and professional services sectors are the most intensive AI users. This is intuitive as the effective use of AI requires appropriate skills and pre-existing digital infrastructure. These complementary assets are important enablers of the productivity advantages that accrue to the AI-using firms.

Given this mounting evidence that digital use, including AI, can and does enhance productivity at the level of individual businesses or plants, the aggregate productivity puzzle becomes a question of why the majority of firms are non-adopters.

Figure 3: Divergence in Total Factor Productivity between frontier firms and the rest

Source: Andrews et al (2019)



What makes it harder for new innovations to be used?

If some firms can use digital technologies so successfully, why can the rest not manage to do so? The answer seems linked to those complementary investments - the general challenge of reorganising production to adopt innovations, and to some specific features of the digital revolution.

Research on the 1990s dot com boom found that businesses then adopting digital needed to make investments in reorganisation that were about much more than the investment in computer and telecommunications equipment itself.²³ The authors note: "Firms that are intensive IT users are also more likely to adopt work practices that involve a specific cluster of organizational characteristics, including greater use of teams, broader distribution of certain decision rights, and increased worker training," (p.2). This early work also found that it could take years for the full value of ICT and organisational investments to be realised.

Costs and skills

The reason is that these technologies change the cost of transferring information, which can make for better decisions, but only if people in the business are able to use the information. They might need new skills, but they will also need to have invested in the data required and to have the authority to make decisions.

The delayering of corporate hierarchies is therefore one of the consequences of the earlier digital phase, as is the development of long and spatially extended production networks as businesses outsource more stages of production in their supply chains.²⁴ Digitally- and data-intensive firms have generally invested more in their 'organisational capital', as compared with counterparts who have not done so.²⁵ They are also more likely to be data gatherers and users. Although there is no consensus about how to value data, its use clearly makes a big difference to the performance of firms able to use it effectively.

Data adoption

It is also likely that data- and software-enabled change is inherently harder to adopt than previous technologies. There is more tacit knowledge involved - that is, the kind of know-how that is not written down but shared among co-workers - because activities involving data science and manipulating software are not very standardised.

In his recent book *The New Goliaths*, James Bessen (2022)²⁶ argues that much of the intangible knowledge involved is now proprietary to individual firms, which has reduced innovative new entry and led to a decline in business dynamism. According to Bessen:

"Across a wide range of industries, dominant firms are employing large-scale information systems to outflank their competitors, including innovative start-ups. They are using proprietary software to better manage complexity and thus differentiate themselves from rival firms. And this has allowed them to increase their market dominance and avoid being overtaken by rivals."

This might change if the new generation of foundation AI models make using digital tools more systematic and routine. In earlier work, Bessen (2015)²⁷ used the historical example of the early cotton industry to argue that new technologies start out by requiring scarce skills and knowledge, but as they become standardised they become easier to use and spread more quickly. It is possible that chatbots and application programming interfaces will make AI models easier to use. But for now there seems to be a high productivity premium for the very specific digital skills and software involved in running a high productivity modern business.

Why does digital adoption matter?

It is easy to be dismissive about the digital revolution and see some of its manifestations such as social media and clever AI chatbots as frivolous - or even productivity-destroying. This overlooks the high value consumers place on digital services even when they do not have to pay for them.¹¹ In any case this focus on consumer activities - or even on product innovations and digital gadgets from smartphones to robotic vacuum cleaners - is to ignore the genuine productivity potential of the ability to convey and use information rapidly at low cost.

Looking at the history of advanced economies since the early Industrial Revolution, although some product innovations (such as antibiotics or indoor sanitation) have without question been profoundly important, the main long-run driver of productivity growth has been process innovations (see Chapter Four). This refers to ways of producing output, rather than the output that is produced. The unprecedented growth of the past 250

years has been a succession of revolutions in production, as the table below shows.

Evolution

It seems quite likely that the latest wave of digital technologies will pave the way for another key step in the evolution of process innovations. In the decade and a half since the iPhone appeared in 2007, consumer behaviour has changed to the point where the average adult in the UK spends 28 hours, more than a whole day a week, online according to Ofcom survey data.²⁸

More to the point here, business models have also been transformed. Many big digital companies and start-ups operate as platforms (or multi-sided markets). Just as in a conventional production network, a company like Nike can thrive without manufacturing footwear in-house at all. In a digital platform market a company like Airbnb or Booking.com can operate without owning or managing any accommodation at all.

The business model of such companies is using data and sophisticated software to co-ordinate the allocation of resources in the economy. It is not just the well-known big tech companies that operate a platform model, this can be found everywhere from pet insurance to spare parts for the auto industry. The new foundation AI models will without question disrupt business still more, although it remains to be seen how and how quickly.

One point underlined by this perspective on process innovation is that the time taken to produce is a fundamental productivity metric. This is implicit whenever we look at labour productivity, which measures how much output is produced per hour worked. Thinking about production processes makes it explicit - productivity has advanced by using information as well as physical technology more effectively to produce faster.²⁹

Table 1: Key process innovations

Source: Author's own

DATE	PROCESS INNOVATION	DESCRIPTION
Early 19th century	American system of manufactures	Use of interchangeable parts in mechanised production processes
Mid-late 19th century	Factory system	Capital-intensive large scale (steam-based) production involving division of labour
Early 20th century	Assembly line (Fordist production)	Reorganisation of production in sequence of small steps, using affordances of the electric dynamo
Late 20th century	Lean manufacturing/Just-In-Time (The Toyota Way)	Elimination of waste and time spent in production, using new control software and computer-aided design and manufacturing, and authorising workers to control quality on the assembly line
Late 20th century	Production networks	Division of production into sequence of increasingly specialised activities more of which could be outsourced, using 1980s onward advances in ICT technologies

Policy implications

Looking at the extent of the changes in consumption and production since 2007 underlines the productivity puzzle. How we spend our days, how we work, how at least some businesses are organised has changed dramatically without moving the dial on measured productivity.

So how can the benefits of continuing technical change – in other areas such as energy and biomedicine as well as digital and AI – be crystallised? The need to speed up diffusion in use of the technologies to generate economically valuable products and services points to the important policy levers.

Using the new technologies requires *complementary investments*. These are needed in physical (wired and wireless broadband and data centre) infrastructure, and in organisational change. Of these, the latter seems to be the hardest. One area for additional policy intervention may be in transferring the necessary know-how and management practices between firms. Management quality may be a more tightly-binding constraint in a business using complex software and data.

Skills

Investment in appropriate *skills* is also required. The wage premium for software engineers and data scientists suggests

their skills are in short supply in the UK.³⁰ The House of Lords technology committee concluded, in a 2002 report,³¹ that government policy had so far failed to address businesses' skill needs, and there is no sign of improvement since then. Given the policy focus on ensuring the UK is a world leader in at least some areas of AI, the skill shortfall is likely to need even greater focus.

Competition

The winner-take-all dynamics of digital markets and increasing concentration in some parts of the economy put the spotlight on competition policy. Business dynamics, the entry of new firms and exit of less productive firms, make an important contribution to productivity growth.

Yet digital markets are often dominated by large incumbents, which might either use their data advantage or their ability to acquire potential competitors to cement their advantage. The Furman Review³² paved the way for the eventual establishment of the CMA's (Competition and Markets Authority) Digital Markets Unit, and the CMA has signalled its intention to play an active role in enforcing competition including the implications of new foundation AI models.³³

Resisting the lobbying of big tech companies to enable new entry in relevant

markets will be essential for the UK to take advantage of its strengths in areas of AI innovation.

Data

Relatedly, the role of data is becoming a key issue. AI runs on data, and firms become more productive through their use of data. The data hoard of big tech companies forms a competitive 'moat' in some markets. What's more, there are emerging areas where the use of data across a whole supply chain or cluster of businesses will be needed to deliver the potential productivity benefits of digital technologies.

Examples include construction projects, 'smart city' networks of sensors, and also events such as the petrol or product shortages that emerged during the pandemic when supermarket chains needed to share information about stocks and sources of supply. Given that competition law rules out much information sharing between firms (as it enables collusion), careful thought needs to be given to data policy.

All of these areas speak to how easy it is to adopt the new technologies to increase productivity. New ideas do not seem much harder to find, but they are perhaps getting harder to use.

Key takeaways

There are emerging areas where the use of data across a whole supply chain or cluster of businesses will be needed to deliver the potential productivity benefits of digital technologies.

Resisting the lobbying of big tech companies to enable new entry in relevant markets will be essential for the UK to take advantage of its strengths in areas of AI innovation.

Investment will be needed in data and in organisational change to get the full productivity benefits of digital technology.

The UK skills shortfall needs even greater focus and investment in appropriate skills is required.



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"Digital markets are often dominated by large incumbents which might either use their data advantage, or their ability to acquire potential competitors, to cement their advantage."

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Skills for productivity growth

CHAPTER SIX

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"High paid employment opportunities for graduates in poorer parts of the UK are relatively scarce, which leads to regional 'brain drain' to London and the South East."

The notion that the education and skills of the country's workforce make an important contribution to productivity growth and improved living standards is deeply engrained, long underpinning UK economic and education policy. Yet this focus on the supply of skills overlooks the importance of what kinds of skills employers are looking for on the demand side, particularly given regional differentials and technological change.

Improving productivity and living standards will therefore require a labour market that is better suited to fulfil people's aspirations at work, across all regions of the UK, and a policy architecture that is fit for the shifting economic landscape.

This preoccupation with skill supply sits uneasily with commentaries and empirical evidence that call into question the assumption that higher educational credentials and skills necessarily make for more productive workers earning higher wages.

For example, many UK employers are saying they are now hiring non-graduate apprentices to fill formerly graduate jobs, potentially shifting the balance of productivity and wage pay-offs to graduate education.¹ There are also major regional imbalances in the returns to graduate education. This is in part because high paid employment opportunities for graduates in poorer parts of the UK are relatively scarce, which leads to regional

'brain drain' to London and the South East, and means that graduates who remain in poorer regions are more likely to work in low paid and non-graduate jobs.²

New digital technologies seem to offer organisations many opportunities to raise productivity by recruiting high skill tech workers (such as developers, data scientists and digital engineers).³ However, these same technologies are also associated with radical changes in the world of work, such that increasing numbers of workers with varying levels of education and skills find themselves in precarious work, devoid of employment protection and income security.⁴

Moreover, many companies are now deploying digital technologies to construct a 'blended workforce' of in-house workers and crowd-sourced freelancers in an effort to improve productivity, which raises questions about the incentives and commitment of employers to the provision of training and career pathways for their employees.⁵

A demand-side focus

This chapter argues that the demand side of the labour market (namely the choices and actions of employers) needs to be better understood if the UK is to develop a virtuous circle between skills, productivity and living standards. This perspective will point to a broader policy architecture.

Productivity Institute research

A complete review of the vast literature on the relationship between skills and productivity is beyond our scope here.⁶ Instead, we highlight three areas of TPI research with important policy implications:

New evidence about the regional patterns of employer demand for graduates and non-graduates in England, including a focus on tech skills.

Recent Productivity Institute discoveries about why a growing number of organisations choose to access skilled workers from a global pool of digital platform freelancers, rather than hiring or training their own employees.

The shortcomings of the UK's current education policy, with long-standing problems of underinvestment, policy churn and policy coordination. Improved skills can enhance productivity and earnings in an uncertain and rapidly changing context, but it will require closer attention to be paid to employers and the shifting economic landscape.

Regional skills mismatch

The 'skills mismatch' can apply across several dimensions.⁷ TPI research is attempting to quantify this by examining the extent to which organisations' demand for specific types of skilled worker matches the supply across the different regions of England, accounting for regional mobility.

Measuring skills mismatch accurately is challenging as it requires reliable data on both the skills available in the labour force and the skills sought by employers. There are many ways to measure this, ranging from official labour market surveys to more subjective surveys of workers about how close their skills match their jobs.

Our research has initial new results from the demand side, which draw on regional job recruitment data placed on platforms by hiring organisations.⁸ For a

given region, organisations can seek to recruit residents of the region – including those already employed in another organisation, direct from educational institutions, from unemployment, or from outside the labour force. They can also try to hire from outside their region.

Graduates

Our descriptive analysis of job platform data first divides qualifications into graduates and non-graduates.⁹ As is well known, the demand for graduates is concentrated in a limited number of regions, especially around London but also around Birmingham and Manchester. The demand for non-graduates is more diffuse, with a few pockets of low demand mostly in more rural areas.

When we look instead at the demand for advanced technical skills a somewhat different geographic picture emerges. We divide job advertisements into those for high-tech skills versus others, based on words associated with tasks carried out by occupations that require advanced technical skills (Figure 1). On this definition, high-tech jobs represent approximately a tenth of all the job advertisements analysed.

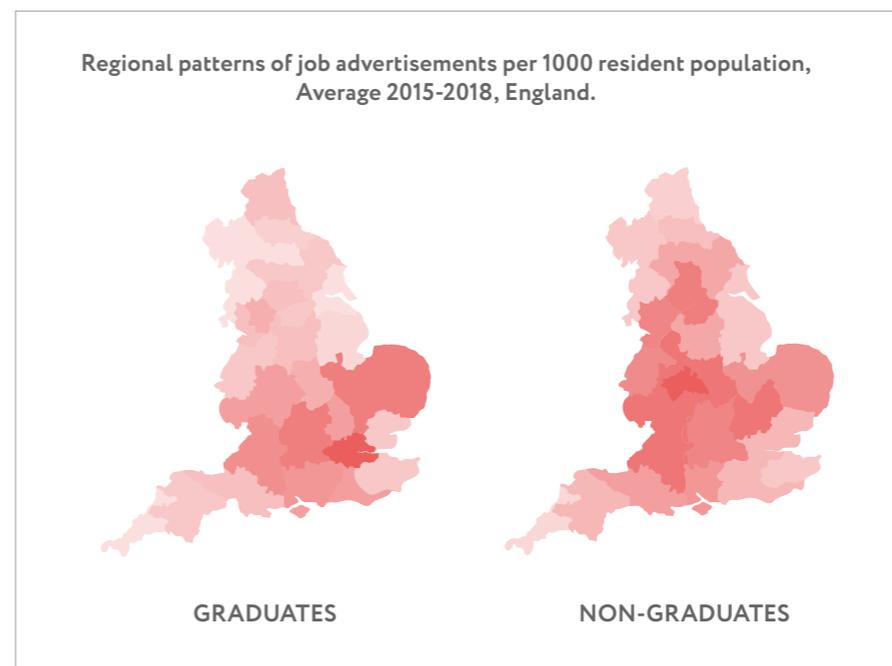
The sample of high-tech job ads is then divided into those requiring graduate versus non-graduates. Interestingly, there is little difference between ads for graduates versus non-graduates in the frequency of words included in the high-tech word cloud.

Figure 1: High tech skills Word Cloud



Source: See Andrieu and Kuczera (2023) for details on the construction of this variable.
 Note: The larger the size of the word, the more frequent the keyword appears in the advertisements.

Figure 2: Demand for high technical skills: Graduates and Non-Graduates.



Source: Authors' own calculations using Lightcast data

Note: The darker the colour the greater the demand relative to population in a region.

Figure 2 shows the distribution for English regions. The demand for high-tech graduates is concentrated mostly in the golden triangle of London, East Anglia (Cambridge), the area around Oxford and extending west to Bristol. The demand for high-tech non-graduates is more dispersed, with high concentrations in the West Midlands and North West, and relatively low concentrations in London and East Anglia. There are large areas where demand for high tech skills, both graduates and non-graduates, is very low, including Essex, Lincolnshire, and Merseyside.

Interpretation

How do we interpret these results? One possible explanation is that high tech graduates migrate to the golden triangle where wages (and amenities) are higher. Organisations in other regions faced with a shortage of workers with advanced technical skills are forced to rely on non-graduates, usually from local FE colleges.

The analysis of regional mobility in de Coulon et al.¹⁰ suggests they are much less mobile than graduates across regions. A kind of 'job queue' effect is observed within each region such that individuals with non-graduate tech skills are closer to the front of the job queue in regions outside the golden triangle than their counterparts searching for employment in the golden triangle (for a given demand for high tech jobs).

An alternative explanation is that organisations outside the golden triangle are producing different kinds of goods and services, not so much in the high-tech sectors, and therefore with less need for advanced graduate-level skills while still requiring workers to have some technical knowledge because of the pervasiveness of digital technologies.

Even in the high-tech sector, ostensibly similar types of organisations across regions may deploy different levels of technical sophistication in their work and production processes, producing differences in demand for graduate versus non-graduate tech skills.

Explanations

Which of these explanations applies depends on whether technical skills of graduates and non-graduates are substitutes or complements. If they are complements, then having access to both kinds of worker is important for organisations.

This may vary by region. Some regions, such as London and East Anglia, may have an ample supply of graduates with advanced technical skills. Given evidence of over education in some research,¹¹ some organisations may be using these graduates in jobs where non-graduate technical skills would be sufficient. If this is the case, then graduates may be crowding out non-graduates in these regions. In other regions, organisations may employ some graduates but also need non-graduates with good technical skills.

Can organisations improve productivity by using digital freelance platforms?

Another lens on the supply and demand of tech skills is provided by research into digital freelance platforms. The rapid pace of innovation in digital technologies is transforming the skills required by organisations in all sectors of the UK economy and posing new productivity challenges (see Chapter Five).

Organisations are having to adapt the skillsets of their workforce to an array of new digital technologies, including robotics, machine learning and data science for example. At the same time, organisations may be able to meet their skill needs by accessing talent available globally on digital freelance platforms. This leads to a number of questions. Why do organisations use digital freelance platforms? What tasks are crowdsourced in this way? And how does this new transactional form of buying skills affect productivity?

Global market

The current trend of using digital platforms has evolved from previous strategies of IT outsourcing and offshoring,¹² yet offers easier access to digitally-enabled transactions.

There are hundreds of digital platforms for freelance labour, such as Dribbble, Fiverr, Freelancer, PeoplePerHour, Topcoder, Toptal and Upwork. They function like a marketplace for specialist services and enable organisations to access directly a global pool of workers such as translators, designers, coders, data analysts, accountants and lawyers. The number of freelancers registered with these platforms is enormous – around 18 million with Upwork and four million with Fiverr for example.¹³

The platform proposes a match between the client and a freelancer for a specific task using a digital algorithm that incorporates client reviews and ratings of each freelancer's performance. The fee is typically negotiated individually either per hour or per task. The platform collects commissions from both the client organisation and from the freelancer.¹⁴

Figure 3 shows the kinds of specialist tasks sourced from a sample of the large platforms.¹⁵ The high-skill nature of tasks is supported by data on the level of education of registered freelancers, which shows that more than four in five (83 per cent) have higher education qualifications (ILO 2021: 141).

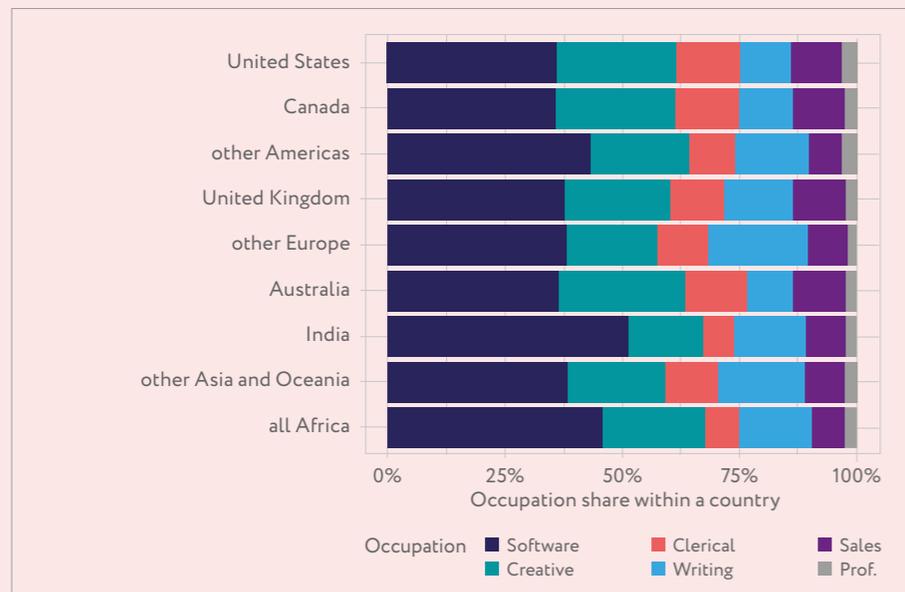


Figure 3: Share of tasks sourced from digital freelance platforms by occupation and country

Source: Kassi and Lehdonvirta (2018: figure 6).

This task-specific, transactional model of using a global pool of platform freelancers raises important issues concerning the relation between skill demand and productivity.

Organisations can potentially benefit from several productivity-related advantages:

COST REDUCTION

There is a potentially large short-term cost incentive since hiring full-time workers is more expensive (not least in terms of tax, social security and office space costs) than a series of individual transactions with freelancers.¹⁶ & ¹⁷ Alternative models of using a specialist outsourcing company (e.g. a payroll company or IT services company), or hiring via a temporary staffing agency, are also more expensive because such workers enjoy protected employment rights with their employing organisation. By contrast, digital freelance platforms abdicate responsibility for providing employment or social protection benefits to the registered workers, which is estimated to reduce labour costs by 20-30 per cent.¹⁸

EASE OF ACCESS TO SPECIALIST SKILLS

Digital freelance platforms typically offer management software systems that enable client organisations to track and monitor progress of tasks and budget spend. This provides an attractive business solution.¹⁹

SPEED AND FLEXIBILITY OF SOURCING SKILLS

Compared to traditional practices of hiring, redeployment or procurement, organisations report being attracted by the speed of sourcing solutions offered by digital freelance platforms in a context of tight project deadlines.²⁰ & ¹⁶

AUGMENT INCUMBENT WORKFORCE SKILLS

Faced with restrictions on headcount, organisations may also be motivated to rely on online freelancers at busy times or to bring in additional skills.

Productivity impact?

At first sight, this suggests that the use of digital freelance platforms contributes positively to the organisation's productivity. But there are important contingencies and unknowns, and these are being explored in ongoing research coordinated by Hsing-fen Lee at the Royal Holloway, University of London (in collaboration with the ILO and King's Business School).²¹

First, there is a strong incentive for organisations to routinise and codify the tasks outsourced to the digital platform to avoid extra time and costs required to explain and manage the work required. On the one hand, the more codifiable the task, the easier (and quicker) the process of knowledge transfer from the platform to the client organisation. On the other hand, however, there is a risk that the complexity of the original task

is purposefully diminished to suit the platform solution at the expense of what the organisation actually needs.

Second, the decision to use knowledge services from other organisations or individuals often underestimates the degree of tacit knowledge required to do a given task well.²² & ²³ Employees in an organisation typically require tacit understanding about how their task fits with other activities. This involves firm-specific know-how and understanding of how to address ambiguities.²⁴ By contrast, once managed as a series of freelance tasks, without this internal tacit knowledge, there is a high risk that the quality of work is lower and does not integrate well with other organisational activities.

Understanding firms' motivations

TPI research is surveying UK firms to better understand their motivations for using online freelancers. In addition to revealing the importance of lower cost and ease of access to specialist skills, the research will also analyse how each task undertaken by online freelancers fits with the firm's activities, so as to evaluate the quality of knowledge sharing.

The research will seek to uncover evidence of sustained productivity effects by examining the degree of sophistication of project management, knowledge coordination and HR management within the client firm. These are likely to increase the scope for learning and assimilation of new knowledge, with positive implications for innovation and productivity.

A long-term, sustainable architecture for skills and education

This chapter has described two ways in which the interaction between skill supply and skill demand may affect productivity, each underlining the inadequacy of the policy focus on supply of education and skills alone. The skills needed, their location, and the way organisations access skills have all been changing.

These uncertainties and challenges of skill formation facing organisations in the UK are not helped by the inadequate architecture for skills policy, particularly in England, over the last two decades. The legacy of underinvestment, extreme policy churn and lack of co-ordination associated with successive governments has held back productivity and earnings growth.

So, whilst skills and vocational education and training (VET) - whether in the form of apprenticeships, new technical qualifications (such as T Levels or Higher Technical Qualifications) or new institutions (Centres of Vocational Excellence, National Skills Academies, National Colleges, Institutes of Technology) - have duly appeared in a series of successive and short-lived economic strategies, they have typically been poorly funded and not joined up with other policies and initiatives.

Short-term

Few policies have remained in place for long, and neither have the ministers or departments and agencies overseeing them. According to the Institute for Government (2017), since the early 1980s there have been 28 major pieces

of legislation related to vocational, FE and skills training, six different ministerial departments with overall responsibility for education, 48 secretaries of state with relevant responsibilities, and no organisation has survived for longer than a decade.²⁵ Gillian Keegan MP, herself a former skills minister between 2020-21, is currently the sixth Secretary of State at the Department for Education since 2019.

"As a consequence, the vocational sector is an 'alphabet soup' of providers, with acronyms that change every year. Students are horribly confused about which programmes are valued by employers, and nobody has any confidence that a qualification will lead to work or pay progression, or even exist in a few years' time. It is the worst failure of domestic British public policy since the Second World War."

(IfG report)²⁶

The instability in the sector has created a complex and ever-changing landscape for individuals and employers, as well as institutional providers.

"Essentially, what we have is a set of institutions, funding mechanisms and levels, inspection regimes, regulatory arrangements, programmes, qualifications, assessment systems, and policies that are in constant flux."

(Keep et al., 2021)²⁷

Co-ordination

There have also been co-ordination problems within the Department for Education, as well as between it and other departments tasked with different aspects of improving productivity and economic performance.

In England schools, skills and universities have all been run in very different and often competing and counterproductive ways. Coffield (2007) argues that England does not have a single, coherent educational system, but instead three badly co-ordinated sectors - Schools, FE (or VET) and Higher Education (HE) - which reflect sharp divisions within the Department of Education.

"Many companies are now deploying digital technologies to construct a blended workforce of in-house workers and crowd-sourced freelancers in an effort to improve productivity."

"The mental image suggested by these structural arrangements is of three well-intentioned but dyspraxic and myopic elephants, who are constantly bumping into each other and standing on each other's feet instead of interweaving smoothly in one elegant dance."

(Coffield, 2007)²⁸

HE in England has been increasingly treated as a market, shaped and funded through individual student choice and overseen by a market regulator, the Office for Students (OFS).²⁹

Numbers in English universities are uncapped and institutional funding for teaching comes through a student loan system. FE, however, even when offering similar programmes, has strict number controls, and budgets and contracts via the Education and Skills Funding Agency (ESFA), now an in-house body at the DFE.

Apprenticeships policy is different again. It is funded through an employer levy and regulated by the Institute for Apprenticeships and Technical Education (IFATE). It is not known whether, or how often, the OFS, ESFA and IFATE meet

together to consider the supply skills in the round. In England there is no joined up tertiary education system unlike in Scotland, Wales, and other European countries such as Ireland.

Government spending

Nor has government spending on education kept pace with the claimed ambition to drive a high skill, high productivity economy.

In the late 1970s, education spending represented 12% of total public spending, making it the largest item of public spending alongside pensions. In the early 1980s, this had declined to about 10%, while from the late 1980s it increased back up to approximately 12% in the 2000s. Since 2010 it has fallen to 10.3% of public spending (2021-22) and it is now only the fourth largest area of public spending.

The FE sector suffers the most from these arrangements. Since 2010 its funding has barely risen at all in real terms and it has instead experienced several periods of significant cuts. According to the Institute for Fiscal Studies (2023), between 2010-11 and 2019-20, spending per student aged 16-18 fell by 14% in real terms in FE colleges and by 28% in sixth forms. For FE colleges this left spending per student at around the level it was in 2004-05, while spending per student in sixth forms was lower than at any point since at least 2002. FE is also where the majority of VET takes place - including adult learning and training in the workforce.

Extra funding

In the 2019 and 2021 spending reviews, the government announced extra funding for colleges and sixth forms. As a result, overall per-student spending in 16-18 education is set to rise by 9% in real terms between 2021-22 and 2024-25 (see Figure 4 overleaf). Yet college spending per pupil in 2024-25 will still be around 5% below 2010-11 levels, while school sixth form spending per pupil will be 22% below 2010-11 levels.

Higher Education pressure

HE funding in England has also been intensifying as the undergraduate tuition fee remains frozen at £9,250 per year (originally set a decade ago and updated for inflation only once in 2017) and high inflation is rapidly eroding its value. In terms of 2012 pounds, it dropped from £9,000 in 2012 to around £7,760 in 2020, a 14 per cent cut. According to Mark Corver of DataHE, in 2023 after two years of high inflation, real terms fees have now fallen to £5,600 - a massive 38 per cent cut from 2012.

There are questions about the ongoing affordability of the HE funding system overall. In a recent report the House of Lords criticised the OFS for failing to recognise the severity of the "looming crisis" facing English universities, stating that "its approach to regulation often seems arbitrary, overly controlling and unnecessarily combative", and that it has paid insufficient regard to either student interests or the financial challenges facing the sector.³⁰

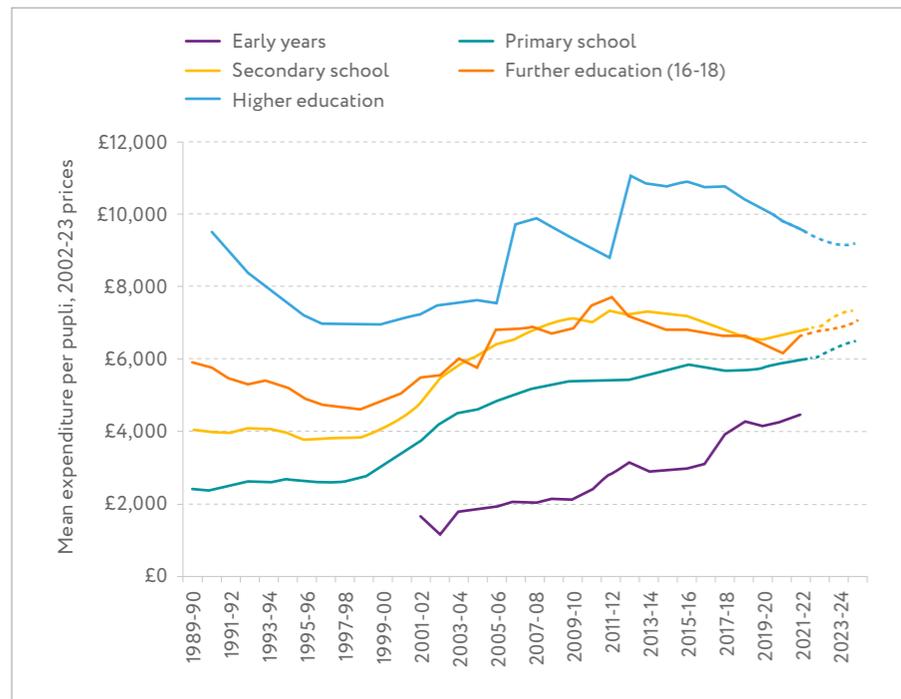


Figure 4: Spending per pupil/student per year at different stages of education (2022/23 prices)

Note and source: Early years figures are spending per child for 3- and 4-year-olds taking up a place. Secondary school spending per pupil includes spending on school sixth forms. Further education figures represent spending per student aged 16-18 in further education and sixth-form colleges. Higher education figures are cohort-based numbers divided by 3 - an approximate course length. HM Treasury, GDP deflators, November 2022 (<https://www.gov.co.uk/government/statistics/gdp-deflators-at-market-prices-and-money-gdp-deflators-november-2022-autumn-statement>).

Lack of co-ordination

An equally significant problem alongside policy churn and inadequate funding is the lack of co-ordination between education and skill policies, and innovation and spatial policy. As the UK commits to increased spending on R&D, including the welcome re-entry to the EU's Horizon Programme, it is particularly important that the skills system is able to absorb and deploy new innovations, knowledge and technologies in the workplace.

This requires closer alignment between education and R&D policies so that there is sufficient 'absorptive capacity'³¹ in firms in all regions. Without appropriate skills there can be no exploiting and implementing of scientific and technological discoveries, yet there appears to be very little practical co-ordination between skills and R&D policies. This can only exacerbate the mismatches described above.

Regional impact

Given the very high levels of spatial inequality in evidence within England and the UK, this is a particular challenge for efforts to improve productivity and economic growth throughout the country. Education policy in England - for schools, FE and HE - has largely operated on a 'place blind' basis.³²

However, the devolution and levelling up agendas, and the creation of Mayoral Combined Authorities (MCAs) with strong economic agendas and powers - including over skills - have begun to change this. For instance, mayors in England now have complete responsibility for their adult education budgets. Moreover, in the recently agreed deeper devolution deals in Greater Manchester and the West Midlands, joint governance boards have been established so that these two authorities and the DFE will jointly run FE for 16-19 year-olds.

This is a move in the right direction. However, this still leaves a number of major challenges if education and skills are to play a role in improving UK productivity performance. Adequate funding will require sustained, long-term reform, and extreme policy churn needs to end.

While England grapples with these challenges, the education systems across the rest of the UK are also diverging rapidly from free higher education in Scotland for Scottish students to ambitious tertiary and curriculum reform in Wales, leading to a fragmented approach to skill formation, particularly VET and HE. There are few signs that the different regimes are keen to learn from each other.

Policy implications

OUR RECOMMENDATIONS ARE TO:

The UK faces significant challenges in building a more effective framework of policy and employer practice to raise productivity and living standards, and in ensuring that economic opportunities are fit for people's aspirations at work.

The TPI research described here focuses purposefully on the role of the employer as a key architect in constructing labour market demand - decisions about where to locate graduate jobs and high-tech jobs, as well as whether to hire from an online pool of freelancers instead of recruiting traditional employees.

With employer needs changing, and varying across the UK, TPI research also demonstrates that the UK's policy architecture is inadequate for a high productivity, high skill growth model, beset by skill mismatches, regional disparities, underinvestment, policy churn and policy fragmentation.

Integrate the tertiary system across higher education, further education and work-based learning (e.g. apprenticeships and other programmes) in England, linking also to schools and building on the current Local Skills Improvement Plans. To some extent this already exists, or is planned, in other UK nations, so this ought to be a realistic option.

Establish new incentives and investment rules for employers and individuals (e.g. tax credits or similar) for greater investment in human capital. This can help spur innovation and technology investment.³³ Counting some education spending as investment in the government's fiscal rules could also be considered to address the funding shortfall described above and enhance people's economic opportunities.

Strengthen the coordination between policies for tertiary education, skills, R&D and innovation. This should target 'absorptive capacity' in firms and places where R&D strengths and/or investment exist (See Chapter Three). It should also align with, and be an essential component of, policy objectives to achieve net zero (Chapter Seven), and to develop advanced manufacturing and high-tech, knowledge intensive services sectors. It should also include a focus on strengthening non-graduate technical skills.

Extend labour rights and social protections to digital platform workers (locational and online platforms) so that the rising demand for platform labour fully reflects its social and economic costs as well as private benefits. This should include health and safety protections (as in Australia for example), ensure decent pay (including procedures for dispute resolution) and give platform workers the right to access data related to their activities (following ILO recommendations).³⁴

"An alternative explanation is that organisations outside the golden triangle are producing different kinds of goods and services, not so much in the high-tech sectors, and therefore with less need for advanced graduate-level skills."

Key takeaways

With employer needs changing, the UK's policy architecture is inadequate for a high productivity, high skill growth model, beset by skill mismatches, regional disparities, underinvestment, policy churn and policy fragmentation.

Adequate skills funding will require sustained, long-term reform, and extreme policy churn needs to end.

Labour rights and social protection for platform workers will ensure employers pay the full costs of using such workers.

Giving English regional mayors more powers over skills is a step in the right direction.



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- Skill mismatch has a variety of meanings, including vertical mismatch (e.g., graduates in non-graduate jobs known as overeducation, or non-graduates in graduate jobs, known as undereducation), horizontal mismatch (educated in a different subject area to that required in the workplace) and skill gaps (skill shortages and skill obsolescence) (McGuinness et al. 2018).
- These are advertisements by firms usually through job hiring platforms such as indeed.com but also include advertisements through firms' own website. These data are compiled and adjusted to remove duplicates by Lightcast data services.
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- [2019 data for Upwork](#) (since when it has not released data) and 2022 data for Fiverr.
- According to platform data collected by the ILO, the commission collected from freelancers is significantly higher than from the client (ILO, 2021: table 2.1).
- Figure 3 is reproduced from the work of academics at the Oxford Internet Institute. It refers to completed tasks on five of the largest digital freelance platforms – Freelancer, Guru, Mturk, PeoplePerHour and Upwork.
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The green transition: net zero as an opportunity to improve productivity



CHAPTER SEVEN

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The transition to net zero is an opportunity for businesses to improve productivity, generate new jobs, and create the markets of the future, but this is not guaranteed. While the prospects are promising, many sectors have not yet reached the tipping point where making the transition is the obvious move.

So how can the government make sure that it provides the relevant support to make this the new reality? This chapter will unpack the business opportunities, uncover the intricate links between productivity and net zero investment, and set out some of the policy implications.

Losing ground

Once a leader in responding to climate change, the UK is losing ground. Passing the Climate Change Act in 2008 and the law to reduce greenhouse gas (GHG) emissions to net zero in 2019, made the UK a global climate leader. It was the first major economy to legally bind itself to a green growth agenda.¹ This ambition to achieve net zero emissions by 2050 was firmly built on the belief that addressing the climate emergency will help the UK create economic growth, not sacrifice it.² The legislation would stimulate green growth and provide companies with the push to think of net zero as a business opportunity to futureproof their business models.

However, while the UK was long considered a climate leader, it is now struggling to maintain this position. The rhetoric is in place, but concrete policy

actions are lagging in comparison to close competitors in Europe and beyond.³ The UK is no longer meeting its own commitments set out in consecutive carbon budgets.⁴ And, recently, the Conservatives have been backtracking on earlier commitments, risking making net zero part of an unproductive culture war, not dissimilar from the one in the US.⁵ The UK government is sending a rather confusing signal about how serious it is about tackling the climate emergency.

Lack of clarity

This lack of clarity is unfortunate because for the most part the realisation has taken root that there is no future for businesses not shifting their activities toward the net zero emissions economy. Since the 2015 Paris agreement, the needle on corporate climate action has moved decisively. While the debate used to be about how companies could reduce GHG emissions in a cost-efficient manner and minimize the cost of compliance, it is currently about the business opportunity of net zero from investing in low-carbon technologies and making fossil fuels a relic of the past.

There is increased awareness, too, that the real impacts of climate change are already being felt across industries. Extreme weather events such as storms, floods and heatwaves are now regularly disrupting business operations and supply chains. Such experiences have led to calls for infrastructure investments such as flood defences that will make the economy more resilient.⁶

Green investments

The rhetoric of opportunity around green investments is not new,⁷ but it is taking on a whole new dimension. This is not surprising. There is evidence that green investments can be hugely successful in generating revenues and creating jobs.⁸ A case in point is the UK's greening of the electricity supply, where offshore wind has become a success story while coal has been almost phased out (see Figure 1).⁹

In other low-carbon technologies, such as electric vehicles (EVs), batteries, and solar PV, however, the UK is seriously falling behind the US with its Inflation reduction Act, the EU with its Green Deal Investment Plan, and China with its many investments in all possible low-carbon technologies. On top of this there is public outrage about the many sewage spills which are the result of decades of underinvestment by water companies. The UK has turned into a green laggard, rather than a leader.

Across the globe, other governments are taking the lead, using public-private investment to create new infrastructure to deliver green energy and to make the economy more resilient to climate shocks. The UK should follow suit, but that will not be easy as it requires massive investment in low-carbon technologies and climate-resilient infrastructure, and above all consistency in climate policy.

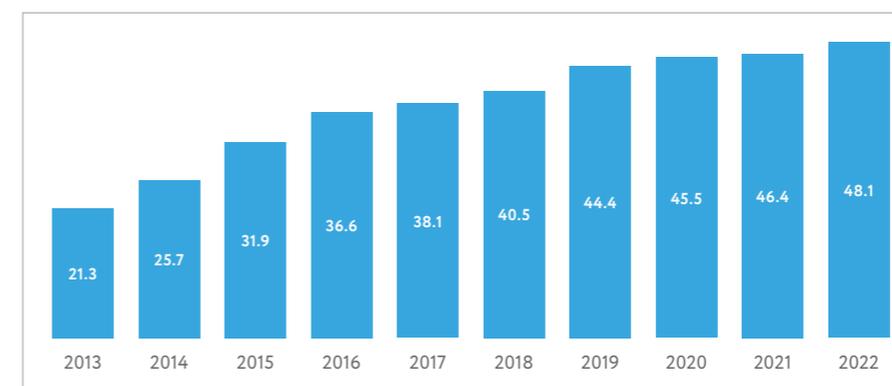


Figure 1: The UK's renewable energy share of electricity capacity (%) - Based on data from IRENA, 2023, Renewable capacity statistics 2023

The complexity of net zero for business

The business opportunities of net zero have long been recognised.¹⁰ Yet most sectors are still slow in taking advantage of them. Fossil fuels remain dominant as energy source and as an input for materials and chemicals. Achieving net zero requires a strategic reorientation of major sectors of the economy and a significant acceleration of investment and innovation to reduce dependency on fossil fuels. This is an arduous task for several reasons.¹¹

First, companies can no longer rely on existing knowledge and competences when they aim to offer products and services without emitting GHG emissions. They must obtain new knowledge to decide which low-carbon technologies to use, and new competences to fit them into existing activities.

In some sectors, the go-to low-carbon solutions have become evident, such as solar PV and wind power for electricity generation, electric vehicles for personal mobility, and heat pumps for heating houses. For many other sectors, the low-carbon solution of choice is not yet so obvious.

The steel industry, for example, has been going through periods of increased exploration of low-carbon alternatives to then abandon these again. Consequently, the UK steel industry has not yet settled on a clear path forward on net zero.¹² While achieving net zero soon is imperative, there are still many questions about how realistic the prospects are for specific low-carbon solutions for specific sectors. For example, what will be the role of nuclear

energy for electricity generation? How likely is the scaling up of (green) hydrogen for wide application in industry? And which low-carbon fuels can be realistically deployed in the short to medium term for shipping and aviation?

Clear direction

Whichever route to net zero is taken, companies are expecting the government to set a clear direction. While the market is the best way to help scale up and diffuse commercially viable low-carbon technologies, the government has a role to play in protecting such emerging technologies until they reach maturity.¹³

For instance, Tesla's current success is in part down to vast amounts of public investment for R&D and generous subsidies for the purchase of EVs.¹⁴ Due to the risk of investing in the 'wrong' green technology, companies expect the government to de-risk their investments through appropriate policy support.¹⁵

The success of the UK's offshore wind is largely the result of effective policy, such as the Contracts for Difference auctions which have provided long-term price certainty.¹⁶ Likewise, Germany's large-scale deployment of solar PV owed its success to feed-in tariffs which guaranteed investors with financial pay-offs for a period of 20 years. Such support is also imperative because deploying low-carbon technologies at scale involves a system transition. Companies cannot make the transition alone, they need a well-functioning infrastructure, including

an upgraded and expanded electric grid,¹⁷ and the buy-in of customers, suppliers, governments, and society.¹⁸ Government has to co-ordinate their multiple decisions.

Urgency

And then there is the question of urgency of net zero. One reason for companies' indecision about the business opportunity of net zero is hitherto a seeming lack of noticeable climate impacts. Although the IPPC (Intergovernmental Panel on Climate Change) has been sending a clear message for decades that the need to act is ever more urgent, for companies the lack of noticeable impacts close to home has meant that investing in net zero felt like throwing money at an abstract future.¹⁹

With extreme weather such as floods and heatwaves making headlines year on year, the urgency is more obvious. However, the need to act now means that companies must accelerate their strategic reorientation and make massive investments at an unprecedented pace.²⁰ This requires a radical change in industries such as heavy manufacturing that are not used to such sudden moves due to the long lifetime of their assets.²¹

Clearly, the route to net zero is ridden with complexities and uncertainty, not only about which low-carbon technologies will deliver the much-needed emissions reductions and who will take the lead, but also about the impact of the transition on companies' financial performance and productivity.

The link between net zero and firm-level productivity

The link between environmental regulation, firms' investments in green technologies, and economic outcomes such as financial performance, competitiveness, and productivity has been much debated.²² At first, government attempts to have companies reduce emissions were seen as driving up costs and harming firm-level productivity.²³

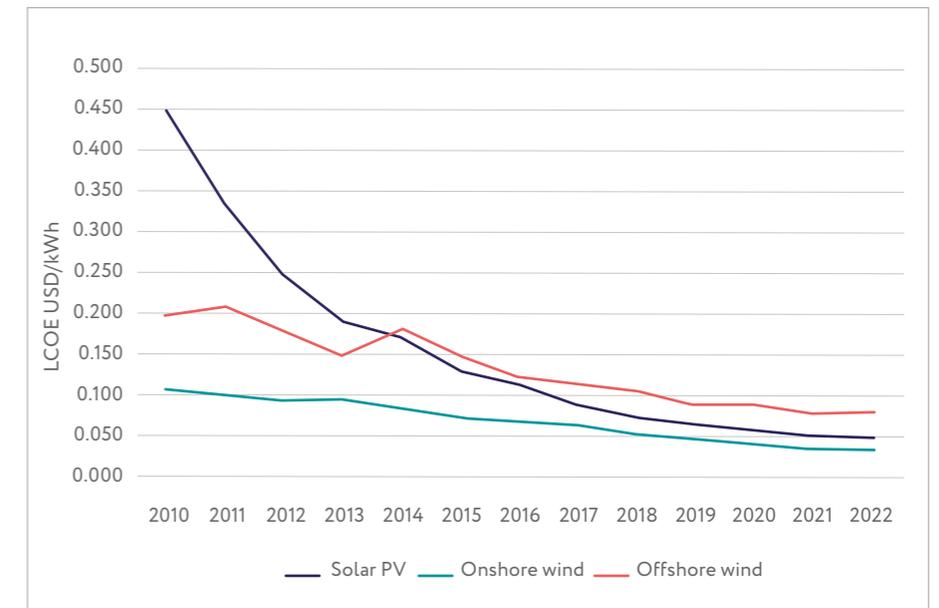
High costs of compliance are a concern because it is not obvious how companies can recoup these costs without increasing prices and thereby harming their competitiveness. There is indeed evidence from German manufacturing industry which suggests a negative relation between previous environmental regulations that drive up costs and firm-level productivity.²⁴

The famous 'Porter Hypothesis' – that environmental regulation would stimulate efficiency and innovation – changed how we now see this link.²⁵ The underlying idea is that environmental regulation compels companies to innovate and run operations more efficiently, which will not only drive down costs but also increase revenues. This 'win-win' rhetoric has gained much traction, but the evidence is inconclusive. Many studies have found a negative relationship instead, although most failed to reckon with the dynamic effects. That is, green investments will not produce immediate results because companies need to learn how to use green technologies to become more efficient.²⁶

Dynamics

Clearly, understanding the underlying dynamics is key to explaining the link between net zero and productivity.²⁷ If it takes time for companies to use low-

Figure 2: Global weighted average of levelized cost of electricity (LCOE)



Source: Based on data from IRENA, 2023, Renewable power generation costs 2022

carbon technologies productively, then investing in them will likely lower firm-level productivity in the short-run. This is similar to the productivity J-curve from using digital technologies described in Chapter Five.

There is considerable uncertainty, too, about whether low-carbon technologies will perform as promised. Many green technologies, such as biofuels and hydrogen, have gone through periods of considerable hype to then lead to disappointing results, both environmentally and economically. It is not surprising then that companies are reluctant to make green investments. When green investments have to be

funded by taking resources away from continued investments in fossil fuel-based technologies, the short-term negative productivity effects might even worsen. Companies would be ceasing investments in technologies known to be productive, to instead bet on green technologies which have not yet proven themselves.²⁸

Then again, there is evidence that low-carbon technologies drive down prices in the long-run.²⁹ The costs of renewables such as solar PV and wind power have been falling exponentially, thereby lowering the price of electricity (compared to what it would otherwise have been) and pushing out coal in the UK (see Figure 2).

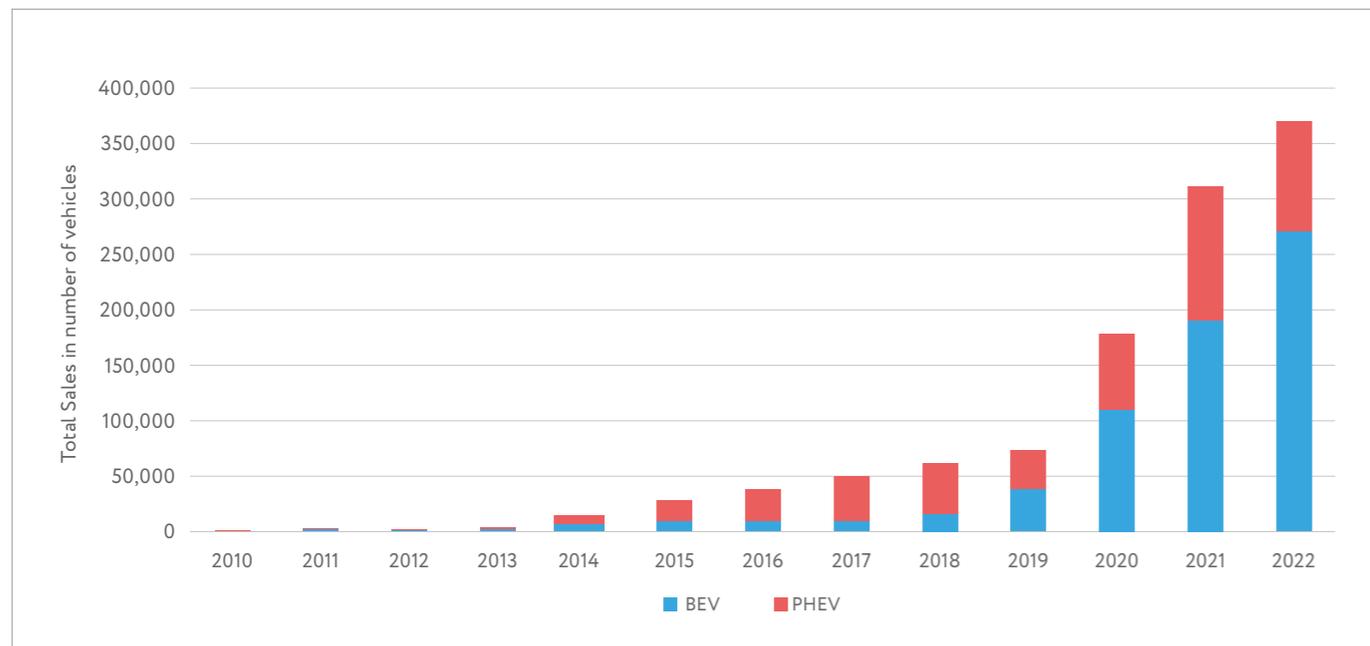
While low-carbon technologies require high upfront capital investments, they do not depend on highly variable fuel costs such as oil, gas, and coal. A similar dynamic is noticeable with EVs which has stimulated their demand (see Figure 3). Currently, EVs are still more expensive, but their running and maintenance costs are lower than conventional cars. If economies of scale further bring down the price of EVs and their batteries, there will eventually be a virtuous circle of increased purchases, lower costs, and lower prices.

There is increasing evidence that low-carbon technologies can indeed reach this kind of tipping point, after which their deployment speeds up considerably, creating new markets altogether.³⁰ A business is therefore ill-advised to look only at what investing in low-carbon technologies will do to short-term costs. While the cost implications are important, they do not tell the full story of the business opportunity of net zero.

Furthermore, investing in a net zero economy might be a matter of essential insurance to sustain productivity levels in the long-run. With the increasing occurrence of disruptive weather events, the need for industries to become more resilient and 'weather the storm' will be crucial to even maintain current productivity levels. Excessive heat, for example, might lead to significant drops in labour productivity as people are not used to working in such conditions.³¹

"While low-carbon technologies require high upfront capital investments, they do not depend on highly variable fuel costs such as oil, gas and coal."

Figure 3: The UK's electric vehicles sales



Source: Based on data from the International Energy Agency, <https://www.iea.org/data-and-statistics/data-tools/global-ev-data-explorer>
 NB: BEVs are battery electric vehicles, while PHEVs are plug-in hybrid electric vehicles

Seizing the business opportunity of net zero

The business opportunity of net zero is not just determined by the cost implications of deploying low-carbon technologies at scale. Yes, if low-carbon technologies are far more expensive than their conventional counterparts, it will be very difficult to convince companies to make a large-scale transition. However, now that many low-carbon technologies are reaching sufficient scale, their price is going down significantly.

Moreover, the price of fossil fuel-based technologies is going up due to regulation. Emissions trading schemes (ETSs) have put a price on carbon, no longer making it an unpriced externality. The carbon price influences how companies make their investment decisions. The fact that renewables have reached price parity with fossil fuels, and have even become cheaper at times, has swayed many companies to favour low-carbon technologies in their plans. Investing in them simply makes business sense from a standard investment perspective of looking at the net present value. The future financial pay-offs make it worthwhile to invest now.

Carbon price

However, not all sectors face a price on carbon. The UK ETS only covers the energy intensive industries, power generation, and (domestic) aviation. Yet, this lack of carbon price does not mean that there is no business case at all. Technologies reach a tipping point, not only because they become affordable, but also because they create other benefits.³² Society is changing in what it expects from business regarding its role in tackling the climate emergency.

The government's toolbox comprises many policy instruments, not only the ETS, to support the development and deployment of low-carbon products and services.³³ And curbing emissions is not the sole benefit of low-carbon technologies, people favour them for many other reasons too.³⁴ They are often simply considered the technologies of the future.

Markets for green products and services develop not only because they are cheaper but also because of what customers want. The business

opportunity of net zero is multifaceted and there are multiple potential business cases.³⁵ Nonetheless, in many sectors, the tipping point has not been reached yet, and low-carbon technologies continue to face an uphill struggle.³⁶

And in those industries that have not yet been hit directly by climate impacts, companies tend to underestimate the need to invest in measures to become more resilient.³⁷ This means there is an important role for government to support the development of these opportunities.

"Society is changing in what it expects from business regarding its role in tackling the climate emergency."

Policy implications

The transition from a carbon to a zero carbon-based economy is a systemic change that will require consistent policy support across a wide waterfront. This will range from financial support to – more importantly – changes to regulatory and institutional frameworks.

- The market for green products and services is growing year on year.³⁸ Customers are increasingly looking for greener alternatives and are willing to pay a price premium. Companies are no longer limited to targeting a green niche, as mainstream interest grows. For example, launching its latest iPhone 15 series with a commercial featuring Mother Nature, Apple highlighted its ambition to make all their products carbon neutral by 2030. Such initiatives are changing the industry norm. Not offering low-carbon products will become a liability for companies in the years to come when their competitors do offer such products. Governments can help expand mainstream markets for low-carbon products to increase economies of scale and move the market to a tipping point. For example, they can do so through the introduction of product standards that set a maximum amount of GHG emissions. Ever-stricter performance standards for CO₂ emissions, for example, have proven successful in driving the car industry to strategically reorient towards EVs.³⁹
- Companies investing in net zero tend to have better access to finance.⁴⁰ They have access to financial resources from ESG funds, but mainstream investors will be more interested too because they can avoid being left with stranded fossil fuel-oriented assets. The fast decline of coal is a case in point, showing the risk

of continuing investments in fossil fuels. Given London's prime position in the world as a financial hub, the UK can play a pivotal role in further unlocking green finance, for example by incentivising institutional investors to invest in low-carbon technologies and energy infrastructure, or by incorporating climate risk in stress testing financial institutions.⁴¹ While there is much potential for private investors to be pivotal in providing the capital needed for the net zero transition, fiscal incentives are needed to trigger significant change in current investment patterns.⁴²

- Net zero may be an important force in attracting Foreign Direct Investment (FDI). Global investment is increasingly going into the green economy.⁴³ There is currently a global race between countries to become the location of choice for green investments, and the UK cannot afford to entirely ignore it. Multinational corporations expect the government to create favourable conditions for them to invest in the UK or to prevent them from offshoring their current assets by helping them to decarbonise operations. Recently, for example, the UK government offered Tata Steel £500 million to support it in making the switch to green steel in Port Talbot.⁴⁴ To become attractive as a destination for green FDI, the government needs to make sure that the necessary infrastructure is in place to help foreign companies work with local partners and achieve positive spillovers from such investments.
- Investing in net zero creates new jobs which tend to require more skilled labour and are therefore generally better paid.⁴⁵ Low-carbon technologies tend to be labour intensive as they require many support

services. However, there are currently not enough people with the relevant skills so considerable public investment is needed in vocational training and further education to create a green workforce, in a co-ordinated manner across education sectors and regions (see Chapter Six). Without a pool of workers with green skills, UK businesses will not be able to exploit the many opportunities.

- Low-carbon products and services rely on complementary technologies such as a charging infrastructure for EVs, installation and maintenance services for solar panels and wind farms, and batteries for energy storage. These complementary technologies create new markets themselves which will generate new business opportunities and jobs. Low-carbon technologies have therefore been likened to general purpose technologies (GPTs) which trigger future business opportunities because of their widespread application across the economy.⁴⁶ Government will need to assist in upgrading existing infrastructure by tackling potential bottlenecks such as the availability of grid connections, and rolling out new infrastructure by supporting new entrants in their early stages before they break-even.
- Companies invest in net zero because they realise that it has become the most urgent issue facing our generation. Being a first-mover on net zero can also bring companies tremendous reputational benefits and make them an employer of choice for the younger generation. But the risk of 'greenwashing' is real and requires adequate consumer and saver protection to guard against it. For example, regulators need to make sure that there is effective regulation against misleading advertising.

- Investing in low-carbon technologies will push companies to rethink their business models and reimagine how they can create and capture value. The diffusion of renewables, for example, can benefit from a further platformisation of the economy where companies make money by facilitating peer-to-peer transactions for energy between people. In the construction sector, newcomers have pioneered modular business models to deliver more energy-efficient homes in a more productive way.⁴⁷ But new business models clash with the mindset of the industry and often struggle to succeed within existing institutional frameworks. There is currently no regulatory framework, for example, that allows peer-to-peer trading of energy between households, hindering platform business models.⁴⁸
- Low-carbon technologies such as renewable electricity with its intermittency, and EVs with their limited range, are only useful when they are paired with digital technologies and infrastructure. Companies that leverage the digital opportunities of net zero can provide a multitude of products and services that will generate additional revenue streams. The full suite of digital technologies including Artificial Intelligence (AI), Internet of Things (IoT), cloud computing, and data analytics can help companies make the transition to net zero. However, SMEs especially risk being left behind as they lack the resources and skills to make the digital transition. Government can help scale up initiatives like Made Smarter to enable companies to adopt digital technologies that also help them on their net zero journey.⁴⁹

Opportunities

Clearly, there are multiple potential business cases and opportunities from the net zero transition. Yet, many companies still need to be convinced of the viability of the business case in their sector. Government will play a pivotal role in supporting sectors across the economy to reach the tipping point beyond which investments in low-carbon technologies will generate increasing returns and green markets will continue to develop at pace.

However, there is considerable heterogeneity across industries. In some industries, the low-carbon technology is there, but it is still not the default option – such as heat pumps. In other industries, such as heavy manufacturing, there is far more uncertainty about what the default low-carbon solution will be. The government will have to co-ordinate with the relevant actors and make a clear choice. Without a decisive government, companies delay making big commitments – and this would hamper UK businesses in global markets of the future.

Currently, government policy is of a start-stop nature. The recent watering down of the UK's net zero plans could put a halt on green investments in sectors such as housing construction and automotives. Relying on a carbon price as the only policy lever needed is short-sighted. There are many other bottlenecks such as an outdated electricity grid which is not fit for the massive electrification of the economy, dysfunctional regulatory frameworks such as planning systems that prevent the building of new infrastructure, and the delayed implementation of much-needed climate policies.

Multi-faceted

It is key for government, too, to appreciate the multi-faceted nature of the net zero transition. No one policy intervention will bring about change. Rather, it is a combination of changing expectations of consumers, experience with the use of low-carbon technologies, a growing group of people working in the green economy, public pressure from social activists, and well-designed policies that together create the positive feedback loops that accelerate the transition.⁵⁰ Stimulating innovation in low-carbon technologies is important, but when a labour force with green skills is lacking, it will be very difficult for the UK to become a prime destination for green investment.

Unlocking the business opportunity of net zero requires action both on the supply and demand side. Most policies are targeting the supply side of low-carbon technologies, which is based on a belief that once the technology is there, it will diffuse throughout the market.

However, to help companies which supply green products and services, the government should also stimulate demand. While subsidies and purchase incentives can be effective, it can also use its public procurement to buy low-carbon products and services only.⁵¹ By introducing low-carbon product standards and changing customer behaviour through nudging, the government can change markets and protect the risky investment of green champions. Only the government can play this co-ordination game and help UK businesses achieve the long-term productivity gains available from new green technologies and the net zero transition.

Key takeaways

Need to appreciate the multi-faceted nature of the net zero transition – no single policy intervention will bring about change.

Unlocking the business opportunity of net zero requires action on both the supply and demand side.

Investing in a net zero economy might be a matter of essential insurance for companies to sustain productivity levels in the long run.



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Public Sector Productivity – managing the Baumol cost disease

CHAPTER EIGHT

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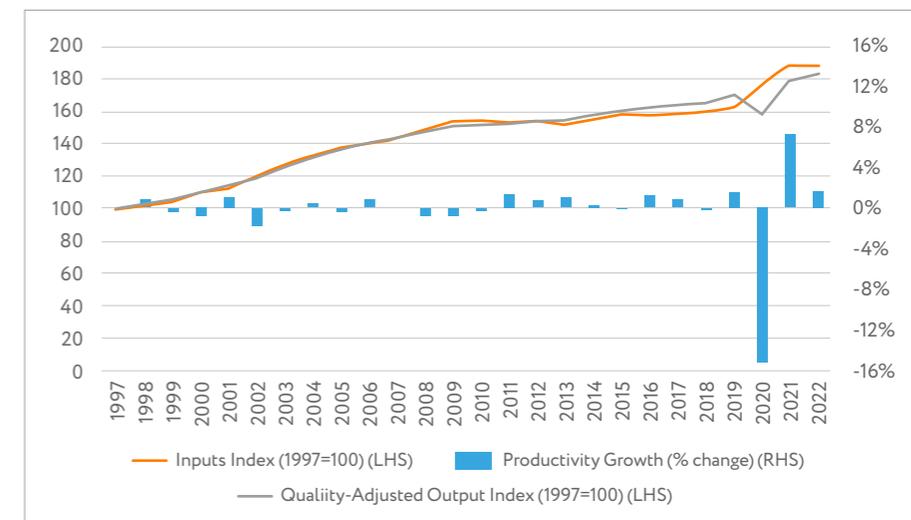
The public sector plays a critical role in the economy, providing essential services as well as creating an enabling environment for private sector growth. These functions have direct and indirect impacts on the economy and society, using taxpayers' money.

In the UK annual government expenditure has averaged at least 40% of GDP since 2008, two thirds of which is spent on public service provision. In the fiscal year 2019-20, the public sector accounted for 22.5% of GDP, or £7,600 per capita at that year's prices.¹ The UK public sector also employs around 17% of the UK workforce.²

Over the past decade, efforts to increase public sector productivity have focused primarily on cost-cutting measures. This approach has been effective in the short-term, but further efficiency gains through this route will be harder to achieve in the face of increased demand for public services and rising costs.

Instead, a focus on organisational productivity and effectiveness is required, with a clear understanding of the delivery chain for different types of public services. Public sector organisations need the administrative and legal capacity to adopt new technologies and innovate, adapt organisational structures, and develop an agile workforce and management.

Figure 1: UK public sector quality-adjusted output and inputs (1997=100) and total factor productivity (annual % change)



Source: Office for National Statistics (2023)

Government review

Public sector productivity has received renewed attention following Chancellor Jeremy Hunt's announcement in June 2023 of a cross-government review. In his accompanying speech, he described the review as the "most ambitious" ever undertaken and that a primary motivation was to "look at what it would take to deliver that additional 0.5% [public sector productivity growth] every year that would stop the state growing ever bigger as a proportion of our output".³

Adding 0.5 per cent per year to public sector productivity growth will not be an easy task to accomplish. Over the past 25 years, successive governments have already achieved a meaningful improvement in public sector performance. For instance, the New Labour administration from 1997 to 2010 markedly increased the quality of public sector outputs by funding major new programmes (grey line in Figure 1). The subsequent coalition and Conservative administrations also had notable success in reducing the cost of services without severely reducing the quality (orange line in Figure 1).

Overall, productivity in the public sector was broadly flat between 1997 and 2007, fell during the financial crisis in 2008 and 2009, and then increased by 0.7% a year from 2010-2019 (blue bars in Figure 1).⁴ During the latter period the public sector enjoyed a better productivity performance than the private sector.

However, the approaches taken during past decades to raise public sector performance are unlikely to produce further gains. The public finances are under unprecedented strain, and many public sector organisations are already struggling to meet the demand placed on their services.

Apart from the dramatic impact of the COVID-19 pandemic - from which public sector productivity has not fully recovered⁵ - there are significant long-term challenges to be faced. Demographic pressures from an aging population, increased need for spending on international security, commitments to regional development ('levelling up'), and adaptation to climate change are putting an increased burden on government to deliver services effectively while keeping spending under control.

Focus on efficiency

The current cross-government review emphasises a 'rigorous focus on efficiency'. However, focusing exclusively on efficiency and cost savings has not always worked in the past, since it carries risks such as poor service quality, low staff retention and underinvestment in innovation.

Indeed, this was the case following the Gershon Efficiency Review (2003/4) which was criticised for leading to a decline in some services, notably through the loss of skills and expertise.⁶ One of the best-known examples is the loss of staff at the Office for National Statistics, most of whom were unwilling to follow the relocation from London to Newport in Wales.

In the healthcare sector, a recent report by the Health Foundation claims that productivity gains from budget cuts are not sustainable in the long run.⁷ A report by the Chartered Institute of Public Finance and Accounting (CIPFA) and the Institute for Government (2019)⁸ also argues that limiting staff pay increases and prompting workers to be more productive is "approaching – or has already reached – its limit".

Policy agenda

The need to improve public sector productivity does regularly appear on the policy agenda, but discussion is often limited in scope and does not consider value for money along the whole delivery chain. Instead, policymakers focus on an easily observable variable that gets public attention (e.g. more policemen on the beat, reduce the length of the waiting list, faster processing of visa applications) and attempt to cut costs or squeeze more out of the same budget. However, these interventions can only produce one-off increases in productivity, and so it cannot deal with the long-term economic and demographic trends that are placing strain on the public sector.

"Baumol's cost disease implies that the value for money approach will not achieve sustainable growth in public sector productivity unless taxes, or government borrowing, continue to rise."

Demand for public services will cause ever-increasing costs because of the brutal logic of 'Baumol's cost disease' which implies that the value for money approach will not achieve sustainable growth in public sector productivity unless taxes (or government borrowing) continue to rise.

New paradigm

It is therefore imperative to find a new paradigm for improving the performance of the public sector that can produce sustainable increases in productivity which are strategic and focus on overall organisational productivity and effectiveness.

Fortunately, the thinking about productivity and its outcomes in the public sector has evolved significantly in recent years.⁹ There is a greater understanding of the key drivers of productivity, and there are more signals of purposeful improvements at a practical level in public sector organisations.^{10 & 11}

But there is still a lot to do. For example, a major review of public sector

performance by Barber (2019)¹² concluded that a long-term strategy for continuously improving efficiency and productivity through both disruptive and incremental innovation was still largely missing.

Outline

In this chapter we therefore first discuss why the rising demand for public services, in combination with Baumol's cost disease hypothesis, means raising public sector productivity faces significant headwinds. This requires a broader focus on the purpose and role of productivity.

We then describe how productivity needs to be managed across the delivery chain from budget to inputs, to outputs, and then to outcomes. Next, we discuss the three drivers of public service sector productivity, namely the development of an adaptive business organisation, the development of a process of continuous innovation largely driven by digital transformation, and the creation of an agile workforce. We conclude with a summary of the implications for pro-productivity policies in the public sector.

The pressures on the public sector: managing the Baumol cost disease

The importance of the public sector will increase further. Firstly, the demand for some public services, in particular for healthcare and climate change mitigation and adaptation, is rising. In education, the demand for primary or secondary schools may diminish as the population growth slows, but demand for adult training and education will increase.

Secondly, even without increased demand, the share of the public sector in the economy will rise because of Baumol's cost disease hypothesis. This states that the services sector, and in particular labour-intensive services such as those provided by the public sector, experience continually rising costs while productivity remains stagnant.¹³ The main mechanism is that wages tend to follow those in the private sector, whose productivity growth is usually faster.

Measurement

The observed stagnation in public sector productivity is partly the result of how productivity is measured. Even today, official productivity statistics assume a zero-productivity growth rate for just over 40 per cent of public sector services, using the so-called "output-equals-inputs" convention. In his June 2023 announcement, the Chancellor also announced a review of ways to improve measurement.

Constant pressure

The combination of increased demand for services and rising cost pressures means that public services are under constant funding pressure. This can easily lead to a

fatalistic view that cutting budgets is the only viable policy instrument. Policymakers either conclude that the only way to keep expenditure under control is by squeezing more out of remaining resources, or that the only way to meet demand is by spending more without much hope of a productivity gain.¹⁴

In other words, service performance can only be improved by increasing spending,¹⁵ consolidation of operations,¹⁶ reduced quality,¹⁶ or axing 'non-essential' functions.¹⁷

Mitigating the impact

However, while the logic of Baumol's cost disease is inescapable, the impact can be mitigated if productivity has more potential to be increased than assumed.

Lagging productivity growth in public sector services is in part a direct consequence of negligence by politicians, government officials, and managers in the public sector regarding the functioning of public bodies.¹⁴

According to Blank, Baumol's

cost disease consists of three separate illnesses. Firstly, the lack of well-functioning markets making public sector organisations dependent on good intentions or on perverse incentives as they try to spend their way out of the problem. Secondly, the assumption that there is an inherent trade-off between quality improvements and productivity. And thirdly, a belief that 'big is always better' leading to an upscaling of public sector organisations well beyond the point where their productivity peaks.

To manage Baumol's cost disease, and so not fall victim to spending more to stay still or spending less to cut costs (and quality), public sector productivity must move away from the narrow focus on cost efficiency. A broader consideration of organisational productivity and effectiveness is imperative.

The focus should be on defining desired outcomes, linking those to outputs, and investing in capabilities to turn inputs into outputs while managing budgets efficiently. This defines the public sector delivery chain.

"The combination of increased demand for services and rising cost pressures means that public services are under constant funding pressure."

The delivery chain in the public sector

Public service provision is complex and dynamic due to the interdependent units involved.^{18 & 19} As a result, defining public sector productivity is not straightforward.

It can be assessed in multiple ways, considering factors like accountability, accessibility, responsiveness, reliability, competence, and safety. What constitutes productivity depends on which parts of the service delivery chain policymakers and managers focus on, i.e. whether they aim for better outcomes, quality and user satisfaction, improving the technical efficiency by which inputs are transformed into outputs, or achieving budget savings (see below).¹⁶

The delivery chain is a map of the budgets, inputs, and output activities that are controlled by an organisation, linked to the desired outcomes (Figure 2). The aim of mapping the delivery chain is to understand the relationship between these components, the effectiveness of transformations along the chain, and where improvements should be

targeted to ensure the greatest increase in overall productivity.

Components

Public sector productivity can be split into three components:

Budgetary efficiency is the productivity by which budgets are transformed into the inputs that are needed for the organisation

Organisational productivity is the way by which input resources are transformed into the output activities that the organisation performs

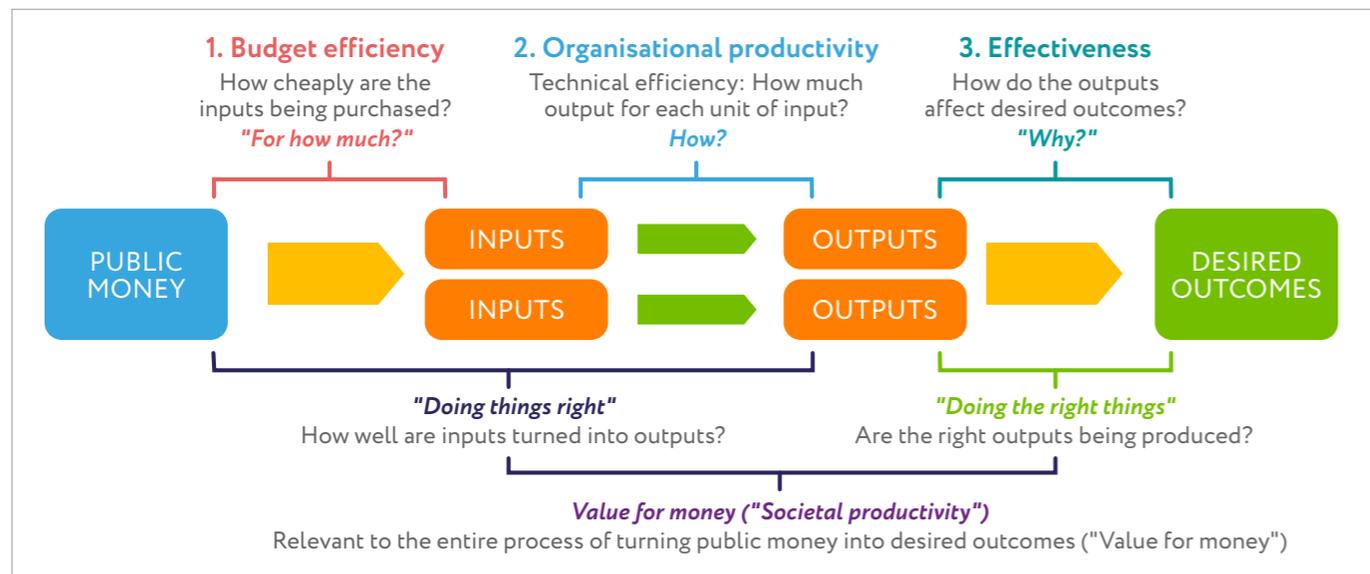
Effectiveness corresponds to the productivity with which output activities contribute to the ultimate beneficial outcome for the community and society.¹⁶

Drucker (1963)²⁰ expresses the difference between efficiency and effectiveness as 'doing things right' versus 'doing the right things'. For example, a surgical procedure in a hospital is an output, and the typical outcome is that the patient will enjoy a healthier and longer life. The Department of Work and Pensions (DWP) produces outputs in terms of the number of benefits paid or the amount of employment advice given, while the desired outcome is a reduction in long-term unemployment.

Mapping the delivery chain is more than an academic exercise. At their core, misunderstandings and misconceptions of public sector productivity are often due to a failure to adequately map it and identify the key bottlenecks where there is scope for improvement.

The mapping of these chains can be tailored to any organisation in the public sector. Many often have multiple delivery chains, or aim for one outcome that is achieved by producing a variety of outputs, which can all be mapped separately.

Figure 2: The public sector delivery chain. A simplified model of how public money is turned into inputs, outputs and outcomes



Source: Adapted from Aldridge, S., Hawkins, A., & Xuereb, C. (2016). Improving Public Sector Efficiency to Deliver a Smarter State. (<https://quarterly.blog.gov.uk/2016/01/25/improving-public-sector-efficiencyto-deliver-a-smarter-state/>)

Drivers

There is an extensive literature on productivity drivers in the public sector and on the similarities and differences compared to the private sector.^{8, 9, 10 & 11} We distinguish three main areas on which pro-productivity policies in the public sector can be focused: adaptive organisation design; continuous innovation; and an agile workforce.

using budgets across years. This can damage prospects for sustained productivity improvements. Annual budgets should be determined as part of long-term spending, investment and delivery plans.

Effects of scaling

An adaptive organisation should also continuously look to balance productivity gains from centralisation, as has happened in healthcare, education and other government services, against diseconomies of scale. Working at a larger scale strengthens the specialisation of human and organisational capital and the use of larger and more efficient capital equipment.

However, scaling public services can also result in reduced access due to greater geographical distances for the user, increased marginal costs from management processes, and a failure to meet the specific needs of some groups. This, in turn, leads to a loss in quality or effectiveness.

Adaptive organisations, even when centralised, need to be able to respond to context specific needs, especially regional or local requirements. Many public services have strong complementarities (training and business support, or health services and social care), which can only be realised in local or regional contexts.

Finally, organisations need to be agile and responsive to crises, such as natural disasters, or sudden peaks in demand, such as for healthcare during a pandemic. The ability to manage spare capacity, or the resilience to relocate resources quickly, may matter more for productivity and effective outcomes than a budget-efficiency approach.

Organisational learning

An important principle behind all three productivity drivers is the concept of organisational learning. These are the processes by which an organisation is constantly looking for, and able to exploit, opportunities to sustain and increase productivity. Creating an adaptive approach to business design requires time to be given to strategic thinking, a culture focused on continuous improvement, and attention to speed and flexibility in the decision-making process.

ADAPTIVE ORGANISATIONAL DESIGN

This lies at the core of any high productivity organisation. By being adaptive, an organisation is able to better respond to the rapid or unexpected changes that occur in its environment by changing (often deep-seated) internal behaviours. By using the service delivery chain concept, public sector organisations can strengthen their adaptivity.

One of the key issues related to adaptivity is the need for a better balance between hard budget constraints and spending flexibility. Government often provides budgets shortly before a new fiscal year which prevents flexibility in

The delivery chain can alter, particularly in response to social and technological developments, and the mapping needs to be flexible enough to accommodate such changes and make corresponding organisational changes as required.

Priorities

An understanding of the delivery chain, and how productive its component stages are, can help managers to understand priorities for improvement.¹⁶ For example, if a policymaker or manager in a public sector organisation is trying to measure the impact of an intervention on productivity, there may be a time lag between the implementation of the policy and the outcome for social well-being.²¹ In this case it may not be feasible to use the effectiveness definition if the time window is not sufficiently wide to capture long-term impacts.

Another issue is that effectiveness may be affected by factors outside the public sector's control, such as general economic conditions, making it a potentially misleading way of assessing a public sector organisation's performance."

All three components of the service delivery chain are key to generating value for money. But for it to be a useful tool, it requires a breakdown and prioritisation of its components. The key test of a strong productivity narrative in a public sector organisation is whether it can explain how budget efficiency, organisational productivity, and effectiveness collectively contribute to its overall objectives and outcomes.

"Organisations need to be agile and responsive to crises, such as natural disasters, or sudden peaks in demand such as for healthcare during a pandemic."

TECHNOLOGY AND CONTINUOUS INNOVATION

Technology and innovation are often seen as a way to improve public sector productivity. Firstly, technological improvement can accelerate the ability to carry out existing tasks. For example, the West Midlands police introduced an AI-based system for identifying at-risk children, augmenting the existing risk assessment procedure to help officers make better decisions about where to target resources.²²

Technology can also create opportunities for expanded activities. For example, drone technology has made aerial surveillance much cheaper for the police, and so can be employed in far more situations like search and rescue, crime investigation, and pursuit of assailants.²³

As well as leading to one-off improvements in productivity growth, technologies can also support continuous innovation by streamlining decision-making processes and improving access to information.¹⁶

"As well as leading to one-off improvements in productivity growth, technologies can also support continuous innovation by streamlining decision-making processes."

Digital transformation

In the UK, digital transformation initiatives have been used to streamline processes and expedite public service delivery. By establishing digital workflows, governments can automate certain components of the service delivery value chain, freeing up more time for public sector employees to focus on more complex and human-facing tasks.²⁴

For example, the NHS Digital Initiative includes a federated data platform for patient management, care coordination, and supply chain management, as well as the adoption of telecare services. While evidence on the success of this initiative so far has been mixed, policymakers believe it holds the potential to transform the UK's healthcare delivery in the long-run.²⁵

Benefits

Take-up of new technology may also generate indirect benefits via reorganisation of the delivery chain, generating further productivity gains via greater specialisation or by freeing up labour for other tasks.²⁶

Such organisational restructuring may also be necessary to yield benefits from new technology in the first place. A study by Garicano and Heaton (2010)²⁷ of US police departments, for example, found that the adoption of information technology (IT) alone is not associated with enhanced crimefighting effectiveness, but is when complemented with specific new management practices.

Challenges

New technology can also create new challenges. Generative AI systems may be able to falsify evidence, produce targeted fraud material, and manipulate markets.²⁸ Or drone technology can be used to transport illicit goods, provide surveillance for criminals, or disrupt air traffic. Hence organisations need to continuously monitor the effects of new initiatives and be able to develop and adapt their delivery chain to respond to the problems.

AN AGILE WORKFORCE

Any technological or organisational transformation requires a reset of skills and competencies of the workforce. This is a particular area for concern because investment in human capital is comparatively low in the public sector. The CIPD (2015)²⁹ found that the median per-employee training budget is 37% lower in the public sector than the private sector.

Some of the latest digital technologies pose challenges in requiring new skills and competencies. For example, using big data analytics and artificial intelligence does not only require STEM (science, technology, engineering and mathematics) skills. Continuous improvement and understanding of customer needs and experiences resulting from these new technologies also require softer skills, such as collaboration, creativity, adaptability, flexibility, and conflict management.

People can be partly trained in some of these core soft skills, but generally they are acquired through experience in organisations that are committed to innovation. As a result, the successful integration of new digital technology necessitates not only the proficiency of individuals but also a well-functioning information technology infrastructure and the elimination of structural and systemic obstacles to new ways of working in the organisation.

Potential

Both STEM and softer skills are key to creating an agile workforce – one with maximum flexibility and minimum constraints using the full potential of all its people. While an agile workforce tends to generate greater employee satisfaction and higher morale, it also needs to be preceded by strong consultative processes and ownership of new working arrangements by those most involved in delivery to ensure high employee engagement.

Given the highly competitive landscape for talent, and the need to attract people with valuable skills, professional talent management in the public sector is important. This involves a comprehensive reassessment of how human resources are managed, including redesigning job characteristics, recognising outside expertise, refining candidate selection processes, and improving onboarding protocols. Synchronizing these phases is critical to hiring of suitably qualified candidates. The context of current labour market dynamics underscores the important link between innovative hiring practices and the overall goal of increasing productivity in the public sector, particularly when – as now – public sector pay has fallen behind comparable private sector levels.

Management

Awareness of modern management techniques is also critical to improving organisational performance by ensuring more efficient coordination, strategic decision-making, and optimal resource utilisation. Cross-national research has shown that modern management techniques, such as the use of performance management practices (goal setting, incentives, monitoring), can be successfully applied in hospitals and schools.³⁰

Performance management serves four main purposes. First, it helps define clear tasks, goals, and objectives and facilitates communication within the organisation. Second, it enables policymakers and public administrators to transparently communicate the use of public funds by measuring performance against these goals.³¹ Third, it allows public sector organisations to learn and improve their performance over time. And finally, performance measurement can serve as a basis for evaluating and rewarding public

servants and ensuring that their incentives are aligned with societal interests.³²

Interpersonal skills

The development of managers' interpersonal skills can also increase productivity by substantially lowering staff turnover. These skills are particularly important in retaining staff with high levels of human capital.³³ Indeed, Hoffman and Tadelis (2021)³³ findings suggest that good managers primarily have a positive effect on productivity by virtue of their ability to help workers to enjoy their jobs.

However, the inherent complexity of the public sector, vague goals, uncertain cause-and-effect relationships, and diverse stakeholder perspectives, make the application of performance management challenging.

Policy makers frequently use language like 'improving' or 'declining' performance, ignoring the trade-off that attempts to enhance performance in one area may have adverse effects in another. For example cost-cutting measures can make budgetary efficiency look better, but will adversely affect long-term impacts and thus reduce the overall value for money in the long-run.

Policy implications

In order to unleash productivity, the public sector needs to invest in its drivers at all steps in the delivery chain. Here we set out a number of policy objective that can help achieve this.

Both public sector managers and government policy makers have important and distinct roles to play in delivering public sector productivity growth. Firstly, strategic management within public sector organisations is vital for optimising the existing delivery chain – identifying bottlenecks, identifying and implementing new opportunities, and utilising the drivers of productivity growth.

Secondly, central government can support productivity growth by ensuring that public sector organisations have the analytical, financial, and lawful capacity to do so. The delivery chain may need to be adapted, and in this case it is central government that has the licence to bring about a substantial transformation.

These imply the following principles for pro-productivity policies in the public sector:

Enable a long-term focus

Long-term planning and strategic thinking are important for public sector managers and policymakers to improve responses to even short-term challenges. This involves strategic planning to respond to anticipated changes in demand, and the delivery of long-term objectives, while also being able to deploy resources to solve immediate problems.

Forecasting and scenario planning are important aspects of this capability.³⁴ If a public sector organisation can adopt a long-term perspective in its decision-making, it will be able to improve budgetary efficiency over time.

For instance, advanced technology and training programmes might require high initial investments and take a long time to begin producing results, but

these projects can be entirely justifiable when considering the substantial benefits that will be incurred in the long-run. Yet government budgeting practices make this kind of investment extremely difficult.

Space for experimentation is also important. This is vital, not just for testing the value of different policies, but also for building a deeper knowledge of the relationships within the delivery chain. However, this requires some level of tolerance from policymakers and politicians for the inherent risk of failure of innovative projects, resulting in some projects not delivering value for money, even if the overall programme does.

Centralised scale and localised operations

All public sector organisations face the challenge of striking a balance between centralised scale and localised operations. Economies of scale from centralisation might appear to reduce overall costs, but might also struggle to address specific needs and lack local context in various local communities, thereby achieving worse outcomes. Conversely, a highly localised approach could be costly due to duplicated efforts and lack of resource sharing and creates inconsistency of service.

Overall, devolution can improve productivity through four mechanisms: tailoring to local needs; innovative dynamism as each unit can conduct experiments; easier collaboration with the local private sector; and the development of local civic participation.

Management driven by measurement

A well-functioning measurement regime is essential for effective project management, process evaluation, and resource allocation. Public sector

organisations are often rich in data due to their statutory requirements for performance and data transparency.

Big data analytics and AI techniques open new opportunities to filter relevant knowledge from massive databases and to share insights more widely. Organisations can leverage these opportunities by developing a data strategy - working out what role data will play in their organisation - and by establishing what organisation-wide processes need to be in place to enable this role. Such a strategic approach will also inform which investments need to be made to deliver the intended data processing capabilities.¹⁶

The challenge is that many inputs, outputs, and outcomes within the delivery chain have a qualitative component that is highly subjective in nature to users, and survey data can enrich quantitative measures. To be successful, the approach to quality adjustment should be evidence-based in that practitioners are willing to experiment in order to find better measures.

It must also be inclusive, in that for the measures to be regarded as legitimate they must reflect the perspectives of as many citizens as possible. The approach to quality enrichment also needs to be collaborative, in that for the intended users to regard the measures as useful they should be included in designing and implementing the adjustment procedure.

Better project management

Projects in the UK regularly suffer from serious cost overruns and time delays, from major national projects like HS2, to local IT programmes such as the upgrade to Birmingham City Council's ERP system. It is important to understand the underlying dynamics that cause a high risk of failure for project

management.³⁵ Among these are the need for procurement officials and project managers to have the technical skills that allow them to act as an intelligent customer and to implement project governance approaches that allow them to manage the inherent risks in the project. There is also a need for procedures that ensure the deliverables integrate well with the existing organisational processes and other upgrade projects. In addition, changes in scope or leadership of a project will have a substantial deleterious effect on its likelihood of success.

Strengthening public trust

Improving productivity in the public sector should also help to increase citizens' trust in government. If citizens see that taxes are being used efficiently and that public services are being delivered effectively, they are more likely to trust and support government. Indeed, numerous studies have shown a positive correlation between quality delivery of public service and citizens' trust in government.^{36, 37 & 38}

This relationship between citizens' trust and public sector performance is bidirectional. While many studies have argued that citizens' level of trust in government is a product of the quality of public service delivery, Van de Walle and Bouckaert (2003) argue that poor level of trust in government itself could produce negative perceptions of public sector performance.

In this sense, subjective trust or distrust in government's capacity to implement public services could influence citizens' willingness to pay for a particular service, or to make other contributions that could contribute to the success of such service delivery.³⁹ Increased trust between citizens and public sector officials is an important step in boosting public sector productivity, especially at the local level.

Conclusions

Over the past decade, efforts to increase public sector productivity have focused primarily on cost-cutting measures. This approach has been effective in the short-term, but further efficiency gains through this route will be harder to achieve as public sector wages have declined relative to the private sector. The combination of an increased demand for public services and the logic of Baumol's cost disease point to an unprecedented burden on public services in future.

It is encouraging that the Chancellor's review has the ambition to make productivity part of the solution. The traditional alternatives of either spending one's way out of short-term problems or squeezing budgets will not achieve a sustained increase in public sector productivity.

Instead, we advocate broadening the scope of thinking about public sector productivity to include organisational productivity and effectiveness. A clear understanding of the delivery chain for different types of public services is required.

Public sector organisations need to create the administrative and legal capacity to nurture the drivers of productivity (organisational design, technology and innovation, and an agile workforce and management), and engage in evidence-based, collaborative, and inclusive policymaking. Whenever possible, the social value added by public services should also be recognised and adequately measured. Productive and effective public services are vital for private sector productivity as well as for a healthy polity and cohesive society.

Key takeaways

Further public sector efficiency gains will be hard to achieve through cost-cutting measures.

Broaden the scope of public sector productivity to include organisational productivity and effectiveness.

The three main areas on which pro-productivity policies in the public sector should focus are an adaptive organisation design, continuous innovation, and an agile workforce.

Increased trust between citizens and public sector officials is an important step in boosting public sector productivity, especially at the local level.



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Regional productivity, inequalities, potential causes, and institutional challenges

CHAPTER NINE

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Productivity differences in the UK have been increasing for some 35 years. For instance, London's productivity is more than one and a half times the UK average, while the regional productivity divergence in the UK is among the most extreme of all OECD countries.

Yet it is only in recent years that awareness of these issues has come to the fore in policy debates. There is a growing realisation that England's governance is characterised by some very distinctive pathologies and problems, including an unusually centralised governance model, which might well have played a key role in constraining the economic prospects of England's second-tier cities and their hinterlands.

But other important issues include the implications of the distinct, overlapping and mostly incommensurable geographies of public service provision and local administration in many parts of England. Without a more systematic focus upon the challenge of creating geographies which align better with the jurisdictions of local and devolved

government, the productivity promise associated with policy reform and devolution deals may be squandered.

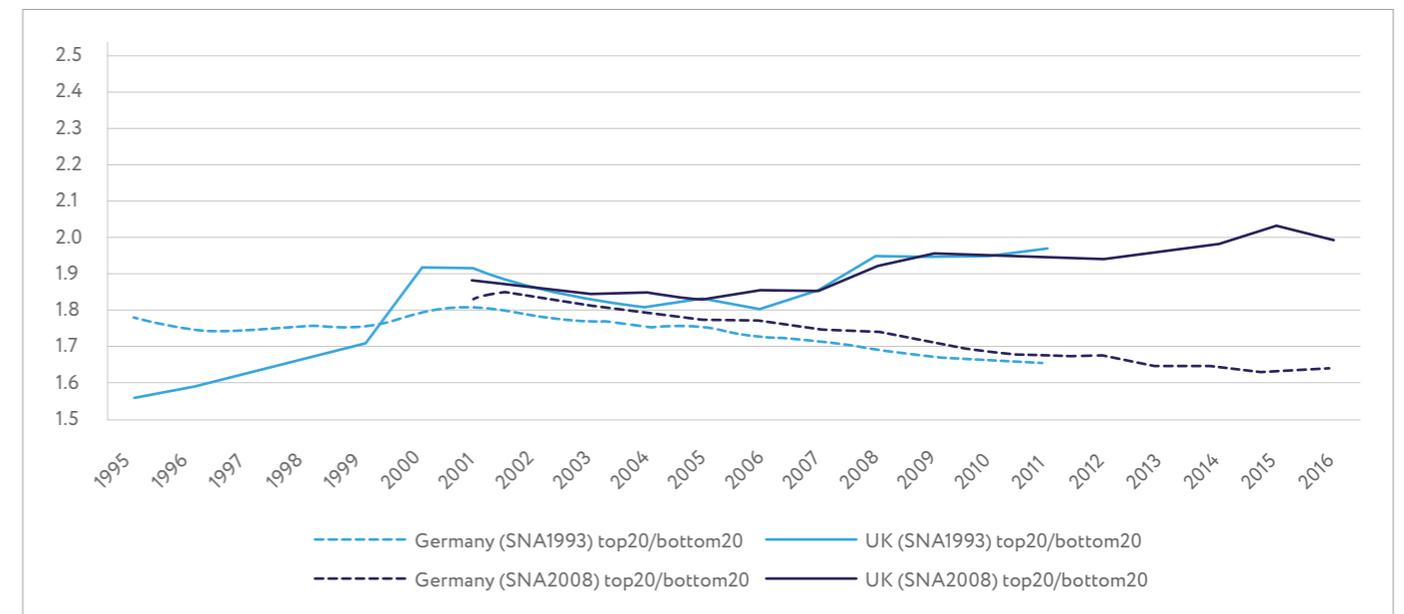
Scale of regional inequalities

Awareness of the nature and scale of UK regional inequalities has increased significantly in recent years. Although, as we say, inter-regional productivity differences in the UK have been increasing for some 35 years, for two and a half decades there was only very limited awareness of this in most political and institutional circles.

For most of the 1980s, the productivity levels of the London economy were typically 125%-128% of the UK average, whereas from around 1988 onwards these gaps have rapidly increased, to the point where London's productivity is typically nowadays of the order of 170% of the UK average.¹ The UK was the first country in the OECD in which regional economies started to diverge rather than converge.

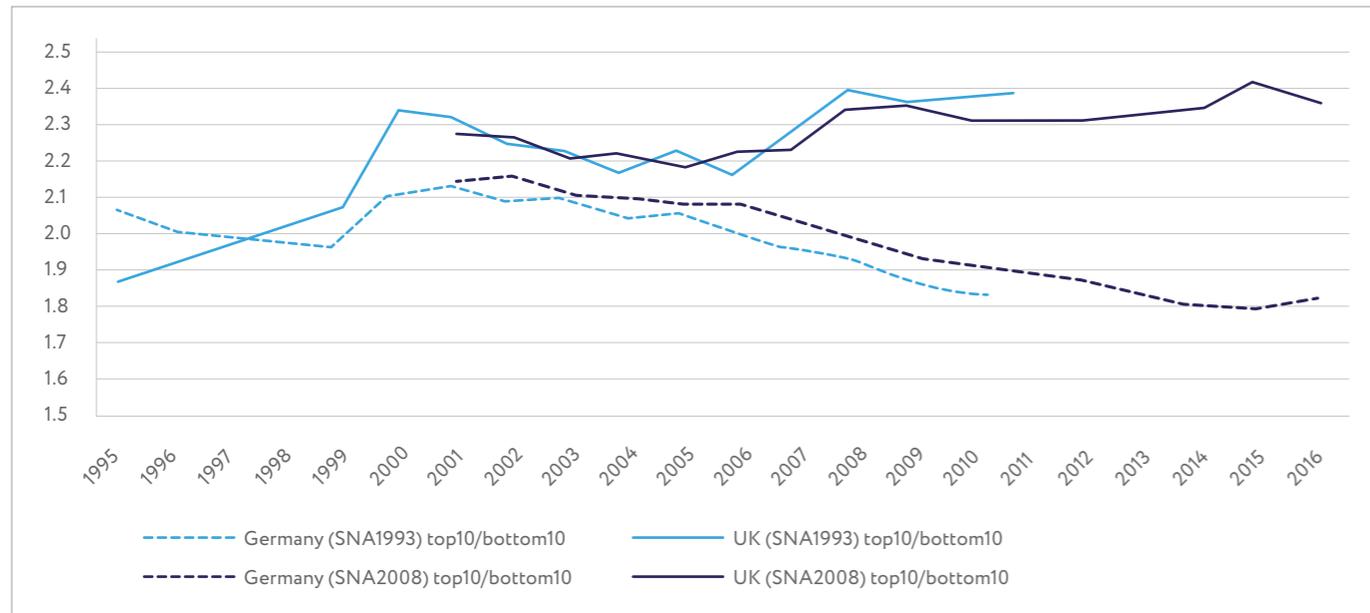
"There is a growing realisation that England's governance is characterised by some very distinctive pathologies and problems."

Figure 1: UK and Germany Inter-regional GDP Per Capita Differences: Top 20% Over Bottom 20% OECD-TL2 Regions



Source: Carrascal-Incera et al 2020

Figure 2: UK and Germany Interregional GDP Per Capita Differences: Top 20% Over Bottom 20% OECD-TL2 Regions



Source: Carrascal-Incera et al 2020

In order to get a sense of the extent of the divergence, we can compare the UK to Germany, countries with similar geographical scales, population scales, city sizes and population densities. In 1990 with reunification, in effect the economy of the former West Germany absorbed that of the former East Germany. Not surprisingly, the reunified Germany was highly imbalanced in terms of productivity, and much more so than the UK, which at that time was only starting to diverge inter-regionally. However, since then, the experiences of the two countries have been in stark contrast.

Figure 1 shows the differing UK and Germany trends in the ratios of inter-regional productivity levels, measured here as GDP per capita, between the top fifth of the population by location and the bottom fifth of the population, since the mid-1990s (showing both the 1993 and 2008 the SNA System of National Accounts). The German trend is steadily

downwards whereas the UK trend is steadily upwards. In other words, at precisely the time that Germany's inter-regional productivity variations were narrowing, those in the UK were widening.

We can repeat this exercise also for ratios such as the top 10% of the population over the bottom 10% of the population, as in Figure 2. Indeed, similar exercises also carried out with other different regional productivity ratios and based on different spatial units all give largely the same picture.²

The reasons for these different patterns are complex, and include major national differences in terms of institutional and governance issues, as well as attitudes towards large-scale policy interventions.³ However, these UK comparisons contrast not only with Germany. Indeed, the regional productivity divergence in the UK is amongst the most extreme of all OECD countries.⁴

Spatial inequality and productivity

The recent increased awareness of this unwelcome distinction re productivity divergence was in part due to the UK's 'austerity' response to the 2008 global financial crisis which led to cuts in public services, especially in weaker places. The subsequent political shocks associated with the Brexit referendum and the 2019 General Election also had profound geographic logics.⁴

The marked geographical patterns associated with these political events engendered rapidly shifting political narratives,⁵ which for the first time focused nationwide and cross-party attention on these patterns. Taken together, these events all provided domestic political reasons for the rapid increase in awareness of UK regional inequalities.

At the same time, the quality, availability and comparability of regional and local data has increased dramatically in recent years, primarily as a result of the efforts of the OECD and Eurostat. For the first time, this has allowed realistic comparisons to be made not only between UK cities and regions, but more importantly between cities and regions in the UK and in other OECD countries.

The OECD and Eurostat regional data were available some 15 years ago^{6&7} and the metropolitan urban data 11 years ago,⁸ but McCann (2016)¹ was the first researcher in the UK to use the data in a detailed, comprehensive and systematic manner.

This meant that during the pre-Brexit years debates regarding regional inequalities were largely myopic and backward-looking to UK experience, rather than to more comprehensive international comparisons, which are far more instructive in terms of UK performance. What comparisons were made by academics were primarily with respect to the USA, along with Canada and Australia, countries with economic geographies and governance systems dissimilar from the UK.⁹

These detailed comparisons from 2016 onwards have laid bare the scale of UK regional inequalities in comparison to more than three dozen other countries. Across a very broad range of more than 30 indicators at different spatial scales, in terms of all productivity-related indicators, the UK is more unequal inter-regionally than any other OECD country.^{2,4,&10}

The political shocks the UK has experienced in recent years, including both the 2016 Brexit vote and the so-called 'red-wall' voting shifts, are in many ways a result of these vastly different inter-regional experiences.⁵ They have given rise to a profound 'geography of discontent',⁴ which is now also evident in other countries.^{4&11}

In the UK, inequality regarding the fortunes of places is now the single most important distributional concern across society and all political persuasions.¹² Not only is regional productivity a national productivity problem, but the local implications of these economic realities also have profound national political implications.

In particular, the UK governance and institutional systems have been found seriously wanting in terms of their ability to respond to these asymmetric regional economic shocks.¹ Addressing these governance weaknesses has led to many of the key institutional and devolution-related reforms initiated in the 2022 Levelling Up the United Kingdom White Paper. This to some extent sought to reverse earlier 2010 reforms which had moved away from a focus on regional strategy, favouring instead ad hoc localism.¹³

"Not only is regional productivity a national productivity problem, but the local implications of these economic realities also have profound national political implications."

Research focus

This context discussed has significant productivity implications. There are various key features of spatial productivity and productivity growth processes about which our understanding is still very limited, and they are therefore a priority research focus at The Productivity Institute.

First, the UK is unique amongst OECD countries in that, once London is removed, the relationships between scale and productivity in terms of economic geography found for other economies are absent for any types of places within the UK.¹⁴ Second, the spatial diffusion of knowledge in a manner which leads to local inter-regional dissemination and local development appears to be largely stymied or stalled, again in a manner which is unlike most other OECD countries.

And third, in terms of regional issues, both the behaviour of UK capital and financial markets (see Mayer et al, 2021) as well as the policy settings¹⁵ & ¹⁶ appear to be overwhelmingly short-termist in nature, potentially undermining these much-needed diffusion and scale-building processes typically evident in other countries. We now look at each of these in turn.

SCALE PRODUCTIVITY RELATIONSHIPS

These are so central to how cities drive economic growth, in both OECD industrialised and many non-OECD industrialising countries, that the almost complete absence of these relationships in the UK is a major analytical as well as an empirical puzzle.

Cities in regions outside of the south of England display almost no urban scale-related productivity advantages in comparison to either small southern settlements, or even small areas in their own hinterlands.¹⁷ Moreover, the productivity differences between UK cities² as well as regions⁴ are also amongst the highest in the industrialised world. This all goes to suggest that the usual agglomeration processes are not evident in many UK cities. Why this is the case is, as yet, unknown.

It may be that the peculiar and unique logic of the UK land use planning system¹⁸ plays a role in this regard by distorting the location of investments. It may also be related to the peculiarities of the UK fiscal system in inhibiting locally tailored policies. Indeed, the particular

logics and operations of both the planning and fiscal systems are unique to the UK, making them the most promising lines of enquiry as to why scale-productivity relationships are barely evident.

Furthermore, there have been major changes in working practices since the COVID-19 pandemic, in that hybrid working is becoming the norm for millions of workers, thereby changing their commuting patterns and frequencies. Research suggests that (contrary to popular perceptions) large cities are likely to be the principal beneficiaries of hybrid working,¹⁹ because reduced commuting frequencies are the most beneficial where commuting costs are the most onerous, namely into large cities.

Exactly how well the UK's land use planning and central-sub-central fiscal systems are able to adapt to the profound shifts in working practices is therefore a major research question.

SPATIAL DIFFUSION OF KNOWLEDGE

With the apparent lack of any systematic, widespread, and large-scale knowledge diffusion beyond the geographical core of London and wider South East, the UK economy broadly exhibits 'hub with no spokes' features.²⁰ Many parts of the country appear to lack any genuine involvement in knowledge, innovation and R&D-related activities.

OECD-wide evidence suggests that knowledge-intensive and highly-skilled activities tend to be heavily geographically concentrated in particular places,²¹ and this is also very much true for the UK for those relating to tradeables.²² But in the UK these concentrations of activities mostly tend to be in the same regions, rather than distributed in clusters across various different regions, as is the case in countries such as USA, Canada, Germany, Japan, France and Australia.

This points to other forces at work simply beyond the spatial decay of localised knowledge spill-overs or particular regional sectoral specialisations. Indeed, the regional productivity premium associated with being located in or around the London economy is largely independent of the sector or firm-type.^{23, 24 & 25}

Positive effects of specialisation are only found in a minority of very prosperous places, and even then at only the five-digit (i.e. very specialised) sub-sectoral scales.²⁶ Yet, whether the inter-regional productivity problem is primarily a problem of a lack of inter-regional knowledge diffusion, or rather a lack of local and regional knowledge absorptive capacity, is still unclear.

"The UK is highly skewed in terms of the geography of its corporate systems, with half of FTSE100 companies having headquarters in London."

Knowledge

Different regions of the UK appear to have different knowledge and technological compositions²⁷ which may shape their absorptive capacity, but how these technological compositions relate to productivity is also typically both non-linear²⁸ and features more complex patterns than traditional relatedness models allow for.²⁹ Knowledge diffusion processes are likely to depend on both technological relationships and also institutional settings, including corporate organisation.

On this point, the UK is highly skewed in terms of the geography of its corporate systems, with half of the

FTSE100 companies having headquarters in London,³⁰ while the greater South East accounts for two-thirds of all headquarters.³¹

Both Scotland and Wales host headquarter locations, but the regional skewness is marked in England with just 6% of FTSE100 firms and 7% of FTSE350 firms having headquarter functions north of Birmingham,³¹ while none of the northern firms in the index when it was first established in 1984 remain. However, exactly how these corporate structural and functional issues relate to knowledge diffusion is not clear, and our understanding of the UK-specific issues is limited and subject of ongoing TPI research.

"Cities in regions outside of the south of England display almost no urban scale-related productivity advantages."

Innovation

In particular, the UK institutional landscape around the promotion of knowledge and innovation-related activities may also play a role, as discussed in Chapter Four. Publicly-funded knowledge-related investments in innovation and R&D-intensive activities have also become increasingly spatially concentrated over recent decades in these same prosperous regions.

This is also the case for transport and infrastructure investments, along with heritage and cultural investments.¹ In other words, publicly-funded investments, which by their nature are intended to be productivity-enhancing, have become more spatially concentrated in the already more productive and prosperous regions over recent decades,³² thereby reinforcing the concentration of private-sector activities.

This is even the case in situations where the cost-benefit logic does not necessarily justify such increasing concentrations.³³ Our research will therefore consider the efficacy of the knowledge diffusion processes associated with the highly centralised UK institutional set-up underpinning R&D and innovation, in the light of the lessons learned from comparison to competitor countries in the OECD.

SHORT-TERMISM

A third issue which often arises in discussions regarding the UK productivity challenges is short-termism, a claim often made about the UK economy as an explanation for its systematically poorer levels of investment than in comparator countries, as described in Chapter Two.

The claim of short-termism implies that investment time preferences and discount rates are systematically higher in the UK than in other comparable countries. However, as yet there is limited specific evidence of business short-termism. Prior to late 2023, UK sovereign and commercial bond rates typically differed very little from other comparable countries, but it may be that such data do not fully capture the issue.

In particular, short-termism may be more relevant at a sub-national spatial scale. There is a variety of evidence that the engagement of the financial and capital markets operating out of the global financial centre of London in other regions of the UK is very limited (see Mayer et al, 2021).

However, the reasons for this remain unclear. Whether this is linked to short-termism per se, or to other risk-related factors which increase discount rates, remains an open question. There appear to be institutional and structural issues which play a role in limiting the geographical spread of investment capital, especially for start-ups and SMEs.

Policy instability

The UK is characterised by rapid institutional churn and policy instability¹⁵ & ¹⁶ and poor policy coordination,³⁴ a phenomenon which appears to have worsened in recent years. This does indeed point to short-termism in governance.

However, whether any purported short-termist behaviour in UK financial markets is caused, or exacerbated, by this institutional churn in government, is unclear. It may be that government institutional churn and policy short-termism simply increases the perceived UK investment risks, and thereby reduces the overall levels of investment, rather than affecting UK time preferences and discount rates. Yet, the links between apparent short-termism and investment levels may also be mediated via shifts in commercial risk perceptions which may be exacerbated by government churn, instability and a lack of governance coordination and policy clarity.

Flight to safety

TPI research³⁵ has identified profound capital shocks associated with the 2008 global financial crisis, whereby a post-crisis 'flight to safety' partitioned UK regions into blue chip and junk bond capital pricing regimes for almost a decade after the crisis.

Moreover, the core-periphery risk-pricing partition mapped closely on to the already evident core-periphery regional productivity inequalities.³⁵ These fundamentally different risk-pricing regimes also led to profoundly different post-crisis growth trajectories, which exacerbated the pre-existing productivity inequalities.

Similar findings were also observed in the USA,³⁶ although there such partitioning favoured the already large and prosperous cities scattered across the country at the expense of smaller cities, rather than with respect to particular regions.

Importantly, the scale of core-periphery risk-pricing partitioning and dispersion in the UK is as great as the whole of the USA or the whole of the rest of Europe, an observation which suggests that the capital markets in no way consider the UK economy as an integrated whole. What appears as short-termism in capital markets may in fact reflect differences in the 'External Finance Premium'³⁷ applied to different parts of the UK, whereby the difference between perceived commercial risks and official discount rates widens as distance from London increases.³⁶

Policy instability and poor coordination, especially as they relate to levelling up,³⁴ may exacerbate these regional risk pricing differences, and underpin calls for new institutions to mitigate the risk perceptions.³⁸ Untangling short-termism from diverging risk perceptions is an important issue about which little is currently known.

"The UK is characterised by rapid institutional churn and policy instability and poor policy coordination."

The weakness of UK governance structures

A key element of the potential governance and policy responses to these productivity challenges is the devolution agenda and there are disagreements in the literature on this issue.^{39 & 40}

However, some recent contributions to this wide-ranging debate point to issues and concerns that are highly germane in the context of the growing political focus on the need for a comprehensive and robust set of devolved institutions across England.⁴¹

Across the OECD devolved governance, per se, has no link to national growth rates, but it is associated with more spatially balanced productivity growth.² There is much evidence to suggest that the UK's major regional productivity inequalities are themselves intrinsically related to the UK's extreme centralisation.¹

State or government failures as they relate to regional economic performance have received less attention in the political science literature (see Besley, 2021). However, UK weaknesses such as overcentralised government as well as constant policy and institutional churn (see Norris & Adam 2017) and ^{1 & 15}. are evident. Over-centralisation leaves central government with too much direct control and micromanagement, and too little knowledge of local and regional needs. This privileges short-term and large-scale intervention while undermining institutional capacity-building at lower levels of government, which in turn lack authority and decision-making powers (see Hooghe and Marks, 2021).

Regional policy churn

One of the most egregious examples of institutional and policy churn is regional policy, which has been chopped and changed for decades.

In the 1980s the Conservative government set up Urban Development Corporations to improve land and property markets in urban areas, but this further entrenched disparities between more prosperous regions around London and parts of the South East and the Midlands and Northern England.

New Labour left intact the Thatcherite economic model of finance-powered growth in retail and service sectors but tried to tackle regional inequalities by creating Regional Development Agencies (RDAs) across nine regions of England, with a budget of approximately £2 billion a year for 12 years. This is substantially higher than the current government's funds for levelling up.

But the RDAs' focus on the 'knowledge economy' and the service sectors at the expense of industry, manufacturing and vocation and technical training failed to address growing imbalances within regions between urban areas and more suburban, rural and coastal areas.

After 2010, the coalition government scrapped RDAs in favour of local enterprise partnerships (LEPs), which have now also been abolished by the current government. What has been missing is a clear, consistent approach to which powers of central government should be devolved, alongside both resources and accountability.

Westminster model

At the heart of UK governance lies the so-called 'Westminster Model' (e.g. Hall, 2011; Richards and Smith, 2015) and 'Northcote-Trevelyan' paradigm. Their centralisation and hoarding of power creates many problems for the regions – not least policies dictated to regions from typically uncoordinated Whitehall departmental strategies.

The UK's economic woes are linked to this high level of political instability and policy churn, which has contributed to low business confidence. This has been particularly pronounced since the 2016 EU referendum. The UK has had five Prime Ministers and seven Chancellors of the Exchequer since the vote, including three PMs and four Chancellors in 2022 alone. For big city regions with mayors, this coincides with their entire period in office as the first mayoral elections were held in 2017.

It is not only ministerial churn that characterises this current period in government. Policies and key economic institutions have been constantly changed and this has included a series of ever-changing growth strategies and the constant reconfiguration of departments associated with delivering them.

So we have seen the Conservative/ LibDem coalition and its Departments for Business, Innovation and Skills (BIS), and Energy and Climate Change (DECC), to their abolition and the creation of a Department for Business, Energy and Industrial Strategy (BEIS) and a Department for International Trade (DIT). And then we have seen the establishment of a Department for Levelling Up, Housing and Communities (DLUHC), and the recent creation of the Departments for Science, Innovation and Technology (DSIT), Energy and Net Zero (DENZ), and Business and Trade (DBT).

New policy approaches

New ministers and departments announce new policy approaches. For instance we had an Industrial Strategy under the coalition, then its abolition in 2015 and rebirth in 2017. There have been multiple growth plans since. Strategies for 'Fixing the Foundations' in 2015, an Industrial Strategy with 'five foundations' and 'four grand challenges' in 2017.

Under Prime Minister Boris Johnson there was 'Build Back Better' in 2021 (with five missions) and 'Levelling Up' in 2022 with 12. All were abandoned under Liz Truss's 'Growth Plan' in 2022 before again being replaced by current Prime Minister Rishi Sunak and Chancellor Jeremy Hunt's five pledges, four E's and a pledge for 'long-term decisions for a brighter future'.

As noted above, there have also been notable differences in approach by governments of different parties to the challenge of establishing a functioning layer of regional, or city-regional, administration. As one recent report documents, there has been an extraordinary amount of policy reversal and churn on this question in recent decades.⁴¹

This succession of ministers and strategies has seen a series of institutions at the national, local and sectoral levels established and abolished.

For example, barely a year after the publication of a 300-page White Paper and a detailed framework for devolution, at the Conservative Party Conference in October 2023 the Prime Minister announced a series of 'town boards' and a 'towns taskforce' to boost local economic growth in 'left behind' towns. According to Rishi Sunak, "we need to change our economic model - away from cities", but at the same time as Investment Zones are being negotiated and rolled out across English cities, because 'if Manchester succeeds, so will Bury'.

These are not only competing initiatives launched into an already crowded field, but also involve yet another set of institutions at the local level, entirely contradicting the plea for long-term stability and strong local institutions in the government's own White Paper.

"One of the most egregious examples of institutional and policy churn is regional policy, which has been chopped and changed for decades."

Policy implications

Demonstrating a causal relationship between decentralisation and economic improvement remains controversial,⁴² but it is increasingly accepted that establishing new forms of governing authority and capacity at levels beneath the central state can generate a range of social and civic benefits.

Some highlight, for instance, improvements in the sense of citizen efficacy,⁴³ and others improvements in social capital,⁴⁴ arising from such reforms. Some stress the kinds of community engagement and self-activity which these can enable.⁴⁴ As various economists – such as Andy Haldane – have suggested, these elements are often the wellsprings of economic prosperity.⁴⁶

Equally, as one recent comparative study has demonstrated,⁴⁷ it may be that the specific features and finances of any devolved model are key factors determining whether efforts at devolution will ultimately generate economic gains. Its authors point, in particular, to the risk arising from the delegation of policy responsibilities to institutions which have ‘unfunded mandates’ – a very pertinent insight when a future UK government may be establishing new devolved authorities in a context of public spending stringency.

Long term approach?

Nevertheless, in the wake of the 2022 Levelling Up White Paper published by the Johnson government, and the English devolution framework set out within it – and alongside the Labour party’s shift towards greater acceptance of the metro mayoral model⁴⁸ – there is some prospect of the deep political divisions which have driven policy and institutional churn in this area abating. If this is the case, there may be a possibility of a more consistent and long-term approach to English devolution.

The Levelling Up White Paper was notable, too, for the emphasis it placed upon

different kinds of social and civic benefit – expressed in the language of ‘pride in place’ – which may accrue from local and devolved governments partnering with Whitehall to develop growth strategies targeted to local circumstances, drawing upon local knowledge.

But while this wider vision for devolution is increasingly accepted within Westminster and Whitehall, replacing earlier scepticism, there has been insufficient consideration given to the harder question of what kinds of capability and expertise are needed to ensure different layers of government are equipped to play these prescribed roles.

Powers of mayors

Similarly, the question of whether Mayors should be given new financial levers, for instance in the shape of hotel or airport taxes, is now being considered more seriously in political circles in relation to English devolved authorities.⁴⁹

This is potentially an important shift given the ingrained wariness to this idea in relation to England, certainly in comparison with the powers awarded (particularly after 2015) to Scotland and Wales.⁵⁰ UK government has been highly resistant to the idea of devolving fiscal levers to authorities that do not have their own legislatures to debate and legitimate the use of such powers. But, significantly, the debate has opened up as more mayoral leaders have highlighted the opportunities missed and constraints generated by their lack of control over revenues.

In particular, there has been a growing chorus of criticism directed at the year-by-year funding settlements offered following annual negotiations with Whitehall.⁵¹ Importantly, a new direction of travel has been signalled by the trailblazer deals agreed for the two flagship English mayoralities, West Midlands and Greater

Manchester, which have been granted more flexibility in allocating their budgets to locally determined priorities.

So where now?

While the case for devolution and arguments about its design continue, there is a growing realisation in British politics and government that England’s governance in particular has some distinctive pathologies and problems, leading to greater citizen disaffection (and lower rates of political participation), than elsewhere in the UK.

These include its currently half-built tier of middle level governance, a greatly weakened and constrained layer of local government, and an unusually centralised governance model, with officials in Whitehall taking decisions about services and forms of provision across the length and breadth of England which may well have constrained the economic prospects of England’s second-tier cities and their hinterlands.

Other important institutional challenges and constraints also need to be brought into focus. The potential benefits of any emerging system of devolved governance will be limited unless serious thought is given to the implications of the distinct, overlapping and mostly incommensurable geographies of public service provision and local administration in many parts of England. Without a more systematic focus upon the challenge of creating geographies which align better with the jurisdictions of local and devolved government (as is true, for instance, in London), the economic promise associated with a new generation of devolution deals may well be squandered. And without institutional reform, the UK’s extreme regional productivity divergence cannot be addressed.

Key takeaways

More consideration is needed into what kinds of capability and expertise are needed from increased devolution.

Without institutional reform the UK’s regional productivity divergence cannot be addressed.

Productivity differences in the UK regions have been increasing for 35 years.



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A new UK policy institution for growth and productivity - a blueprint

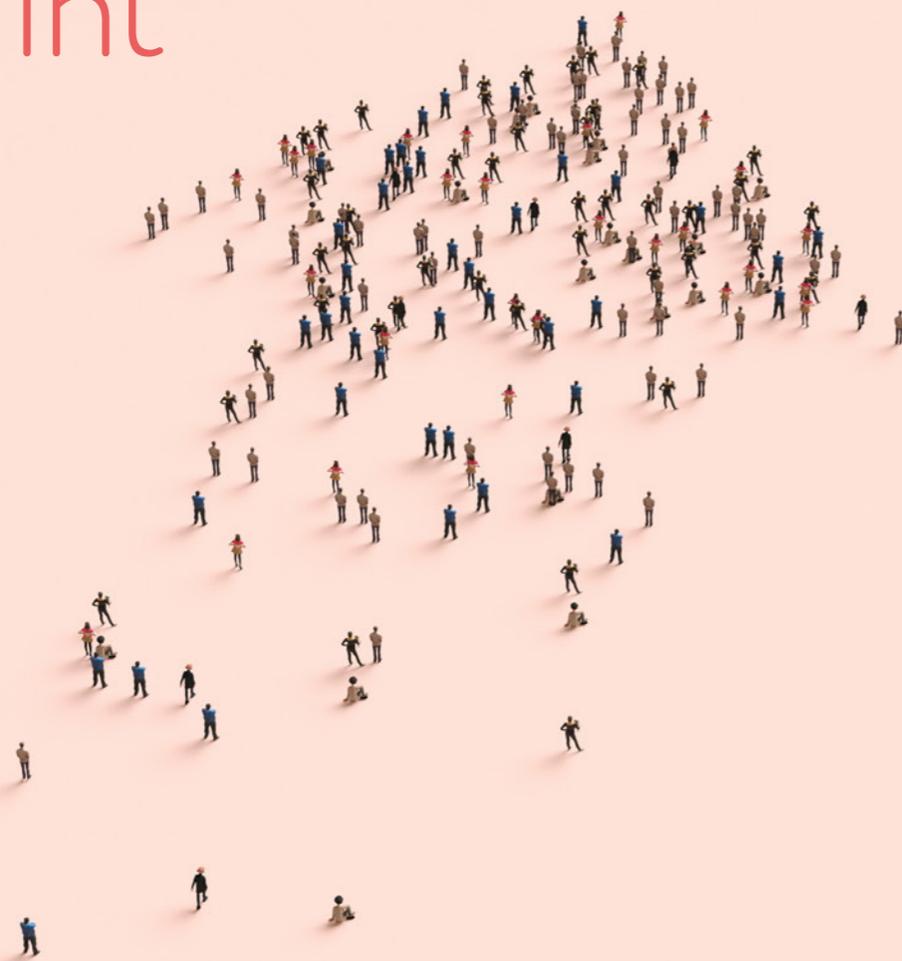
CHAPTER TEN

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"Recent years have seen a multitude of growth strategies and plans seeking to address the UK's growth problems, aimed at boosting investment, innovation and its diffusion... but a high degree of policy churn has prevented these strategies and plans from having an effect."

The UK has experienced 15 years of poor productivity performance relative to its own past and relative to its peers. Analysis of the UK's productivity problem points towards many contributing factors, discussed in this volume. Addressing the UK's productivity crisis is urgent if the UK is to see sustainable increases in living standards once more, particularly given the headwinds of fiscal constraints and demographic change. Here we argue for a dedicated, independent policy institution, that is unwaveringly focused on finding solutions to the productivity problem. Crucially, such an institution would help with the politics of making difficult long term decisions.

Average annual growth in labour productivity (GVA per hour) in the decade before the financial crisis was around 2%, but has averaged less than 0.5% in the years since. The GDP growth that we have seen since the financial crisis has been largely accounted for by an increase in labour supply which is not expected to continue in the years ahead.

Analysis of the UK's productivity problem points towards many contributing factors, notably chronic private and public sector underinvestment in tangible and intangible assets including skills, a lack

of diffusion of productivity-enhancing technologies and practices (between firms and between places), and highly centralised policy-making at the same time as fragmented execution.¹

While the UK economy has comparative advantages in services and certain areas of high value manufacturing,² it appears that these are not being fully exploited. Indeed, much of the productivity slowdown since the financial crisis occurred in 'knowledge economy' sectors which are considered UK strengths.³

The productivity gaps between London and the UK's largest cities are also bigger than in comparator countries, and one of the critical routes to improving productivity performance at the national level will involve improving the productivity of our largest cities.⁴ The evidence suggests that a higher productivity future will need to see more economic dynamism than in recent years.⁵

Against this background, contemporary challenges also point to an urgent need for increased investment, innovation and structural change - in particular with regard to the UK's legal commitment to meet net zero greenhouse gas emissions by 2050. The

Climate Change Committee estimates that additional annual investment will need to rise to £50 billion by 2030 (largely in electricity, buildings and surface transport),⁶ and most of this is expected to come from the private sector.⁷

A strategic approach to this investment must consider how to capture the associated growth opportunities,⁸ and implies an accelerated and more purposeful approach to 'green' industrial policy.⁹ Ongoing technological change, including the rise of generative AI, together with an ageing society, Brexit and geopolitical shifts, also imply a more strategic approach to growth is needed.

The UK therefore stands at a critical juncture. Under significant fiscal pressure following the pandemic and the energy crisis, and in the light of demographic shifts, the government will find it increasingly difficult to increase public spending in response to these challenges. This implies scarce resources will need to be used more productively, and policy levers pulled effectively to catalyse significant amounts of private capital.¹⁰

Recent years have seen a multitude of growth strategies and plans seeking to address the UK's growth problems, aimed at boosting investment, innovation and its diffusion. Some of these emphasise the need to do so in a manner that is consistent with sustainability and inclusiveness.¹¹

But a high degree of policy churn has prevented these strategies and plans (and associated policies) from having an effect, and from being properly evaluated. Crucially, this churn causes uncertainty for businesses (in already uncertain times given recent shocks and global trends) which dampens the incentives for investment.

Such churn applies at a high level (e.g. the UK's Industrial Strategy was launched in 2017, and abandoned in 2021),¹² across core areas of business policy such as corporate tax (with changes every year since 2010¹³) and with respect to detailed policies (e.g. the Growth Voucher Programme, and Help to Grow: Digital, both of which lasted around a year) and support for key technologies (e.g. reversals on carbon capture, usage and storage competitions¹⁴) or transitions (the recent delay of key net zero targets for cars and homes¹⁵).

An attempt to strengthen institutions for growth and productivity with the establishment of the independent Industrial Strategy Council by a Conservative government was short-lived, although the Labour Party has proposed relaunching it and placing it on a statutory footing.¹⁶

Our argument is that a dedicated policy institution, that puts productivity at the heart of the growth agenda, is a key part of the answer. In this chapter, we build on arguments made by the LSE Growth Commission,¹⁷ the Economy 2030 Inquiry,¹⁸ and The Productivity Institute,¹⁹ setting out how a well-designed growth and productivity institution would improve the formulation, implementation and staying power of effective pro-productivity policies. Crucially, such an institution would help with the politics of making difficult decisions where positive outcomes are likely to be felt over the long term.

But even if we agree that such an institution would be valuable, there are questions around its focus, role and institutional design. Many drivers of productivity are long-term, uncertain and intertwined. They are influenced by national, devolved nations', regional and local government as well as external, global factors.

Nevertheless there is precedent that the UK can learn from. In fact the UK stands out amongst a group of 20

other OECD countries for not having some such policy institution. The UK commissions that have taken place have usually involved academics and other key stakeholders and been external to government.

Moreover, growth policy in the UK stands out amongst other core areas of economic policy (including fiscal, monetary, competition and climate policies) for not having stronger, independent institutions governing it. Lessons from dedicated productivity institutions overseas, and economic policy institutions at home, provide a set of principles that can shape the design of a new growth and productivity institution in the UK. These lessons are summarised in the following sections before we set out key considerations and suggestions on focus, role and institutional design.

At this point we are not prescriptive about the name of a new institution, though we argue that it would be desirable for this to reflect a focus on productivity. Henceforth, we refer generically to a new Growth and Productivity Institution (GPI) for the UK.

"Even if we agree that such an institution would be valuable, there are questions around its focus, role and institutional design."

Lessons from overseas

It is only relatively recently that several OECD countries have established productivity bodies. Typically these are called commissions, boards or councils. Broadly speaking, these institutions aim to highlight the importance of productivity for economic performance, to strengthen understanding about the drivers of productivity, and to provide guidance to governments on policies to strengthen productivity. Today, around 20 pro-productivity institutions operate across the OECD area with Australia's Productivity Commission (founded in 1998) the oldest. From 2010 onwards, several other OECD countries (New Zealand, Denmark, Mexico, Norway and Chile) also established commissions, and these were followed by many EU countries after a recommendation of the EU Council in 2016.

Key features

Table 1 (overleaf) summarises key features of the institution, set-up and reporting framework for 11 of the 20 pro-productivity institutions in the OECD area (for which there is sufficient information). While the missions of the 11 are similar, typically focusing on productivity analysis and advice, the variety in institutional arrangements demonstrates that governments have taken different decisions on how these commissions work and the advice they want them to provide.

In most countries the institutions are independent advisory bodies consisting of three to 12 members, typically appointed by the government. In some countries (Chile, France and Germany) membership mainly consists of academics, possibly supported by government officials.

Other countries (Denmark and Ireland) involve representatives from business and trade unions or draw on expertise from business, as in New Zealand. In contrast, in some countries (Netherlands and Portugal), they are mainly composed of government officials and are closely linked to Economics or Finance Ministries. Institutions often have their own research teams, but also use existing research, for instance from the academic community.

In practice these institutions play a variety of roles: informing the national productivity debate; developing evidence and analysis on productivity growth and its drivers; providing policy recommendations; and contributing to policy discussions nationally or internationally. The bulk of their work has focused on the 'direct' drivers of productivity, such as investment, human capital, innovation, digitalisation and business dynamics.

However they are starting to tackle new questions such as: the rationale for a more focused or targeted innovation policy (New Zealand); resilience and strategic dependencies (Germany); the role of health for productivity (Australia); or policies linked to data and artificial intelligence (Australia, Germany, Ireland). They undertake little work on macroeconomic policy, financial markets and competition policy, possibly as such issues are already addressed by other institutions. Also, few of the commissions have explored the regional dimensions of productivity.

The wide range of issues covered suggests that many pro-productivity institutions take a broad view of their mandate. In taking on such a wide range of issues, important questions emerge related to policy coordination across different parts of government.

Impact

It is difficult to assess formally the impact these institutions have on the national productivity debate, on policy development and implementation, and ultimately on productivity growth. The Australian government has accepted and implemented many of the recommendations of the Australian Productivity Commission (notably in the areas of industry assistance and economic policy, with a more mixed record on social and environmental policy), and the economic benefits (in terms of higher productivity and lower prices) of resulting reforms have been pointed out.²¹ New Zealand's commission notes that: "The influence of our work may only emerge over long timeframes, and it may be challenging to directly identify and attribute it to our work."²²

Table 1: Overview of key Productivity Commissions in the OECD area

INSTITUTION	ESTABLISHED	TYPE OF INSTITUTION	MISSION	LOCATION
Australia Productivity Commission	1998	Standing inquiry body	Promoting productivity-enhancing reforms	Independent, reports to executive and Parliament
Belgium National Productivity Board	2019	Independent advisory body	Examine development of productivity and competitiveness	Independent structure, reports to trade unions and employers' organisations
Chile National Commission for Evaluation and Productivity	2015	Independent advisory body based on presidential decree	Analyse and recommend on policies for productivity and well-being; evaluate regulations and policies	Independent (tacit), reports to the president and government
Danish Economic Council	2017	Independent advisory body (multi-stakeholder)	To analyse productivity and competitiveness	Independent, provides advice to Danish policy makers
Finnish Productivity Board	2021	Independent expert body	Monitor productivity and competitiveness and conduct independent evaluations	Independent expert body linked to Ministry of Finance, reports to government
French National Productivity Council	2018	Independent advisory body of academic economists	Analyse productivity and competitiveness and policies that affect them	Independent, non-partisan advisory body reporting to the Prime Minister and Minister of Finance
German Council of Economic Experts	2019	Independent academic advisory body	Analyse developments in the field of productivity and competitiveness	Independent, provides advice to German policymakers
Ireland National Competitiveness and Productivity Council	2018	Independent council established by government (multi-stakeholder)	Analyse policy and developments in the field of productivity and competitiveness	Independent council, reports to Prime Minister and government
Netherlands Productivity Board	2017	Independent economic research agency	Gain understanding of factors driving productivity growth	Independent agency, part of Ministry of Economic Affairs and Climate Policy
New Zealand Productivity Commission	2011	Standing inquiry body	Improved well-being, improved productivity	Independent, reports to Parliament
Portugal Productivity Council	2018	Joint temporary structure	Monitoring policies related to productivity and support discussion	Joint economic structure of Ministry of Finance and Ministry of Economy

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Lessons from UK institutions

As set out by the LSE Growth Commission in 2017, the UK has strong frameworks governing monetary, fiscal and competition policy. Objectives are defined and enshrined in law, while independent experts play a role in offering advice and in some cases taking policy decisions. The remit of such bodies is transparent, with justifications for their advice presented in statutory publications, and such arrangements have the potential to improve stability and promote external scrutiny.

These institutional features are set out in Table 2 overleaf, which also includes the institutions for infrastructure and climate policy. These provide useful lessons concerning complex areas where many policy levers are relevant, and where outcomes are long-term, requiring significant supply side reform and investment.

While the roles and remits vary from decision-making powers (Bank of England MPC and Competition and Markets Authority) to advisory and monitoring roles (Office for Budget Responsibility, Climate Change Committee and the National Infrastructure Commission), there is a general consensus that previous policy failures such as short-termism, time-inconsistency and accountability failures justify independent decision making or analysis in these areas.

Most of these examples are statutory bodies (i.e. established through legislation) with the exception of the National Infrastructure Commission, which is an Executive Agency of HM Treasury.

As a non-governmental statutory body, accountable to both Parliament and the Chancellor, the OBR is considered to have enhanced the credibility of the

UK's economic and fiscal reporting and instilled greater fiscal discipline around government budgets.

The value of the OBR forecasts which accompany fiscal events was brought into stark relief by the fact that a forecast was not requested at the time of the disastrous 'mini-budget' in September 2022. The unfunded tax cuts this included led to market chaos, policy reversals and the departure of the Prime Minister and Chancellor.

By contrast, it has been argued that UK infrastructure decision-making might have benefitted if the National Infrastructure Commission had been on a statutory footing – as was the original intention.²⁴

"As a non-governmental statutory body the OBR is considered to have enhanced the credibility of the UK's economic and fiscal reporting."

Table 2: Examples of Institutions in other areas of UK economic policy

INSTITUTION	ROLE	TYPE OF INSTITUTION	MANDATE OR GUIDELINES	LEGISLATION	TRANSPARENT PUBLICATION
Bank of England's Monetary Policy Committee (MPC)	Decision-maker	Public body, answers to Parliament (HoC Treasury Committee)	Inflation target	Bank of England Act 1998, Bank of England and Financial Services Act 2016	Monetary Policy Reports
Office for Budget Responsibility (OBR)	Oversight	Non departmental body	Examine and report on the sustainability of the public finances	Budget Responsibility & National Audit Act 2011. Charter for Budget Responsibility	Economic and Fiscal Outlook (EFO) (accompanying fiscal events). Fiscal risks and long term projections
Competition and Markets Authority (CMA) Board	Decision-maker	Non ministerial department	Duty to promote competition for the benefit of consumers	Competition Act 1998, Enterprise Act 2002, Enterprise and Regulatory Reform Act 2013, Subsidy Control Act 2022	Merger inquiry findings. Market investigation findings
Climate Change Committee	Oversight and advice	Non departmental body	Advise the UK and devolved governments on emissions targets and to report to Parliament on progress made (incl. adaptation)	Climate Change Act 2008	Progress reports. Carbon budgets. Other reports on net zero and adaptation
National Infrastructure Commission	Oversight and advice	Executive Agency, sponsored by Treasury	Provide government with impartial, expert advice on major long-term infrastructure challenges		National Infrastructure Assessment (once in every Parliament). Monitoring reports. Specific studies

Source: Builds on Table 3.1 in LSE Growth Commission; see: UK Growth: A New Chapter, LSE, 2017.

The Industrial Strategy Council (ISC) set up in 2018 (and disbanded in 2021) had some desirable institutional features and was focused on key drivers of growth and productivity.

While not a statutory body, which would have required legislation to close it, it was an independent advisory group within the Department for Business, Energy and Industrial Strategy (BEIS). Its remit was to develop metrics to monitor and evaluate implementation of the 2017 Industrial Strategy White Paper, producing regular progress reports as well as studies on relevant topics.

The remits of the existing institutions included in Table 2, and others (e.g. other regulators, the British Business Bank and the UK Infrastructure Bank), shape and inform growth policy and outcomes in the UK.

But there is a gap in the institutional framework governing UK growth and productivity policies. We note that the proposals set out below are general

principles for any government seeking to set up a new GPI – whether in the form of a resurrected ISC (which, in that case, should be stronger and have a broader remit), or an entirely new institution.

Rather than duplicate efforts and analysis with other pre-existing institutions, a new GPI could play a coordinating role. For example, it would complement the Office of Budget Responsibility's work, drawing upon its analyses on the fiscal outlook, but contributing insights on the longer-term productivity impact of government policies or other trends such as technological change.

While the Climate Change Committee advises on and monitors progress towards net zero, the new institution could identify how policies for net zero interact with the need for investment, innovation and economic dynamism for growth – setting out clearly where there are synergies or trade-offs and how to address these.

"Rather than duplicate efforts and analysis with other pre-existing institutions, a new Growth and Productivity Institution could play a coordinating role."

Key considerations

Focus and scope

It is important to be clear about the focus and scope of a newly-launched GPI. 'Productivity' needs to be at the heart of its remit. While many other factors will be critical for the economic future of the UK, including the impacts of climate change and demographic shifts, productivity growth will account for the lion's share of GDP growth and income growth over the next decade.

How broadly should productivity be linked to other key policy domains? One option is to focus on the direct drivers, including investment (such as physical, human and intangible capital provided by public and private sector organisations) and technological change, notably the diffusion of knowledge and technology across firms and regions.

There is likely to be a sectoral or technological (which could be termed 'industrial strategy') element, broadly defined as policies that seek to influence the structure of the economy,²⁵ and an outward focus on global trends and how the UK interacts with the world will also be necessary. Indeed, the UK's Industrial Strategy Council sought to evaluate government progress across both economy-wide 'horizontal' areas (e.g. skills, innovation) and more specific or 'vertical' objectives (sectors or 'missions').

A GPI should have a broader scope than the Industrial Strategy Council, and should also deal with investment and growth-related issues around trade, foreign direct investment, regulation and competition, planning, 'levelling up', and potentially also net zero and climate change adaptation.

However, the risk of too wide a scope is that the new institution would be thinly spread and fail to supply the detail needed to formulate actionable policy. Given the experience elsewhere, it seems likely it would draw in and coordinate related topics even where these were not explicitly in its remit.

Given those arguments, we recommend a primary focus on the direct drivers of growth and productivity (investment in physical, intangible and human capital), while considering the origin of these drivers (which sectors, places, technologies should be in focus). Specific topics for inquiry could be chosen by government in consultation with the institution's leadership. This would not exclude the possibility of including other domains, but in such cases the institution could rely on the expertise of others and focus on how to connect those themes to design an integrated policy framework. It could therefore also play a coordinating role in good policy design, a role largely absent in the formal UK governance structures.

In other words, the GPI should prioritise areas based on evidence about what drives productivity. The institution should also explicitly consider ensuring that productivity growth is compatible with environmental sustainability and inclusivity, taking into account a UK-wide, devolved nations and regional perspective. One key role of the institution could be to highlight where synergies and trade-offs exist and how they might be addressed, particularly in the short-term.

It would also be important to keep the remit of the GPI high-level and non-contested, so that it could survive changes in political priorities. From this perspective it might not be sensible to link overall objectives of this institution to a specific part of a government's growth agenda – though this will shape priority areas for inquiry.

Remit

There are a number of options for the specific role of a new GPI, with various features that could add value to current policy frameworks. A key feature would be to provide the long-term expertise and capacity needed to conduct analysis that can inform pro-productivity policy recommendations and reporting. This is particularly important given the career structures in the civil service which incentivise frequent moves.

More specifically, the GPI would have the ability, capacity and legitimacy to:

- Conduct inquiries into priority areas agreed with government. Focus on well-defined problems that can be addressed by policy, allowing space for policy entrepreneurs to generate ideas, and supporting policy makers in translating those into detailed, careful, thoughtful, and thorough policy design to make the policies work. The outcome of these inquiries should be actionable and evidence-based recommendations.

- Monitor and evaluate policies against key defined objectives – the implementation of pro-productivity policies, proximate outcomes (e.g. investment as a share of GDP) and ultimately productivity.

- Produce high quality data and reports on productivity and its drivers, based on an understanding of the literature, data and institutional history of the UK and other relevant comparators. This should be a combination of regular reporting on key metrics, and bespoke reports based on specific issues or inquiries. A microeconomic understanding of the drivers of productivity, and barriers to investment (including within firms) will be crucial, as well as how this translates to macro outcomes. Access to non-economic expertise will also be required in many areas (e.g. planning and regulation).

Given that productivity growth is shaped by many areas of policy at national, devolved nations and regional levels, and by the actions of industry, the third sector and civil society, **stakeholder consultation, coordination and communication** should be a key feature. This will improve the legitimacy of recommendations and reports, which should be based on consultation as well as research and analysis, as well as their salience in the public debate. In this way, a key role of a new institution would be to provide a focal point that facilitates policy action.

Data and metrics will be crucial, and a GPI could build capacity in constructing and linking relevant micro-datasets, working with academics and data providers (the ONS, but also government departments, international institutions such as the OECD, and private sector data providers), and using these to monitor and report on trends and evaluate policies where possible. The institution might also advise government on which metrics should be used for monitoring progress.

Evaluation of the GPI itself, against its stated objectives and remit as set out in its mandate, will also be necessary to maximise legitimacy. This will require a robust theory of change along with metrics for monitoring and evaluation. This could build on work by the Economic and Social Research Council (ESRC) in assessing its academic productivity investments (acknowledging shared objectives of providing robust analysis and information, shaping policy and ultimately improving productivity).

"A microeconomic understanding of the drivers of productivity and barriers to investment will be crucial."

Institutional design

The following principles should guide the design of a new GPI:

- Independence to ensure credibility, and create some distance from political priorities
- Embedded long-term focus, insulated (to the extent possible) from short-term issues and policy churn
- Some flexibility, such that ongoing work and inquiries can be shaped by new developments (e.g. shocks) or changes in government or political realities
- Ability to impact on government machinery and create political leverage, facilitating the political process and creating an environment to solve difficult long-term problems.

Given the multiple policy domains that ultimately impact productivity, it seems most appropriate to set up the GPI as a non-departmental body, reporting to the Cabinet Office. While the objectives and remit of the organisation would be set by the government and Parliament, this would allow the institution to work across relevant policy domains and government departments.

Clearly HM Treasury has a large stake in growth and productivity policies and frameworks (including fiscal policy, structural policies and public sector productivity), whereas other departments relate to specific drivers (for example, innovation, education, infrastructure, regional dimensions or trade). These connections with government departments could be reflected in the composition of a Ministerial Group

reviewing the work of the GPI and providing political leverage. A group of civil servants could support the institution on specific topics.

For longevity and accountability, the GPI should be a statutory body, accountable to Parliament. Parliamentary approval is critical to assure longevity and safeguard expertise by committing to the institution while allowing for flexibility to repurpose its formal objectives as required. As the legislation to establish a new body could take time, it may be advisable to start with a simpler non-statutory structure while obtaining buy-in and commitment. This could also facilitate experimentation to see what works while legislation is in progress.

Following good practice elsewhere, the GPI itself could consist of between six and 12 independent commissioners. Depending on the degree of stakeholder coordination, some commission positions may be allocated to independent experts, possibly representing specific constituencies, such as business and workers. Representation from outside London, particularly from devolved nations and regions with the most potential to contribute to productivity growth, will also be needed. The Chair should be fully independent with a strong public profile and well-recognised expertise, analytical capacity and convening power.

To be effective, the GPI will need to be well-resourced. In addition to an administrative support team, it will be necessary to have a strong analytical team, working on a well-defined research agenda determined by the priorities as set by the commissioners, in consultation with government.

The research team may be supported by other research entities outside government or policy analysis teams within government, collaborating

as needed. However, reports and analysis should be developed independently, approved by the GPI, presented to both government and Parliament, and with a statutory requirement for government to respond on a committed timetable and set out how it will take forward the policy recommendations (or why it will not).

Conclusion

This chapter has set out the case for a new GPI in the UK and outlined how it might be designed. Would the UK's growth and productivity performance in recent years have been better had this type of institution existed? We think so, encouraged by the evidence from well-established commissions overseas, such as those in Australia and New Zealand.

Given the breadth of policy areas which are potentially influenced by productivity-related interventions, a more coordinated and long-term approach to policy with a pro-productivity focus can be expected to have a positive impact on growth. The need for such a coordinated and comprehensive approach for pro-productivity policies is even more urgent in the light of the consecutive economic shocks from the EU referendum vote, the pandemic and the energy crisis. An independent, enduring institution with the expertise and credibility to shape pro-productivity policy would contribute to the ability of policy makers to take decisions that may not be immediately popular but are in the long-term interests of the nation.

Key takeaways

Addressing the UK's productivity problem requires increased long-term investment in physical, human and intangible capital, and a new Growth and Productivity Institution (GPI) would help to ensure that the appropriate policies are in place to achieve this.

Such a body, placed on a statutory footing to ensure it survives political churn, would provide independent expertise and credibility to shape effective, coordinated and lasting pro-productivity policy.

Through conducting inquiries into key areas, monitoring and evaluating policy, and regular reporting to Parliament, combined with extensive stakeholder consultation, coordination and communication, a new GPI would help with the politics of making difficult decisions where positive outcomes are likely to be felt over the long term.

Experiences setting up similar institutions in other advanced economies, and independent institutions in other areas of policy in the UK provide lessons for the design of a new GPI in the UK.



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