

INSIGHTS 2018

THE SIZE OF THE PRIZE

What the construction
sector deal means
to the UK





Mark Reynolds
Chief Executive

Mark Castle
Deputy Chief Operating Officer –
Construction

Appointed Mace's Chief Executive in January 2013, Mark has been a member of the Group Board since the management buyout of the company in 2001.

His vision is for Mace to lead the industry through innovation, be a major British exporter of construction services, deliver a consistent high quality service to clients and ensure that Mace continues to develop, attract and retain the very best people in our industry. Mark gained his early experience in the commercial sector on the Broadgate and Ludgate developments in London, later moving on to projects with BAA.

He was the Deputy Programme Director for the London 2012 Olympic and Paralympic Games, reported as the best ever delivered venue in the history of the modern Olympics.

Since 2016 Mark has sat on the board of the widely respected business body London First. In 2017 he was appointed to the UK Government's Construction Leadership Council heading up the skills workstream.

Mark joined Mace in 2005 to set up the company's fixed price construction business. With over 35 years' experience, Mark has managed UK and North America based organisations and today retains a hands on approach to many of our strategic client relationships.

In 1998 he was appointed Wates' managing director for construction in London, prior to becoming an executive director in 2001. Following this, he was managing director for StructureTone, a construction group based in North America with interests in the UK, Ireland, Europe and Asia.

Mark also provides strategic leadership on major construction projects such as the Tate Modern extension, the Emirates Air Line cable car across the Thames in London in time for the 2012 Olympic and Paralympic Games and currently Tottenham Hotspur's new football stadium. He is a fellow of the Royal Institute of Chartered Surveyors and the Chair of Build UK.

The UK economy produces...

£31.50

of GVA* per hour worked.



Manufacturing produces...

£35.50

of GVA per hour worked



Services produce...

£31.50

of GVA per hour worked



Construction produces...

£25.50

of GVA per hour worked ^{xvii}



*GVA is a widely used measure of the value of goods or services produced by a sector or industry.

Construction sector output in the UK is currently worth over...



...which equates to...

6%

of the UK's total economic output ^v



INTRODUCTION

The British Government has not only put productivity at the heart of its economic policy, but also as a core plank of its new industrial strategy.^x The reason is simple: productivity is linked directly to living standards and wages, with the country's ability to improve its standard of living over time almost entirely dependent on productivity growth. As a result, productivity is crucial in determining the long-term prosperity of our economy.

The recent sad events surrounding the collapse of Carillion starkly demonstrates the importance of this. Not only is the construction sector a major employer itself, with over 2.3m workers in the UK, but it is delivering the new infrastructure, schools, hospitals and housing that is absolutely critical to improving the nation's productivity and improving peoples' lives. The Government has thus given infrastructure generous coverage in the policies designed to tackle the flagging productivity seen in the economy more widely,ⁱⁱ underpinned by a multibillion-pound National Productivity and Investment Fundⁱⁱⁱ

However, there is concern about the construction sector's capacity to cope with the nation's current infrastructure pipeline,^{iv} and to meet the growing demand for infrastructure that the Government's industrial strategy and departure from the EU will demand. The sector is currently struggling in terms of capacity, with present shortages of labour set to continue unless innovation, new ways of working and new technology can transform our industry.

This report looks at the UK's productivity challenge and the role the construction sector specifically can play. It is a market that faces challenges, with a current pace of innovation which could be described as 'glacial,' and so there is justification for policy action to help the sector improve its own productivity, given its size and economic importance. This report considers what that action could most usefully be.

The potential prize is enormous. Given the size of the economic footprint construction has in the UK, higher sector productivity would not only deliver a significant uptick to our national labour force output, but the spill over effects – for example, the greater connectivity and agglomeration delivered by new transport schemes – would combine with greater labour productivity to produce a significant positive effect on the UK's GDP growth, year in year out.

Our new analysis for this report shows that if construction was as productive as manufacturing, £100bn would be added to the UK's economy each year. Resulting in an additional £40bn in tax revenues – enough to eliminate the current UK deficit.

The good news is that there is broad political consensus around the recognition of the importance of raising construction sector productivity. The announcement of a £170m Construction Sector Deal as part of this focus shows that there is a commitment to change things for the better.

ABOUT THE CONSTRUCTION SECTOR

Construction sector output in the UK is currently worth over £100bn a year to the economy which equates to 6 per cent of the UK's total economic output.^v The construction sector provides 2.3 million jobs, which is around 6.5 per cent of the UK's total jobs. This 6.5 per cent figure has broadly flat-lined over the last 25 years.^{vi}

A comparatively very high percentage of construction jobs (nearly 40 per cent, or 850,000) are in self-employment, compared to 13 per cent for the economy as a whole. The construction sector is also hugely dependent on migrant workers, particularly in London where it is not uncommon to see as many as 70 per cent migrant workers on a given construction site, mostly from the EU. According to NIESR, over half of London's construction workforce comprises of migrant labour.^{vii}

The construction sector provides

2.3m

jobs, which is around 6.5% of the UK's total jobs.



Nearly...

40%



of construction jobs (850,000) are in self-employment, compared to...

13%



for the economy as a whole.

According to NIESR, over



...of London's construction workforce comprises of migrant labour.^{vii}

The National Investment Productivity Fund has allocated...



...across four priority areas: housing, transport, digital communications and science.^{xi}

WHY GOVERNMENT IS PRIORITISING CONSTRUCTION PRODUCTIVITY

Key to the Government's economic strategy is the effort to spread growth to all regions of the UK: a "rebalanced economy and a thriving Northern Powerhouse" in the words of HM Treasury.^{viii} The North-South rebalancing, for example, has been one of the key political justifications for the £50bn+ High Speed 2. Vastly improved connectivity within the North, embodied in 'Northern Powerhouse Rail',^{ix} an idea Mace has campaigned for, will be needed to join up the cities of the Northern Powerhouse and deliver on the Government's vision. The construction sector is the key element that enables this progress to be made.

Capital investment in infrastructure and housing – key construction sector outputs – are crucial planks of the Government's productivity plan.^x Backing this is the £31bn National Investment Productivity Fund (NPIF)^{xi} allocated across four priority areas: housing, transport, and digital communications (all construction-related), as well as science.

The reason that construction is so important to growth, particularly housing and infrastructure construction (including digital and communications infrastructure), is that it expands the economy's productive capacity through better connectivity. This has several effects:

- Making it easier to trade goods and services
- Enabling greater specialisation and economies of scale

- Enabling the formation of 'economic clusters'
- Allowing businesses to access a wider and more diverse pool of skills

Connectivity brings businesses closer together to help create the critical mass that allows regions and smaller cities to compete globally. Transport connects people to jobs and products to markets. Digital communications infrastructure – fixed and mobile broadband connections – enables new and more efficient business processes, access to new markets and support flexible working and working from home. They support efficiency and labour force participation across the whole economy.

But decades of infrastructure underinvestment (particularly in transport) means the UK ranks only 27th in the world for the quality of its infrastructure in the World Economic Forum rankings. It is second bottom amongst the G7 economies.^{xii} And in the North of England transport links are so bad it is currently quicker to travel the 283 miles from London to Paris by train than it is to travel less than half that distance between Liverpool and Hull. It is little wonder productivity in the North lags the rest of the UK which in turn lags the G7 average. Thankfully, the Government understands this. The recently revised national infrastructure pipeline included more than £600bn of infrastructure development spending, including in the North.

Owning a house remains an ambition for many in the UK – and the wider housing agenda contributes to a competitive economy – and hence productivity – through its interaction with the labour market. Housing that is both affordable and in the right places allows people to live where job opportunities are and helps to keep wages competitive. Hence promoting more housing and in the right places is one of the Government's 15 points in their productivity plan.^{xiii}

But the UK has endured a double whammy of not building enough homes for decades and of building many of those in the wrong places. We have been building vastly fewer new homes than are needed to keep pace with the growing population since the late 1970s, resulting in a housing shortage nationwide well in excess of a million homes. In London, we have rarely built more than half the 60,000 homes a year needed. The Government recently announced a target of 300,000 new homes that need to be built each year in England to meet housing demand, but we have a very long way to go before that is achieved.

Clearly, meeting the priority policy areas of infrastructure and housing delivery – and getting the biggest bang for the Government's buck and its £600bn construction pipeline^{xiv} – will rest on growing the construction sector's capacity to deliver.

But the construction sector faces huge challenges in this respect and there are concerns it will be unable deliver on such ambitious plans. Indeed, the Government's target to build 1 million homes by 2020 and 1.5 million by 2022^{xv} in England is already being tested by the construction sector's capacity to build them, with many industry insiders suggesting traditional house builders are running at full capacity.

Furthermore, with likely labour supply constraints in the coming years – 1 million older workers retiring, possible restrictions on EU workers – we could see a 25 per cent reduction in the construction workforce by the end of the decade.^{xvi}

So the construction sector's capacity to deliver will need to be increased in another way: by improving its productivity.

In the World Economic Forum rankings the UK ranks...

27th
for quality of infrastructure



It is currently quicker to travel...



283 miles
from London to Paris by train than it is to travel less than...



With one million older workers retiring the UK could see a...



decline in the construction workforce available by the end of the decade.^{xvi}

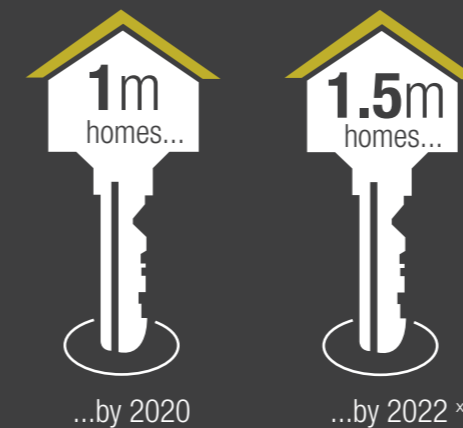
We have been building vastly fewer than the...

250,000

...homes a year needed to keep pace with the growing population...



The government has set targets to build...



Compensating for a 25% smaller workforce would require a...



boost in construction productivity just to stand still.

THE PRODUCTIVITY CHALLENGE FOR THE CONSTRUCTION SECTOR

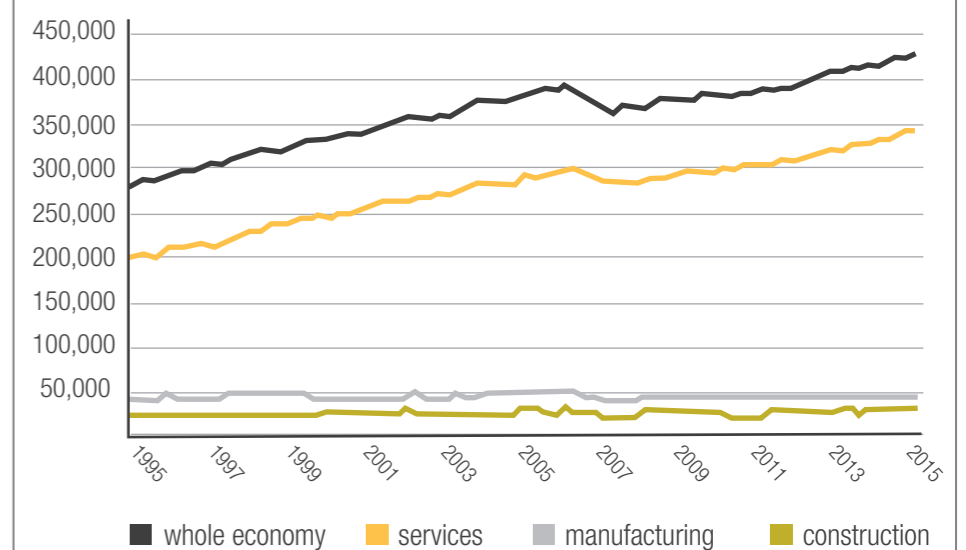
The construction sector today is characterised as being 'labour-intensive' – it employs more people to produce each £1 of output than most other sectors and it generally employs less capital e.g. plant, machinery, computers etc. And it hasn't changed or 'innovated' its productive processes as much as other sectors over the years.

According to the latest ONS productivity data^{xvii}, the UK economy produces £31.50 of GVA per hour worked, compared to £25.50 per hour worked in construction. This compares to £31.50 per hour worked in services and £35.50 per hour worked in manufacturing. Construction is bottom of the productivity pile, a position that was not true 20 years ago. Manufacturing, in contrast has moved from bottom to top.

The same data also shows almost all the UK's overall economic growth during the last 20 years has come from the growth in the services sector, as shown by the parallel 'whole economy' and 'services' lines, in the line graph below.

UK manufacturing output has flat-lined. But what is interesting is that the number of manufacturing workers has fallen by around 40% - the manufacturing sector is producing the same but with 40% fewer workers.^{xviii} Hence manufacturing productivity is massively up. Construction output has risen moderately but so has the number of construction workers and so its productivity has barely budged.

Total economic and sector output (GVA), UK



DRIVERS OF PRODUCTIVITY GROWTH

Drivers of productivity growth in the construction sector are fundamentally no different to those in the rest of the economy, even if the construction sector suffers from its own unique productivity challenges which hold it back. The main ones are:

1) Capital investment

“Nearly every theory of productivity growth retains a central role for investment and the accumulation of capital. Investment raises the long run productivity of nations by increasing the level of capital that each worker has at their disposal.”^{xxii}

In the past, productivity has grown with increased physical capital investment – typically in plant (factories) and machines, as well as in infrastructure.

This process began with the industrial revolution from the late eighteenth century. At any time, for a given level of technology, the more capital (machines and tools) per worker, the more each worker could produce.^{xxiii} But this key driver – physical capital investment – is down as a percentage of GDP both by historical standards and comparing the UK to other developed economies.^{xxiv}

Examples of capital investment include spending on plant and machinery, transport equipment, computers and software, new dwellings and other buildings, and major improvements to existing buildings and structures, such as roads. UK capital investment is currently just over £300bn

annually.^{xxv} It has ranged between 15% and 20% of GDP since the mid-1990s.

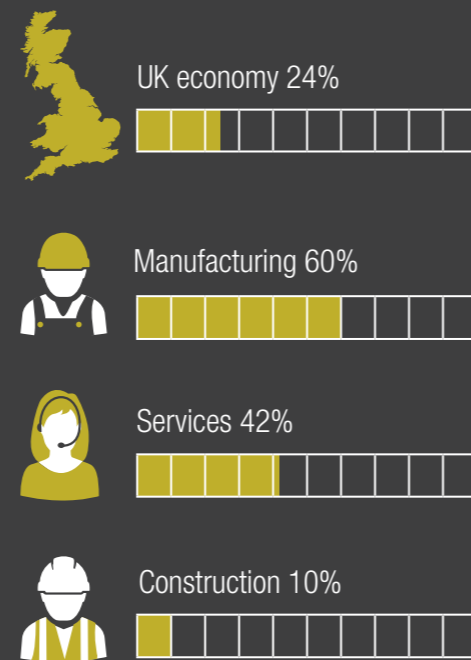
2) Upskilling and education

“Investment is an essential part of raising productivity. In today’s economy that is not simply a matter of increasing the stock of machines, equipment and essential physical infrastructure but also, crucially, the development of human and intellectual capital.”^{xxvii}

Productivity growth is also associated with rising human capital, namely skills and education. As more people have become skilled and more educated over the generations, productivity has risen. In the workforce, the more highly skilled and educated generally command higher wages than the lower skilled and lesser educated, which reflects their respective productivities.^{xxviii} Skilling and education factors have a profound effect on how well ‘labour’ and ‘capital’ interact to produce things.

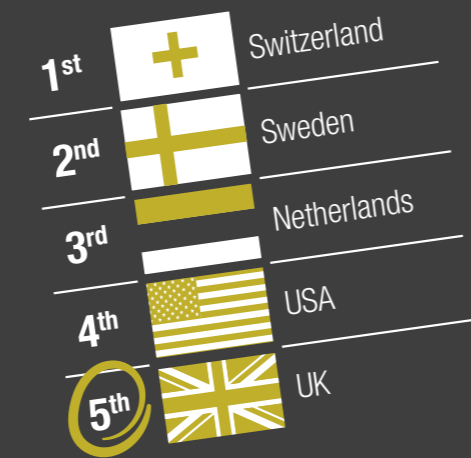
But the UK suffers from several weaknesses in its education and skills base compared to many of its international competitors, as demonstrated by a various international measures highlighted by a recent Centre for Social Justice productivity report.^{xxix} Two areas have been repeatedly highlighted as problematic: PTE and STEM^{xxx} subjects.

Productivity growth in the UK between 1995–2015^{xxix}



In the Global Innovation Index, the UK ranks....

5th out of 127 countries.^{xxxiv}



OECD figures show that, across developed countries, an average of...

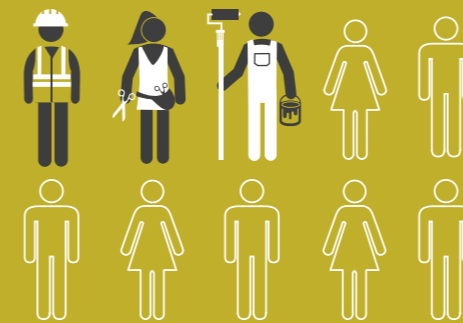
50%



of young people follow vocational routes to work and in Germany, the proportion is close to 75%.^{xxxi}

In the UK, it is just...

30%



The UK has a lower percentage of adults who were considered skilled (at level 2 or 3) in ICT than Germany, Netherlands and Sweden. The UK performs poorly on intermediate profession and technical skills and is forecast to fall to 28/33 OECD countries for intermediate skills by 2020.

Technical and vocational education is sadly sometimes seen as second best. A House of Lords select committee said last year there is a culture of inequality between technical and academic education. The committee quoted OECD figures showing that, across developed countries, an average of 50% of young people follow vocational routes to work and, in Germany, the proportion is close to 75%.^{xxxi} In the UK, it is just 30%.^{xxxii} Hopefully the apprenticeship levy will start to address this.

3) Technological advancement and Innovation

Another way productivity improves over time is through technological advancement through new inventions and discoveries. Many of these since the late 19th and early 20th centuries – penicillin, the telephone, the motorcar, radio and television, flight, refrigeration – were economically and socially transformative (not least for their direct impact on living standards).

Research and development spending is a way of fostering, or quickening, technological advancement. But R&D spending

in the UK is low by international standards. It has been consistently below 1.8% of GDP since the mid-1990s. It is currently 1.7% of GDP, lower than Germany’s near 3% and the OECD average of 2.4%.^{xxxiii}

However, the UK has punched above its weight when it comes to new inventions, so R&D activity isn’t the whole story. Commercial organisations and universities are at the forefront of R&D activity. In terms of research, UK institutions feature well with Oxford, Cambridge, and Imperial College London ranking highly – these are three of the world’s top ten universities.^{xxxiii}

In sum, new technology is important. But so too is the diffusion and pace of adoption of new technology into products and productive processes – i.e. innovation. The UK ranks 5th /127 in the Global Innovation Index.^{xxxiv}

All in all, the UK does well reasonably well on innovation, but under performs on physical capital investment and key aspects of its education and skills base. But we also need to create a culture of measurement and learning, as we did for safety with the AFR and lost time incidents. By having an agreed approach to measurement it means that comparisons across projects and companies can be made and lessons learnt. One potential method for collecting and sharing this information is the i3P platform which is used to collaborate and share innovations across infrastructure projects.

CAPITAL INVESTMENT AND INNOVATION: CONSTRUCTION INDUSTRY 4.0

Comparisons between construction sector productivity and manufacturing productivity are often made – but what is it about manufacturing that has enabled rapid productivity growth?

At a basic level the answer lies in employing economies of scale to produce a lot of the same thing (e.g. cars, the iPhone), plus introducing new technologies and innovations in the production line drive down costs, produce more – and thus grow profit.

In contrast, construction production has historically been highly bespoke – there is only one version of the Shard (with its own unique innovations), or of the new Forth Bridge. Even houses and schools are less standardised than perhaps they could be. It does not make sense to build a whole production line for something that there is only going to be one of, or that does not have a mass market.

This is where ‘Industry 4.0’ comes in and creates huge future opportunities for construction. Industry 4.0 is a term used synonymously with the 4th industrial revolution which many believe is underway. Industry 4.0 is a world where advanced technology, from artificial intelligence to robotics to autonomous vehicles, will transform the productive capacity of the economy in highly specialised areas, as well as in areas of more basic mass production.

According to a recent survey by Mace of those working in the construction industry, specific innovations of the Industry 4.0 age anticipated to affect the construction sector within the next five years include: advanced data and analytics; augmented and virtual reality; advanced offsite manufacture; and advanced material science.^{xxxvii} It is generally thought that the assembly and build out parts of the production cycle, as well as design stages, will be the first and most impacted by Industry 4.0.

We believe there are four areas where real opportunity lies to boost construction productivity. These are:

i) Standardisation

There is great scope to standardise building components and mass-produce these offsite, in much the same way as different car makers can share the same components but build a highly differentiated product. To indicate the scale of the opportunity to standardise building components, only 50 percent of respondents to the MGI Construction Productivity Survey said that their firms had a standard design library. History shows what might be achievable in the future of housing – the 1930s Metroland housing boom in London, for example, showed that standardised housing can be delivered en masse, be popular and work. In the modern age, with modern manufacturing methods, this effect can be better still.^{xxxviii}

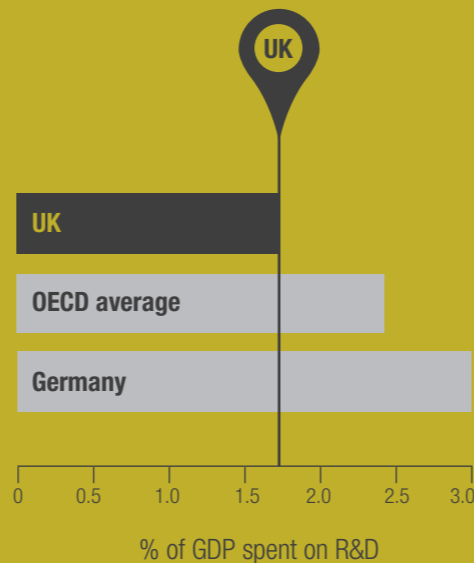
The UK performs poorly on profession and technical skills and by 2020 is forecast to fall to...

28th

out of the 33 OECD countries for professional skills.



R&D spending in the UK is low by international standards^{xxxii}



The adoption of existing and widely available technology such as BIM, drones and digital collaboration tools...

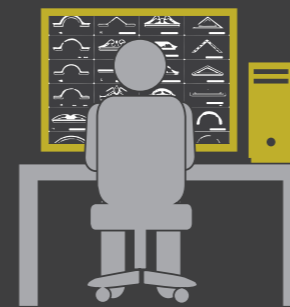


...could boost global construction productivity by around...

14–15%^{xi}

Only **50%**

of respondents to the MGI Construction Productivity Survey said that their firms had a standard design library.



ii) Modern methods of construction

Linked to standardisation, McKinsey notes: “The biggest impact on productivity would come from moving toward thinking about construction as a production system, where possible encouraging off-site manufacture, minimizing on-site construction through the extensive use of pre-cast technology, assembling panels in factories and then finishing units onsite.”^{xxxix} In other words, making construction more like – even part of – the manufacturing sector.

Some off-site construction plants are being pioneered in the UK, for example Legal & General Modular.^{xi} But these are very early days and it is unlikely more than a few 1,000s of homes will be produced in this way during the coming years. Developing new lightweight materials and construction methodologies such as prefabricated pre-finished volumetric construction could further improve the viability of off-site fabrication and make its adoption more widespread.

iii) Digital

McKinsey estimates that the adoption of existing and widely available technology – 3D building information modelling (BIM), digital collaboration tools, drones for scanning, monitoring and mapping – could boost global construction productivity by around 14–15%, one of the potential easy wins.^{xii}

iv) An ‘Industry 4.0 ready’ workforce

“Change in the construction sector cannot be achieved without investment in retooling a workforce that is aging and changing its makeup through migration. Construction firms and workers need to continuously reskill and train to use the latest equipment and digital tools.”^{xiii}

With growth in infrastructure investment, the pipeline creates a demand to recruit and train at least 100,000 additional workers by the end of the decade. But the required skills blend to deliver the investment plans will change over time, leading to a need retrain and up-skill around 250,000 of the existing workforce over the next 10 years.^{xiiii}

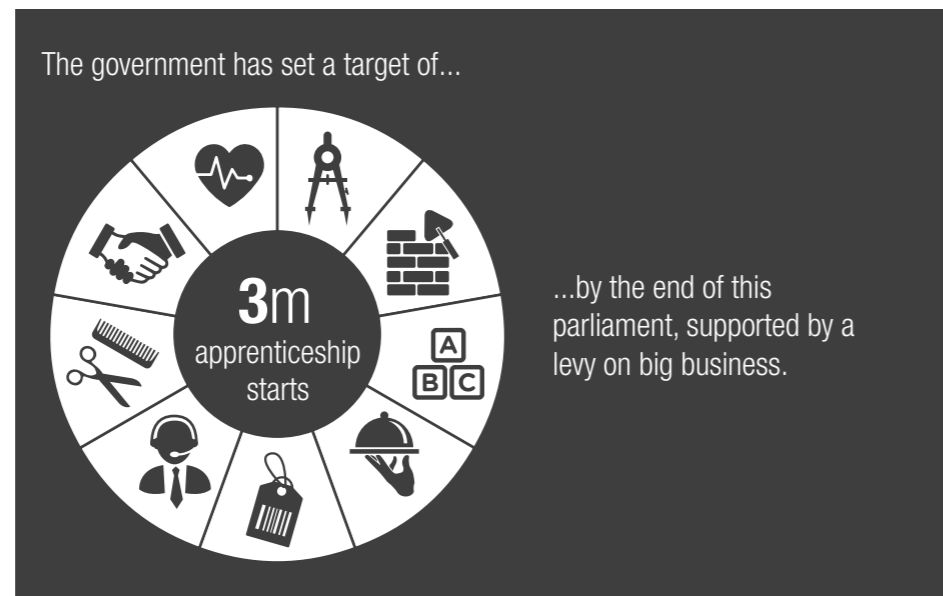
The skills mix of the construction labour force will inevitably move away from the traditional bricklayers, plasterers and labourers and towards a ‘newer generation’ or ‘Industry 4.0 ready’ construction workforce. Recent economic analysis by Mace estimated that, under a ‘fast change’ scenario towards Industry 4.0, up to 600,000 construction jobs could be affected over the next 20 years.

So, ensuring the construction workforce of the future is not simply about the retention and recruitment of enough workers with 'traditional' construction skills to fill the void left by the large numbers retiring or returning home to the post-Brexit EU. It is one that brings in and embeds the new skills necessary to use the new technologies that will need to come on-stream in the sector as it enters the fourth industrial age. These will include digital machine operative skills to run offsite construction plants, onsite robotics and drones.

The big problem is that such a workforce is one which the UK education system is unlikely to be able to provide in its current form, where technical education is still seen as second best – a key reason for high requirements for migrant labour in the digital industries. Also, the construction sector lacks the diversity needed to ensure talent is being sourced from as wide a labour pool as possible, and is not always promoted as an attractive industry in which to pursue a career, including amongst the highest calibre of young people. The slightly maligned 'vocational' route is not seen as attractive to many of our brightest young people who opt for a traditional university education. It is the role of our industry to reach out to schools and change those impressions.

Reputable university-equivalent tertiary education institutions, offering esteemed degree-equivalent technical qualifications – including those tailored to construction – would go a long way to addressing this. Reforms and additional resources for part-time learning, together with more emphasis on maths, science and technical subjects in our education system, are crucial to the construction sector.

Apprenticeships are also important and the Government with industry has begun to set out detailed strategies for producing high quality apprenticeships in infrastructure.^{xiv} The Government has set a target of 3 million apprenticeship starts by the end of this Parliament, supported by a levy on big businesses. But this -



and an Institute of Apprenticeships - is only part of what is needed. A newly-reformed tertiary part-time education system would need to incorporate sandwich placements to develop skills on the job for the sector's future leaders.

The construction sector, in turn, needs to play its part in offering solid career pathways with clear progression opportunities and attractive salaries. The good news is that high-productivity jobs generally come with high wage packets.

These are just a couple of the key ingredients required to attract high calibre young people into the construction industry, in sufficient numbers, to build the 'I4.0-ready' workforce it needs.

THE PRIZE OF INCREASING CONSTRUCTION SECTOR PRODUCTIVITY



..... this would mean tax revenues would be increased to...



The construction sector currently produces around £100bn of economic output each year. Had productivity in the construction sector increased in line with manufacturing since the mid-1990s then, according to new analysis for this report, this means:

- Around 3% added to our GDP – a significant economic boost.
- Each construction worker producing not £25.50 an hour but £38.00 an hour – just ahead of manufacturing.
- Progressing through the £600bn national infrastructure pipeline not within six years but just over four.

The delivery of an extra £50bn a year of infrastructure would also have wider economic benefits through (a) multiplier effects, whereby the sector's comparatively long supply chain (most construction materials are sourced domestically, not imported) generates a large spread of economic benefit; and (b) spillovers, whereby construction projects generate wider economic activity.

For example, every £1 spent on High Speed 2 is estimated currently to deliver between £1.80 to £2.50 of benefits, including through increased connectivity, time-saving and other economic benefits.^{xlv}

If we use a low estimate of £1 of construction sector output creating £1 of GDP in additional economic benefits, a £50bn construction productivity improvement yields £100bn of additional economic output.

To put £100bn into context, it is the current size of the the budget of NHS England.^{xlviii} The tax take on £100bn would bring in an additional £40bn to the Exchequer each year, enough to eliminate the Budget deficit from next year (2018/19) based on the Spring Budget forecast.^{xlix}

It would be equivalent to raising our GDP by around 6% over 20 years or +0.25 percentage points on GDP growth each year. That would be a significant prize too in the context of long run GDP growth in the UK of just over 2%.

The systematic issues affecting the construction industry – so starkly demonstrated by the recent collapse of Carillion – means that increased construction productivity is unlikely to happen spontaneously. If it is to happen at all, let alone within the timescales demanded to meet the nation's new infrastructure, it needs Government support and the industry working together.

This is due to a number of issues highlighted in this report, such as a lack of access to finance, ever-squeezing margins and a lack of skills and diversity in the UK construction labour force. Yet the sector employs so many people and is so essential for national growth and interconnected-ness that even modest improvements would yield huge productivity benefits for the economy.

For that reason, there is a role for government to help catalyse change in the sector. The Government's new Construction Sector Deal is one focus for potential action and it will undoubtedly make productivity its central concern.

Our recommendations for Government action include a five-point plan:

1. **Brexit exports initiative:** seize the opportunity Brexit presents to expand the UK's exporting of advanced construction services helping the UK to become a global trading nation. We need to ensure funds from government (announced at the 2017 Budget) focusses on developing British expertise in digital, offsite construction, robotics and drones which would not only benefit UK schemes but give British firms the edge in the \$3.3 trillion global construction market.
2. **Future-proof skills:** our Industry 4.0 report predicts that over 600,000 workers may need to be retrained by 2040 as a result of innovation. Government must ensure that the apprenticeship levy can be used on a wide range of forward looking training programs, rather than just addressing the status quo.
3. **Construction balanced scorecard:** the announcement in the recent Industrial Strategy about introducing a balanced scorecard approach for construction is welcome. This scorecard can be used to drive the right behaviour and practices that will promote productivity improvements. The elements which we think should be included in addition to the basic things around time, cost, safety and quality are:

- Digitisation
- Spend with SMEs
- Social value
- Use of modern methods of construction
- Productivity

4. **A national construction academy:** based in the North of England, a new national centre of excellence should be set up as both a symbolic and practical measure to develop advanced post-16 construction training. It would also be a focus for promoting diversity, for example through the use of scholarships.
5. **Promoting MMC:** a presumption in favour of 'modern methods of construction' (MMC) will be introduced to all procurement from the Department for Transport, Health, Education, Ministry of Justice and Defence by 2019. This is welcome, but MMC can often be transformative on smaller, more local projects too, so government should look into how to extend this principle into guidance for councils, where it meets value-for-money criteria.

As we have explained the role that construction can play is immense. Both by helping to boost productivity in the whole economy or in helping the UK become a truly global trading nation. With such a clear opportunity it is for the industry to work closely with Government to transform our industry and make it a reality.

- i. Building Our Industrial Strategy: green paper (HMG, 2017) <https://www.gov.uk/government/consultations/building-our-industrial-strategy>
- ii. Fixing the Foundations: creating a more prosperous nation (HMG, 2015) <https://www.gov.uk/government/publications/fixing-the-foundations-creating-a-more-prosperous-nation>
- iii. <https://www.gov.uk/government/news/23-billion-investment-in-infrastructure-for-new-housing>
- iv. For more on the pipeline, see the National Infrastructure Delivery Plan 2016 to 2021 (HMG, 2016) <https://www.gov.uk/government/publications/national-infrastructure-delivery-plan-2016-to-2021>
- v. Measured in GVA (2016). UK GDP Low level aggregates data, Office for National Statistics (ONS) <https://www.ons.gov.uk/economy/grossdomesticproductgdp/datasets/ukgdpolowlevelaggregates>
- vi. JOBS02 Workforce Jobs By Industry, Office for National Statistics (ONS) <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/workforcejobsbyindustryjobs02>
- vii. <https://www.niesr.ac.uk/publications/impact-free-movement-labour-market-case-studies-hospitality-food-processing-and>
- viii. Fixing the Foundations: creating a more prosperous nation (HMG, 2015) <https://www.gov.uk/government/publications/fixing-the-foundations-creating-a-more-prosperous-nation>
- ix. See also The Northern Powerhouse: one economy, one agenda one North (HMG, 2015) <http://www.transportforthenorth.com/wp-content/uploads/A-report-on-the-Northern-Transport-Strategy-1.pdf>
- x. Ibid
- xi. <https://www.gov.uk/government/news/23-billion-investment-in-infrastructure-for-new-housing>
- xii. World Economic Forum Global Competitiveness report 2017/18 http://reports.weforum.org/pdf/gci-2017-2018/WEF_GCI_2017_2018_Profile_GBR.pdf
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The new economic modelling commissioned by Mace in this report was done by Chris Walker from WPI Strategy.

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