

INSIGHTS

Q4

THE UK'S PRODUCTIVITY PROBLEM AND HOW TO SOLVE IT

The importance of
construction in an
industrial strategy





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COO for Major Programmes & Infrastructure

Jason is responsible for Major Programmes and Infrastructure (MP&I) and is driving our goal to be the UK's leading programme manager by 2020. He has over 20 years' industry experience and leads on some of the UK's most significant projects alongside the largest global programmes. Under his leadership, MP&I has seen 43% growth over the last three years. He was CLM's programme director for the London 2012 Olympic and Paralympic Games, responsible for the delivery of the Games venues and the commercial closure of the most successful Olympics ever.

Prior to joining Mace he was CEO of Bovis Lend Lease while also holding the role of CEO of Catalyst Lend Lease.

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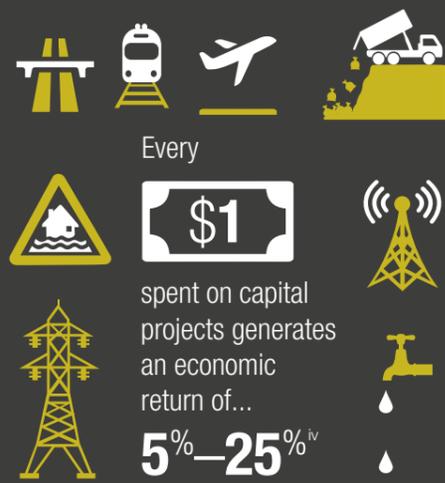
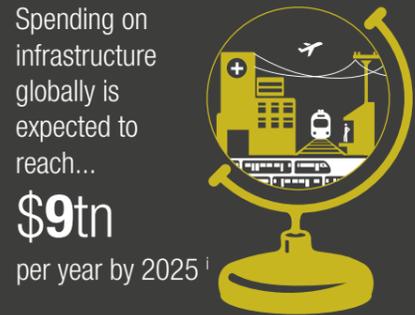
Mark Castle

Deputy COO for Construction

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 a director of Build UK.



INTRODUCTION

Recent years have seen countries around the world show an invigorated appreciation of the benefits of investing in new infrastructure, including housing. With some estimates expecting spending to reach more than \$9tn per year by 2025.ⁱ

This spending however will not fall evenly. Western Europe, for example, will not see infrastructure spending reach pre financial crisis levels until 2018.ⁱⁱ

In the United Kingdom, although some progress and increases in investment has been made, the country still lags behind many other developed nations. In the most recent Global Competitiveness Index published by the World Economic Forumⁱⁱⁱ the UK's ranking for the overall quality of infrastructure has risen modestly in the last year from 27th to 24th, showing that improvements are starting to be felt on the ground.

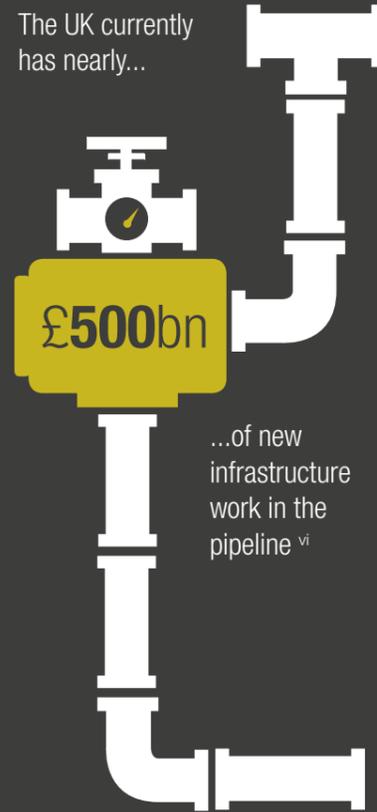
When the Prime Minister, Theresa May, took office in July 2016 she outlined her intention to create an industrial strategy that promotes regional growth across the UK and helps to tackle the UK's diminishing productivity levels. Although, details on the specifics of any industrial strategy have so far been thin on the ground, we anticipate that the Government will focus on providing the crucial inter-regional connectivity that increases opportunity, productivity and growth.

The World Economic Forum estimates that every dollar spent on a capital project (in utilities, energy, transport, waste management, flood defence, telecommunications) generates an economic return of between 5% and 25%. And our recent *National Infrastructure, Local Benefits* report showed how major regional benefits could be achieved by modest investments to boost travel times to key services. We estimate that by shaving a minute off journey times to key services outside of London could lead to an economic boost of £3.4bn to the economy^{iv}, plus the associated productivity benefits.

With such a strong evidence base for the importance of construction and infrastructure spending to the economy, it becomes ever more important that the sector charged with delivering these projects is itself as productive as it can be, so that the wider economic benefits are felt quickly and taxpayers' money goes further. As a recent Chartered Institute of Building report^v states "construction, and the wider built environment, has a major bearing on how productive we are as a nation".

At a time when the UK has a pipeline of nearly £500bn of new infrastructure and major construction work across the public and private sector,^{vi} including things like a third runway at Heathrow, a new generation of nuclear reactors and HS2, modest improvements to productivity in the industry could have a tremendous impact on the national economy. And given that the UK is exiting the European Union, polling done by Mace shows that over ten times as many people now believe it is now more important to invest in our national infrastructure.^{vii}

But more than that, productivity improvements should lead to higher wages, clients getting better value for money and it should reduce waste, be better for the environment and more efficient use of resources.



Over the last decade output per UK construction worker has remained constant while output in manufacturing has increased by more than...



Construction in the UK will require...



For nearly a decade the UK's productivity levels have lagged behind those of other nations. But the most recent release from the Office for National Statistics, showed the biggest fall in UK productivity since the financial crisis in 2008.^{viii}

It's no wonder that this issue has now bubbled up to the front of politicians' minds. During the November 2016 Autumn Statement, the Chancellor stated that: "[The UK] lags behind the US and Germany by some 30 percentage points. But we also lag France by over 20 and Italy by eight. Which means in the real world, it takes a German worker four days to produce what the UK makes in five; which means, that too many British workers work longer hours for lower pay than their counterparts."

This is a particular issue in the construction sector, where discussions about how to boost productivity has been on the cards for nearly 50 years.^{ix} While we acknowledge some of the technical problems in measuring productivity in the industry, the scale of discrepancy between construction and other sectors of the British economy is stark. Over the last decade output per UK worker has remained about constant in construction, whereas the service sector has improved just over 30% and output in manufacturing has rocketed by more than 50%.^x

And this is making a big difference to output. McKinsey estimate that making some modest improvements across all large global construction and infrastructure projects could save \$1tn a year.^{xi} In the UK, while the economic output of construction has remained fairly stable, the workforce has actually expanded, becoming more inefficient, meaning that construction will require about one million new recruits by 2022.^{xii}

With the recent call for action from Mark Farmer saying: "the prognosis for the construction industry, if action is not taken quickly, is that it will become seriously debilitated" has given the sector a reminder of the importance of tackling the issue head on, and with renewed vigour.

The number of factors which affect productivity is almost endless. A recent study done by the Construction Industry Training Board (CITB),^{xiii} found that there are more than 70 factors affecting productivity stated by volumes of academic research.

We at Mace, and in this report, consider four main factors that should be looked at to boost output and dramatically speed up delivery:

1. Real collaboration
2. Innovation
3. Skills
4. Community support

REAL COLLABORATION

In recent years ‘collaboration’ has become a common industry buzzword that somewhat masks the underlying ‘class structure’ that exists on many large projects. In our experience, the UK construction industry has developed an unequal working relationship and status between those who design and manage the project and the contractor and supply chain who then has to deliver the work.

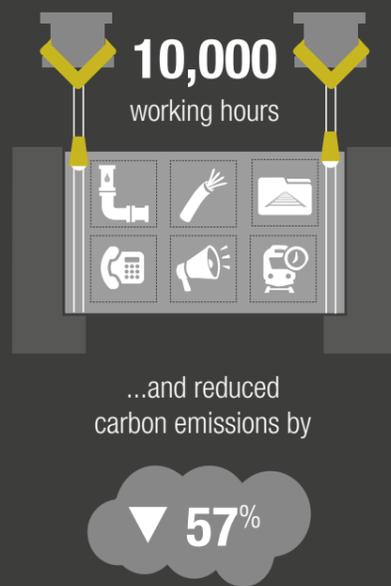
It is important that all parties involved in the delivery of larger projects are seen and treated as partners, rather than simply hirelings to execute the terms of a contract. Bringing contractors in early to advise the client and the designers of a scheme on what is actually technically possible and efficient has the potential to save a tremendous amount of money and time.

This unequal relationship between parties, means that often onerous contracts are drawn up by procurement teams, with little input from a project team, which can lead to an adversarial relationship from the beginning. According to research by McKinsey,^{xiv} most contracts penalize contractors for delays and these penalties can be draconian, even punitive. A better approach is to create contracts around a set of common interests, in partnership, with a well-defined payment structure and a balanced mix of incentives and penalties.

Starting off on the wrong foot, means problems can continue down the line, and real collaboration, which would benefit all parties, can never be achieved. For example, if programmes begin to slip, instead of working together to realign resource and priorities, sometimes parties can conceal issues until they become a problem. If deadlines are not hit or not likely to be achieved, a true collaborative environment would mean these issues are discussed openly and a solution found.

Incentives for benefit sharing, which helps both the client and the contractor, is one approach that has been piloted on some recent projects and has been shown to greatly improve the interaction between parties. Some clients allocate an element of a project budget for a pooled bonus that is paid out if the project comes in on time and on budget. A payment schedule based on achieving key milestones, rather than end-of-month payments, help motivate teams to work closer together towards mutual objectives.

The creation of a modular ‘service spine’ at Birmingham New Street station saved...



Building modular service units off-site means Mace will be able to deliver above-ground areas...



INNOVATION

“The current pace of technological change and innovation in wider society is such that unless the industry embraces this trend at scale, it will miss the greatest single opportunity to improve productivity and offset workforce shrinkage”. Those are the words of Mark Farmer, in his recent report^{xv} commissioned by the Construction Leadership Council, and we at Mace agree.

We’ve always worked with our clients and supply-chain to push the boundaries of what’s possible. Like using top-down construction – a world’s first – to reinforce the concrete core on The Shard in London, the creation of a modular ‘service spine’ at Birmingham New Street station that saved 10,000 working hours and reduced carbon emissions by 57%. But the recent calls by Government and by the Farmer Review has made it clear that as an industry we need to redouble our efforts. Here, we have chosen to focus on three innovations that could have a dramatic positive impact.

Think modular design and standardisation

Standardising and modularising components can save costs and time. India’s Reliance Industries is an excellent case study of what can be achieved through standardisation. When Reliance built a refinery in Jamnagar, it was almost an exact replica of the first one they had built, with some updates to accommodate new technologies. The decision to replicate an existing facility shaved six months off the engineering schedule. On a smaller scale, utility companies are increasingly using standard design for new substations. This also improves life-cycle costs, because spare parts can be used across assets. The use of standard designs should be considered on a case-by-case basis, taking into account local conditions or the latest technologies, to avoid using suboptimal design. However, it is typically more efficient to start with the last design and adjust, rather than to start from scratch.

Prefabrication

Through the use of Design for Manufacture and Assembly, the technology now exists to create the core, structural frame, facades, bathroom pods and MEP services within a single prefabricated module to create lean, precise and right-first-time construction. At Mace we've made significant advances in this innovative technique that can be applied to major structural components as well as key building service units, cladding and curtain wall panels and internal fittings such as bathroom pods. In particular the construction of Mechanical, Electrical and Plant (MEP) modular building service units off-site allows for pre-commissioning, certification and higher quality control. Our research and experience shows that Mace is able to deliver above ground areas at least 15% faster, with 60% less lorry movements required and 40% less materials.^{xvi} Meaning a radical boost to productivity, quality and safety.

Making the most of what you've got

Particularly in developed nations, more focus is being placed on how to maximise the current assets, as opposed to immediately looking to build new.^{xvii} And the attraction to governments is obvious. Rather than invest in more expensive new projects, governments can use emerging technology to boost utilisation rates, optimise maintenance, and varying things like speed limits to boost capacity of existing infrastructure. Recent research estimates that by using new technology in this way could achieve savings of up to \$400bn a year^{xviii} worldwide.

In the UK, Mace has been helping Highways England to undertake some of the 480 lane miles of so called 'Smart Motorway' upgrades that are planned before 2020^{xix}. Smart Motorways use the latest technology and active traffic management techniques to boost capacity and reduce delays. Data collected by Highways England on the M25 motorway^{xx}, near London, has shown up to 20% time savings, and 6,000 delayed hours saved since the introduction of the Smart Motorway technology, resulting in a significant productivity boost for commuters, with less cost to the taxpayer.

Governments worldwide could generate savings of up to...



by utilising existing infrastructure over costly new projects^{xviii}



Since the introduction of Smart Motorway Technology...



showing time savings up to...



In the UK,



By the end of the decade, the UK could see a...



decline in the construction workforce available^{xxii}

360m

older, often highly-skilled, workers set to leave the workforce by...



SKILLS

It is well documented that the productivity of the workforce is highly dependent on the level of skills that individuals possess^{xxi}. And as the OECD states, "productivity is about working smarter, rather than working harder", by investing in the people in our industry we should start to see efficiencies and new approaches to how things are delivered on the ground.

This is not simply a nice to have, it is becoming a business imperative. By the end of the decade, the UK could see a 25% decline^{xxii} in the construction workforce available, and given the fact that over half the workforce of London is comprised of migrant labour^{xxiii} and that we are exiting the European Union, the issue has become increasingly pressing. As well as this being a particular issue for the UK, it's also becoming an international priority with 360 million older, often highly-skilled, workers set to leave the global workforce by 2050.^{xxiv}

The public and the Government clearly already see this as a major issue, if we are to deliver the infrastructure and buildings required. Private polling done by Mace, shows that 84% of the public believe it is important that we train British workers to deliver our major projects rather than relying on skills from overseas, and more than four in ten people would like to see more money spent on technical training as opposed to universities.^{xxv}

We suggest that one option is for the British Government to consider using some of the funds generated by the Apprenticeship Levy, into the creation of a new degree-level qualification in 'infrastructure delivery'. We also suggest some of these funds could be used to encourage a wider pool of young people to consider a career in construction, something which is currently prohibited by the rule around the levy. But the industry cannot simply blame Government and rely on them to provide all the solutions. Research by McKinsey has found that the construction sector in particular often defers to familiar types of people and teams rather than asking where they can find the best people for each job – this needs to change.

COMMUNITY SUPPORT

A barrier to the delivery of many major schemes is the extent to which the local residents support the development.

Research has shown that local communities are more likely to support developments if they understand the potential economic benefits, for instance increased employment or more apprenticeships for young people.^{xxvi} A key example is that more residents support expansion of Heathrow airport than oppose it in nine of the ten parliamentary constituencies closest to it. Support is also increased where local people feel that they have been brought into the process earlier and properly consulted. Here future developments could learn from approaches to public and community engagement in places like the United States, France and the Netherlands.^{xxvii}

While national growth and jobs are important, given the potential opportunity impacts of infrastructure investment, it is strange that so much of the discussion is focused on the national economic impacts. This is best highlighted by a focus group participant discussing HS2: "Don't talk to me about a boost to the country's GDP from a project. I just want to know how this will affect our local community".^{xxviii}

Research supports these ideas, showing that people think that arguments around quality of life for local people (47%), local job opportunities (44%), the local environment (37%) and individual quality of life (35%) are much

more likely to boost support for development, rather than arguments around the national economy (21%).^{xxix}

The public do not trust national politicians. When asked, just 3% of the public would trust Government ministers to make the right transport infrastructure investment decisions. Significantly more people would trust either technical experts (54%) or local councillors (22%) and local MPs (19%).^{xxx} When thinking about what would boost confidence in the process of delivering infrastructure, the public also support community engagement that discusses local needs (41%) and the creation of a local infrastructure plan. Businesses also support the move to more local decision making and engagement, with the majority of businesses across every region of England supporting the devolution of decision making.

There's also another important element that should be considered – direct cash payments to local residents. In a recent poll conducted by Mace,^{xxxi} it showed that a direct cash payment of £5,000 was enough money to persuade a majority (57%) of the country to accept a large-scale infrastructure project near to where they live.

These approaches combined should dramatically speed up the process of securing local consent for major schemes, and hence reduce the amount of time and money that needs to be spent before spades can get into the ground.

A direct cash payment of...



...was enough money to persuade a majority (57%) of the UK to accept a large-scale infrastructure project near to where they live^{xxxi}



47% of people think that arguments around quality of life for local people is more likely to boost support for HS2...

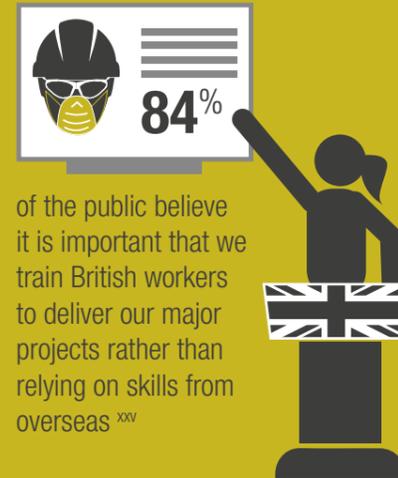
...rather than arguments around the national economy^{xxix}



54% of the public would trust technical experts to make the right decisions over transport infrastructure investment, with just...



...trusting Government ministers^{xxx}



84% of the public believe it is important that we train British workers to deliver our major projects rather than relying on skills from overseas^{xxv}

CONCLUSION

It is well accepted that the UK and the construction industry has a particular productivity problem. To tackle this will require a concerted effort from the industry and Government.

The combination of a different project relationship structure, the embrace of emerging technology, the full use of the Apprenticeship Levy and allowing schemes to incentivise local residents could have a remarkable impact on the speed, quality and cost of delivering major infrastructure and construction schemes in the UK and the world.

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