

360° view



Turner & Townsend

Next generation

Offering a series of perspectives on how we can inspire and futureproof projects and programmes.

WarnerMedia's epic move to 30 Hudson Yards

New York's newest and largest private real estate development in US history

5

Digital and the human:

remodelling universities for the future

13

Taking inspiration from the automotive industry:

why design for manufacturing and assembly must drive innovation in UK construction

19

Global thought leadership
Issue 11

making the **difference**

Foreword

We are experiencing a time of intense global change. Technological innovation is evolving at an unprecedented pace, transforming how we live and work. The world's biggest challenges, from battling climate change to accommodating population growth and conserving the earth's precious resources, are becoming ever more urgent.

Our buildings and infrastructure have both shaped and been defined by the immediate needs of society. Today we're witnessing the next stage of evolution as our built environment adapts to the needs of the next generation.

Building for the future requires imagination and compassion. Witness how universities are remodelling their campuses, new look education is not just about clever harnessing of technology, it's also about creating human-centred spaces that encourage interaction and socialisation.

For those lucky enough to be living or working in skyscrapers, these offer a lot more than wow factor – flexible space that is sustainable, efficiently constructed and can be easily adapted for changing needs.

The most forward-thinking leaders are taking the macro approach, reshaping entire cities or even countries. Singapore's stratospheric rise to a world-leading smart city is a masterclass in how to fuse business innovation and public sector initiatives to make life easier for citizens and businesses.

But to make the most of these exciting opportunities, construction needs to embrace next generation thinking, from adopting automotive manufacturing principles to encouraging a culture of healthy discussion and debate. Standardised data and strong governance of projects will be vital for the survival of the fittest. Businesses also need to become more agile and resilient in fluctuating commercial and geopolitical markets.

So who will lead us into this bright future, and how do they see it evolving? Some of Turner & Townsend's young leaders offer their thoughts on what our next generation workforce might look like, and, of course, the game-changing technology that will take us to the next level.

We hope that you enjoy this latest issue of **360°view**.

James Dand

Chief Operating Officer, Turner & Townsend



Contents



Contributors



Robin Sweasey

Title: Director

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Robin has delivered a diversity of complex projects in the education sector. Projects have involved new-build and refurbishment combinations within integrated master planned precincts in the context of fully operational campuses.

 Page 13



Guy Beaumont

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Guy enhances performance of programmes through the application of data, analytics and technology solutions that connect the physical work to the digital environment. The goal is to improve outcomes through innovation.

 Page 19



Lisa Chong

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Lisa is a cost management professional with over 22 years' experience supporting major clients. She oversees the hi-tech and manufacturing sector, enabling us to strengthen our market presence in Southeast Asia.

 Page 23



Mark Wainwright

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As global head of mining and metals, Mark grows the business through key accounts and major programmes, develops services in line with market needs and delivers value to our clients.

 Page 29



Nima Aase

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As Director of the Swedish business, Nima's focus is growing the business, providing service excellence to our international clients and establishing us as leading consultants in the local market.

 Page 33



Haidee Gonsalves

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As Project Director in the hi-tech and manufacturing team, Haidee is commercial lead for the remote team, supporting quantity surveyors on site for a key data centre client.

 Page 35



Client interview

WarnerMedia's epic move to **30 Hudson Yards**

Interview with

Thomas Santiago

Senior Vice President,
WarnerMedia Real Estate



As 30 Hudson Yards nears completion, senior vice president for real estate Tom Santiago looks back at the decisions and milestones which set up and kept the project on track for success, passing on the lessons he has learned to the next generation of real estate leaders.

Perched on Manhattan's west side, Hudson Yards is New York's newest neighbourhood and the largest private real estate development in US history. Its vibrant blend of work and leisure space will eventually be home to 16 skyscrapers.

An early star of this epic production is 30 Hudson Yards; the tilting 102-storey tower that is the city's second tallest office building. The tower is the new headquarters of WarnerMedia, which is sweeping together its diverse brands, including HBO, CNN, TNT, TBS, and Warner Bros., from seven locations across the city.

Fittingly for a media company, the story of 30 Hudson Yards has the drama and scale of a classic blockbuster: it was built on a platform over a rail yard with 30 live rail tracks, it boasts New York's highest outdoor observation deck, and 10,000 people were working on site at peak.

But, the tale of how WarnerMedia is managing the migration of its thousands of staff to the new 1.5 million sq ft headquarters is equally compelling.

"It's more art than science," says Tom Santiago, senior vice president for WarnerMedia real estate. "You need all the technical proficiency, best-in-class processes and project management systems, which we certainly had, but that's not enough. You have to run these programmes like a business.

"It's what differentiates successful megaprojects from unsuccessful ones."

Santiago joined the company in 2011 to develop the company's real estate function and to oversee the development of WarnerMedia's strategy for New York, along with the company's other major hubs in London, Santiago, the West Coast and Atlanta.

At the time, WarnerMedia had leases on 75 percent of its New York buildings, many were set to expire in 2018, and all were below market value. The older buildings in the portfolio lacked flexibility and would be difficult to modernise. But finding suitable new space would also be challenging, as land prices were soaring and rents were increasing.

According to Santiago, there was no "secret plan" from the top of the company to bring the brands together under one roof. The decision evolved from many months of evaluation and consultation with management and employees.

"We were committed to a process of just following the facts and the numbers, and bringing as many of our people along as possible...and being as inclusive as we could. With no overall mandate other than to run an intelligent and open process, the work ultimately led us to where it led us," he says.



30 Hudson Yards facts

2013-2019
Project duration

1,268
Feet tall

102
Storeys

90,000+
Tonnes of steel in the shell

2.6 million
Square feet of commercial
space

LEED Gold
Green building credentials

Ownership:

WarnerMedia has signed an agreement with an affiliate of related companies to sell (and leaseback) its space at 30 Hudson Yards for approximately US\$2.2bn.

Many options were considered over an 18-month period, but 30 Hudson Yards became an increasingly attractive frontrunner.

“It presented a “blank canvas”, on which the company could stamp its identity and build from scratch.”

WarnerMedia was also able to achieve economies of scale in the tower – reducing its total commercial space in the city by 35 percent.

As well as bringing in outside experts, Santiago says that a governance programme comprising an Advisory Board along with several working groups, emerged as a best practice, and proved to be critical to the success of the overall programme. More than 200 staff eventually had a role, representing a diverse range of functions, offering input on everything from space design to staff mobilisation.

“We wanted to ensure that there wasn’t just a small handful of people sitting in a room at the corporate offices, making a whole bunch of decisions alone. We consciously made the difficult decision to cast a wider net, which made for a longer process, but in the end was more effective and reflective of the culture,” Santiago says.

He is proud that many employees whom, with no prior experience of real estate and design and

About Hudson Yards

Hudson Yards is the largest private real estate development in US history. The development includes a 1 million sq ft retail centre, with more than 100 shops and more than five acres of public plazas, gardens and groves.

Cultural projects at Hudson Yards include the Vessel, Thomas Heatherwick's interactive sculptural staircase, and the Shed, a unique theatre and exhibition space with a telescopic expanding shell.

Anchoring the East side of the development are the tilting 'dancing partner' towers of 30 and 10 Hudson

Yards, designed by Kohn Pedersen Fox. 30 Hudson Yards is the largest tower in the development and the third tallest tower in New York, behind the World Trade Center and 432 Park Avenue. It also boasts the 1,100 ft high outdoor observation deck – the highest in the western hemisphere.

The skyscraper is built on a platform over the Long Island Rail Road storage yard. The land created by this platform totals 11 million square feet.

construction work, now feel genuinely involved with the results.

"Many colleagues feel this is as much their project as anyone's, and that they genuinely contributed. They're invested in this, not only from a business perspective, but also emotionally," he adds.

If timing is everything in drama, it is just as critical in the scheduling of the construction timeline. At 30 Hudson Yards, the shell and core construction was all the more complicated because of the live rail yard on the platform below. Contractors were limited to working in tight windows for only certain parts of the week.

"They had to mobilise, work weekends, then demobilise afterwards before the next regular week. This happened dozens and dozens of times," remembers Santiago.

The interior fit-out of 30 Hudson Yards is one of the largest that New York has ever seen. To ensure smooth running, WarnerMedia worked with Turner & Townsend, which was monitoring the exterior and interior programmes, to define a series of critical milestones. Certain floors, such as CNN's newsroom, needed much longer lead times to install the complex digital broadcast technology. As a result, the company negotiated earlier access to these floors, with fit-out starting more than a year before the steel had been fixed at the top of the tower.

"We wanted to get the harder work started earlier, and then some of the more general office work could start."

Santiago says the interior reflects the location which, between Chelsea and Hell's Kitchen, is more edgy and gritty than Park Avenue or Wall Street. The company steered away from the opulent marble and gilded interiors favoured by law or finance firms, favouring finishes that are high quality, but "understated".

“As soon as you walk into our space, we wanted our digital branding, not the architecture, to communicate that you were in the home of a 21st century media company.”

Guests will also notice the smart technology running the building, from the "turbo-charged" Wi-Fi, to the smart lighting sensors, or lifts that, triggered by your security pass, know which floor to deliver you to.

Santiago adds that 3D building information modelling (BIM), essential for coordinating the trades during fit-out phase, will now play an important part of operations and maintenance.

"It's a building run by software," Santiago comments, adding that the design has allowed plenty of bandwidth to install new, as yet unknown technologies.

As it migrates each business across the city, WarnerMedia is also shifting its working culture: the number of closed-space offices in New York are going down from 2,000 to 800, and 83 percent of its space will be open, versus 55 percent today. As a result, roughly a quarter of staff will find themselves in shared working areas for the first time, but in exchange they will now have superior amenities and a wide diversity of spaces.

"We've done a lot of work listening to employees, and have introduced the notion that personal workspace is much more distributed at Hudson Yards, instead of just being about your assigned seat. We've also been emphasising light and airiness of the new building, and the choice of space, and what they might gain."

He adds that the final office moves should be completed in summer 2019, as WarnerMedia employees embrace their new culture and new home.

Q&A

Tomorrow's leaders, tomorrow's world

Drones, digital disruption and data analytics are transforming the way construction responds to some of the planet's biggest challenges, from scarcity of resources to climate change.

But what does the next generation of professionals think about this rapidly evolving landscape? Five of Turner & Townsend's future leaders give us their take on everything from the skills gap to 3D printing, setting out their priorities for driving change.





Imran Hussain

Principal Consultant
Santiago

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Over 13 years in cost consultancy Imran has experienced first-hand a number of changes in technology and systems. He has worked for Turner & Townsend since 2014 in the UK, Australia and now Chile, becoming a principal consultant in 2017.

Q In the future, which technology do you feel will be most disruptive to your role and why?

Drones have already started to revolutionise the way progress is measured on site. In addition, the need for intelligent software that automates the traditional quantity surveyor role, by measuring quantities, controlling design changes and variations directly from 3D models, will grow.

Q How would you sell a role in the construction industry to the next generation?

If you want to join one of the most booming industries in the world, have an ambition to develop your career and travel, while working on some of the most exciting projects and programmes around the globe...then this industry might just be for you!

Q What is the one thing you think the construction industry should adopt to help minimise its environmental impact?

Adopting a circular approach, with an emphasis on designing buildings that interact with the natural environment, will help reduce our environmental impact. This includes the usage of locally sourced materials in their natural form, which after the lifecycle of the building can easily be decommissioned, reissued, or left to decompose naturally.

Saravanan Pillay



Associate Director
Johannesburg

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Saravanan is the project management office (PMO) lead for several programmes across Africa. With nine years' industry experience, he joined Turner & Townsend in 2016, attracted by the company's global footprint and client base.

Q In the future, which technology do you feel will be most disruptive to your role and why?

For me, it's artificial intelligence (AI) and data analytics. These are already disrupting projects, programmes and portfolio management – and that will continue. The information-gathering capabilities of AI can help reduce human error and biases when it comes to creating budgets, predicting cost overruns, and developing schedules. This allows project professionals to devote more time to ensuring that projects remain aligned with organisational goals.

Q What key skills do you believe the next generation of construction professionals will require?

Future construction professionals will need to be agile, resilient and dynamic, as roles are evolving quickly. The role of a project manager for example is growing to one of a strategic advisor, innovator, communicator, big thinker, and versatile manager.

Q How would you sell a role in the construction industry to the next generation?

To attract the next generation, we need to create a culture that truly values collaboration, teamwork and social opportunities. I believe it's important for us to build corporate communities and sustainable cultural structures that inspire and engage employees in the long term. Plus, construction is a built form that lives even beyond us: who wouldn't want their name to be carved in history or tell their grandchildren proudly 'I built that!'.

Q What's the best piece of advice you have received from someone you admire?

Follow your heart, follow your passion, be one hundred percent committed and happy with what you are doing, and you will achieve what you want!

Q What is the one thing you think the construction industry should adopt to help minimise its environmental impact?

I believe that 3D printing for materials and equipment on site would make a big difference. It has been proven to reduce material usage and generate less waste compared to traditional methodologies. 3D printing reduces labour turnover, saves on energy consumption and can use eco-friendly materials.

Malini Sudhakar



Director
Bangalore

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A trained architect with an MSc in construction project management, Malini worked for ten years in the UK before relocating to India. In May 2019, she was promoted to director, becoming the first woman to sit on our board in India.

Q In your region, what do you think is the biggest challenge our clients or industry face?

The lack of a skilled workforce and certified professionals is one of the biggest challenges in India. The literacy level among our workers is low, with most being illiterate, having not had basic schooling. Training on site around 'life skills' to cultivate personal and communication skills, literacy levels, environmental awareness and digital knowledge is a good start. We tried such a programme on one of our projects and it was a huge hit.

Kaarin Kalavus



Associate Director

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Kaarin is a digital construction specialist who helps clients develop and implement digital data strategies. One of her current projects is the Abu Dhabi Midfield Terminal where she is working on data and systems that will inform asset management in the future.

Q What key skills do you believe the next generation of construction professionals will require?

Now more than ever we need to be open to change and adapt. The technological race is on and a lot of development is happening in all areas of the construction sector. The next generation needs to embrace change to stay relevant and ahead of the game.

Q In your region, what do you think is the biggest challenge our clients or industry face?

In the Middle East, one of the key challenges for construction projects is the skills shortage. The availability of skilled professionals to deliver mega projects to the expected time and quality is in scarce supply. However, new projects have been announced and there remains optimism and ambition for the region and its construction sector.

Q What is the one thing you think the construction industry should adopt to help minimise its environmental impact?

The mindset of 'building for a lifetime' rather than applying quick fixes, using low quality and cheap materials. Poor quality materials typically have a short lifespan; they've generally been sourced from unsupported processes and are difficult to recycle and reuse, which means that they put a huge strain on the environment.

Luke Vanner



Senior Product Owner

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Luke joined Turner & Townsend on its graduate programme three years ago and is now part of the digital transformation team. His role sees him working with both cost managers and software developers to create in-house apps.

Q In the future, which technology do you feel will be most disruptive to your role and why?

It's hard to pinpoint a single technology. As a product owner, my role is to be the interface between people and technology, so basically any technological change will be a good thing!

Q In your region, what do you think is the biggest challenge our clients or industry face?

Since the last recession in the UK growth has been low, public debt remains high, and interest rates remain near zero. This has created a macroeconomic climate where investment in large-scale construction projects is likely to be severely limited if we have another recession. To reduce the impact this will have, we can look to encourage alliancing across the industry to provide great efficiency in delivery, making investment in construction a more attractive offer.

Q What is the emerging trend in your industry specialism and how are you responding to this?

We're employing best practice agile software development to help us bring our users, software engineers and technical infrastructure closer together. This gives us the ability to build and run all our products from a single internal development team, which isn't dissimilar to an owner-operator model in construction.



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Digital and the human: remodelling universities for the future

Robin Sweasey
Director, Turner & Townsend

Universities are transforming their campuses to maximise the student experience. Their built-form strategy needs to integrate cutting-edge technology with human-centric focus.

A dazzling spectacle confronts visitors stepping into the atrium at Queensland University of Technology's (QUT) brand new Peter Coaldrake Education Precinct at its Kelvin Grove campus: a five-metre diameter digital sphere, suspended from the ceiling and displaying fully digital content that interacts with a large digital HD screen on the adjacent stairwell wall.

The sphere is symbolic of the transformation that many universities are undergoing in Australia as they seek to attract students and prestigious research grants, as well as increase their rankings in global tertiary tables. Universities are no longer just centres of teaching and research, but public campuses, with a diverse mix of facilities in constant dialogue with industry and the broader community.

New generation learning

“Tertiary institutions are remodelling themselves for the new generation of digital adults.”

It is now common that students will work from at least three devices: a mobile phone, a tablet and a laptop. This is giving rise to new methods of flexible learning and collaboration, replacing traditional lecturer-centric teaching methods.

The traditional lecture theatre, while not completely disappearing, is becoming far less common. In its place, flat interactive learning spaces with multiple projection screens are becoming the norm. Students are able to participate by “throwing” digital content from their devices onto mobile screens. Campuses are also introducing smart cameras that follow lecturers around,

livestreaming their presentations to national and international audiences.

Universities are also being confronted by the deteriorating state of mental health of this digitally driven and social media-consumed generation. Recent years have seen a marked rise in stress and anxiety levels of young people, with the isolating effect of technology impacting increasing numbers of students in negative ways.

Human-centric design

To combat this, campus master plans are seeking to create urban precincts that enable a fully human-centric experience, by creating spaces that maximise social interaction and a sense of overall physical and mental well-being. Campuses are becoming destinations in their own right, with retail outlets, heritage precincts, coffee shops, theatres and restaurants opening up to the broader community as well as students and staff. They are simply enjoyable places at which to spend time.

Transforming universities into ‘cities within cities’ is a complex undertaking. Live campuses are restrictive environments in which to undertake major redevelopments, with more stakeholders and industry partners to consult with than ever before.

Ambitious transformation projects can risk spiralling out of control if not matched with an agile and proactive project management approach. This is because the complexity and duration of the undertaking inherently involves uncertainty: not everything can be known at the outset, particularly when redevelopment programmes can require more than four years to deliver.





A programme needs rigorous governance, but should be given the breathing space to flex and shift as circumstances change.

Traditional procurement models are often not sufficiently flexible to adequately absorb this uncertainty. This is because they tend not to allow the input at an early enough stage of all the parties that are best placed to accommodate or mitigate risks.

Sophisticated risk-sharing and an agile approach

By contrast, non-traditional procurement methods that allow the early involvement of experienced contractors, managed within a collaborative and high-performing project culture, allow more sophisticated risk-sharing between clients, suppliers, consultants and contractors. This approach puts clients in the driving seat. They have increased ability to control the scope and quality of the programme, with a better understanding of real-time market pricing and within a collaborative programme framework.

“The benefits can be felt from the beginning as subcontractors and suppliers are involved in the earlier design phases.”

Involving the construction supply chain early can mitigate against costly errors and quality issues that may have to be rectified later. This is particularly important when deciding on the technical infrastructure: technology evolves so fast that in four to five years – the not-uncommon length of a complex transformation project – the technological solution achieved at the end of a project may not even have existed at the start.

Balancing fluidity with the demands of the delivery schedule and budget is essential to a sophisticated and agile management approach. Indeed, a key aspect of managing stakeholder expectations is in ensuring that the project governance body understands from the outset that time and cost contingency provisions should be adjustable as the risk profile of the project evolves, and successfully



delivered against these moving targets.

This is not an easy task: at the early stages of a large programme there is a risk that expectations are somewhat 'black and white'. This is because, owing to the unpredictable nature of the work, the complexity and challenges are not immediately apparent. Indeed, problems don't often emerge until some way into the programme, after considerable time has elapsed.

An important factor in successful project delivery is in holding and managing stakeholder expectations. To do this, programme managers need to have highly developed and subtle communications skills, continuing the dialogue with the governance body so that significant changes and impacts can be absorbed without negatively impacting their perception of the project's success.

Take the stunning sphere that hangs in the atrium at QUT. The university knew that it wanted a signature digital visualisation installation from the outset, but did not fully resolve the solution until after the project started construction on site. The programme, combined with a collaborative mindset across the project team, allowed it to do this with minimal complication and

ultimately no impact on the construction critical path, although funds were sourced to accommodate additional service-related elements necessary to accommodate the sphere in the base building, which had been designed well before the ultimate form of the visualisation was known.

Embracing technology

As the education sector continues to implement increasingly complex projects, it should also be mirroring other sectors in embedding the use of building information modelling (BIM), not only into managing projects from the initial briefing stages, but also in managing the maintenance of its buildings. BIM can be instrumental in unlocking a host of efficiencies, not only in project management and construction delivery, but also in developing a sophisticated understanding of how campus building portfolios are performing operationally.

Tertiary education clients understand very well how they must adapt their academic environments to be more flexible, agile and responsive to technology. Their campus strategies must be the same.

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Client interview

Afrox on risk: thriving in uncertain times in Africa

Risk management is a key imperative for businesses to remain robust and sustainable in today's volatile and competitive economic environment, says African Oxygen Limited (Afrox) Managing Director, Schalk Venter.



Schalk Venter
Managing
Director, Afrox

"Companies that used to rely solely on forecasts and projections have learned to respond in a far more agile way to market changes; now, they have the added focus to proactively manage risk to succeed.

"One of the main threats to businesses today is unidentified risk. The need to focus on identifying, understanding and managing risks before they impact the business has become a core management responsibility," says Venter.

Venter leads a business in the toughest of environments – the volatile and unstable emerging markets of Africa.

This year, Afrox celebrates 92 years in business, operating in eight African countries and employing more than 2,000 staff. The company manages five more African operations on behalf of its parent, Linde plc; a global player with 80,000 employees in over 100 countries, all working together for a business close to US\$30bn in revenue and US\$90bn in market capitalisation.

Afrox's customer portfolio is a litmus of South Africa's business and economic health. The company supplies heavy and light industry, steel producers, mining, fabrication, construction, automotive, agriculture, healthcare and hospitality, to name a few markets.

JSE-listed Afrox is operationally strong, structurally sound and well positioned to manage risk and confidently seize the opportunities as they arise.

"Risk and the management of risk is no stranger to us," confirms Venter. "Afrox has successfully managed risk as part of good business and governance for decades in an environment that is beset with constant ups and downs, be it on the economic or political front." In 2015/16, Afrox successfully underwent a total restructure to align operating costs, and risks with the economic realities of continued low growth in its power zone of South Africa.

"Executive management decided a natural and prudent progression to growing our business would be to engage a fresh set of eyes, with new and innovative ideas around the very real risks our industry and markets face today. Turner & Townsend brought the fresh perspective we were looking for," confirms Venter.



“The ability to recognise and manage risk enables leaders to act decisively regarding critical business decisions.”

Objective assessment of the level and nature of risks facing a business provides a high level of confidence for leaders to deal with risk effectively.

“This is where Turner & Townsend has added significant value for Afrox,” says Venter. “Through implementation of an effective risk management process, we can now identify and assess potential problems before they occur so that mitigation activities can be planned and implemented.”

Afrox’s risk awareness has steadily matured, reflecting management’s commitment to evolving risk management. Risk awareness is not just “another initiative”; it is embedded in the day-to-day management of operations, says Venter. “But transforming the culture to a risk-aware culture requires continuous engagement and close interaction between the Turner & Townsend team and the various Afrox sites and divisions in order to understand the risks we face on a daily basis,” says Venter.

Companies can better understand the true risk underlying their exposure when developing their operational strategies via risk intelligence management and the integration of the risk management perspectives throughout the business; this ultimately leads to quality decisions, sustainable solutions and value for all stakeholders, says Afrox’s Managing Director.

Today, businesses face constantly changing risks including security of supply, institutional bad debt,

regulatory risk, increasing competition, potential reputational damage, business interruption, commodity and price risk, cash flow and liquidity risks, industrial action and political risk.

“While external risks may not be within management’s direct control, the ability to understand them, mitigate and react quickly is.”

Without this ability, a business cannot possibly define its objectives for the future with any certainty. In turn, if a management team sets objectives without taking the risks into consideration, chances are the leadership will be blindsided, and lose control and direction when these risks materialise, says Venter.

He adds: “Afrox undertook a Business Continuity Management (BCM) project for our disaster recovery processes. This enables us to build organisational resilience by proactively identifying and planning to minimise the impact of risks that could affect our objectives, operations and infrastructure. The BCM process, developed with Turner & Townsend, provides Afrox the capability to ensure continuity of operations and activities following any disruptive event.”

As a leading business, Afrox understands the social, economic and governance environment has deteriorated, and the decline is likely to continue. “We believe that in such uncertain times risk activism is critical for success, and leading and guiding the business and ensuring risk management is an integrated part of our strategic and operational thinking and implementation,” confirms Venter.

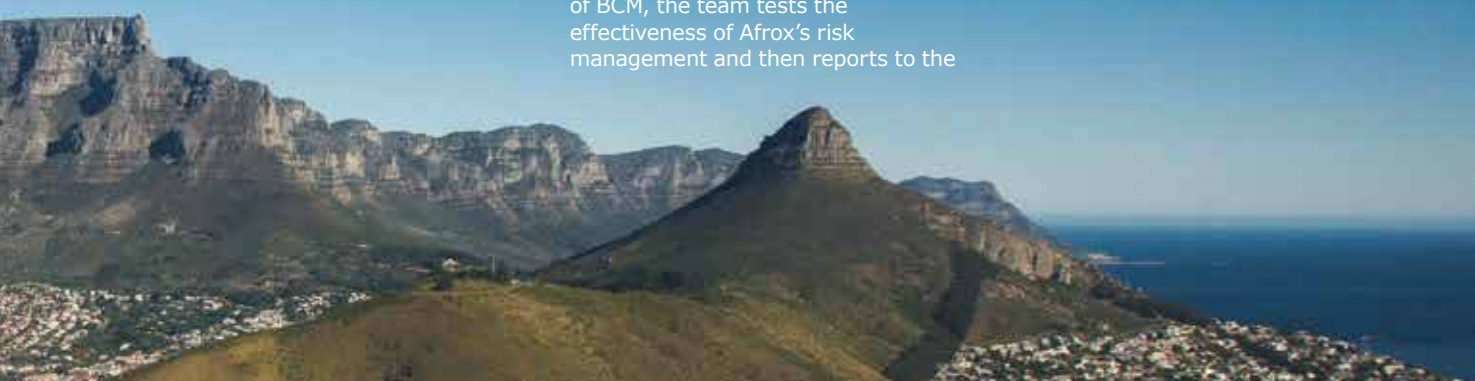
To ensure ongoing robustness of BCM, the team tests the effectiveness of Afrox’s risk management and then reports to the

Executive, Audit Committee and the board. “BCM is a reactive process in the risk management cycle and outlines the actions to take in a crisis to protect life, property and to contain the event,” says Venter.

He adds: “Afrox’s BCM framework is essential in fortifying the critical business process. The framework informs the response to, and recovery from, disruptive incidents. We have incorporated material risks that could seriously impact the execution of the company’s strategy, and its value creation goals, into the decision-making process. Risks are then elevated to the appropriate decision-makers and ultimately to the board when they require strategic action.”

In 2018, Afrox rolled out a full BCM programme across South Africa, developing and testing 28 Business Continuity Plans, including digital and cyber security, within its business units and sites.

“Across the board Afrox is now a fit-for-purpose, sustainable business, and shareholder expectations as to our ongoing performance are at their highest for nearly a decade.”





Taking inspiration from the automotive industry:

why design for manufacturing and assembly must drive innovation in UK construction

Guy Beaumont, Director, Turner & Townsend

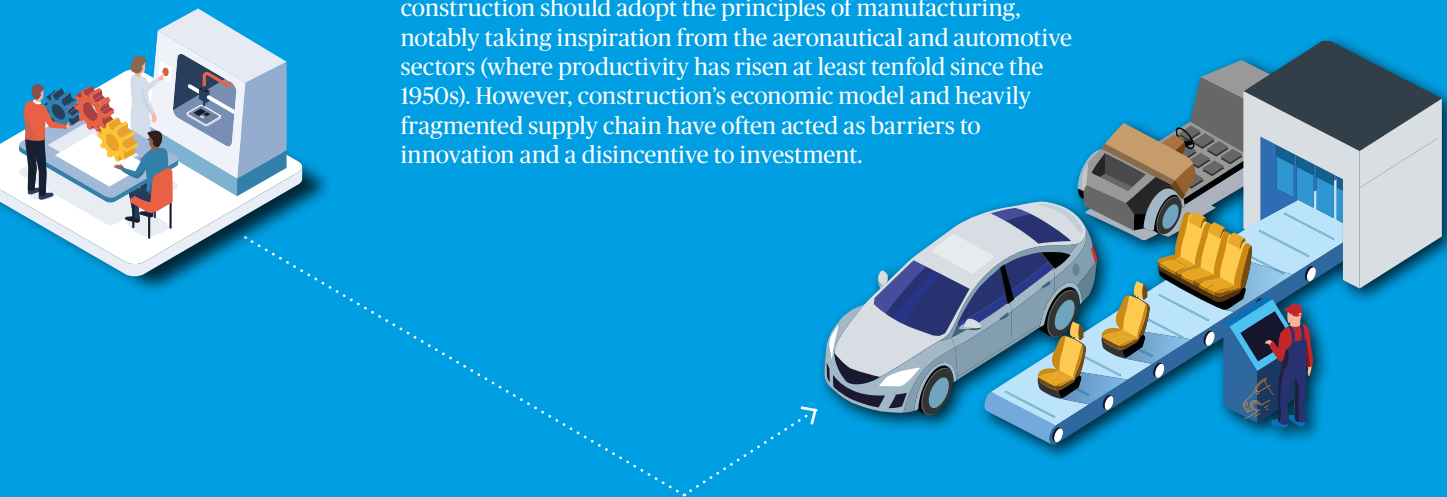
- Design for manufacture and assembly (DfMA) uses principles from the automotive industry, where products (in this case-buildings) are designed and created from standardised “platforms” and components.
- A recent desktop study by Turner & Townsend calculated DfMA could bring capital cost savings of between 18 percent and 45 percent on the structural steel frame and floor building elements, when benchmarked against traditional methods.
- DfMA can unlock many other benefits including: slashing project delivery schedules, cutting waste and raising overall productivity and build quality.
- DfMA could disrupt traditional supply chains models and will change recruitment and training requirements, but a collective change in industry mindset is required, if industry is to reap the full benefits.

A design for manufacturing and assembly led approach could be a game changer the UK needs to slash costs and delivery times and ramp up productivity. But industry needs to evolve its business models and change its mindset to reap the full rewards.

According to a recent McKinsey report, the UK's construction productivity levels have been in the doldrums for the past 20 years.¹

In the UK, the construction industry is feeling this challenge particularly keenly as it grapples with the urgent need to deliver a pipeline of major infrastructure, commercial and housing projects. This is set against a backdrop of an ageing workforce, and the potential loss of many valuable migrant workers post-Brexit.

For decades, industry reformers have been advocating that construction should adopt the principles of manufacturing, notably taking inspiration from the aeronautical and automotive sectors (where productivity has risen at least tenfold since the 1950s). However, construction's economic model and heavily fragmented supply chain have often acted as barriers to innovation and a disincentive to investment.



¹ McKinsey & Company, *Imagining construction's digital future*, June 2016
www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/imagining-constructions-digital-future
 (accessed 25.06.2019)



The rise of platforms



Now, the concept of using “platforms” to enable design for manufacturing and assembly (DfMA), in the same way that cars are created and customised through a series of standardised components, is finally beginning to gain traction. The concept has been given extra impetus with the backing of the Infrastructure and Projects Authority for a wide variety of public sector applications including prisons, schools and hospitals. The government’s stated preference for offsite methods on public sector projects from 2019 onwards is an additional driver.

Turner & Townsend has been working with technically led design consultancy Bryden Wood to explore the benefits, as well as the practical challenges, of bringing the DfMA approach to market.

Our recent desktop study calculated DfMA could bring capital cost savings of between 18 percent and 45 percent on the structural steel frame and floor building elements, when benchmarked against traditional methods.

Efficiencies were gained at every stage of the process: in the factory,

where less raw material is needed and designs can be simplified and streamlined for manufacture; at delivery phase as the components can be packed, stored and transported more efficiently. On site, where a comparably smaller workforce is needed, many trades can be replaced by multiskilled workers trained in assembly techniques.

“Construction is also demonstrably faster and precision-made parts dramatically reduce waste compared to traditional projects.”

Early adopters are already reaping the rewards. For example, at Circle Hospital in Reading, where 79 percent of components were standardised, the schedule was reduced by 20 percent and 28 percent cost savings were achieved. For the EcoCanopy children’s centres, Bryden Wood’s kit of parts for the primary schools’ market, 90 percent of work was carried out offsite, which

contributed to a 50 percent reduction in the overall programme. The costs were also 40 percent lower, compared to traditional methods.²

GlaxoSmithKline (GSK) has also been using this approach for delivering new facilities, with the pharmaceutical giant achieving an impressive 60 percent reduction in programme and cutting the number of on-site operatives by 75 percent. Ex-Ghurkhas formed a major part of the GSK delivery team. Specially trained in assembly, they achieved double the productivity rates of traditional site labour.

This is tangible evidence of how DfMA can be used to attract a new and more diverse workforce, addressing the skills gap, while improving productivity.

As it evolves, DfMA will be the key to unlocking benefits from many other innovations. It could provide the design and delivery ecosystem within which algorithmic design, building information modelling (BIM) and digital control, augmented reality, assembly robots and 3D printing can further hone improvements in productivity.

New operating model

But if DfMA is to succeed in construction, the sector needs to reinvent its traditional operating model, which is still dominated by specialists working in silos, designing bespoke projects. Traditional contracting forces subcontractors to hold disproportionate amounts of risk, while the layered supply chain structures inhibit knowledge and information flow.

The new ways of operating should be more collaborative, with integrated design teams working from standard BIM libraries. They should also be less hierarchical, with clients able to readily access the specialist knowledge of the lower supply chain tiers. Contracts should incorporate clear data and information requirements and should be managed in a common data environment.

Other behaviours will also have to change: in order to maximise economies of scale, there must be industry-wide agreement to adopt standard platforms. Meanwhile, on individual projects the design must be fixed early so that parts can be ordered in advance, without any break in the process. In general, industry will have to take a longer-term view, rather than focusing on short-term projects.

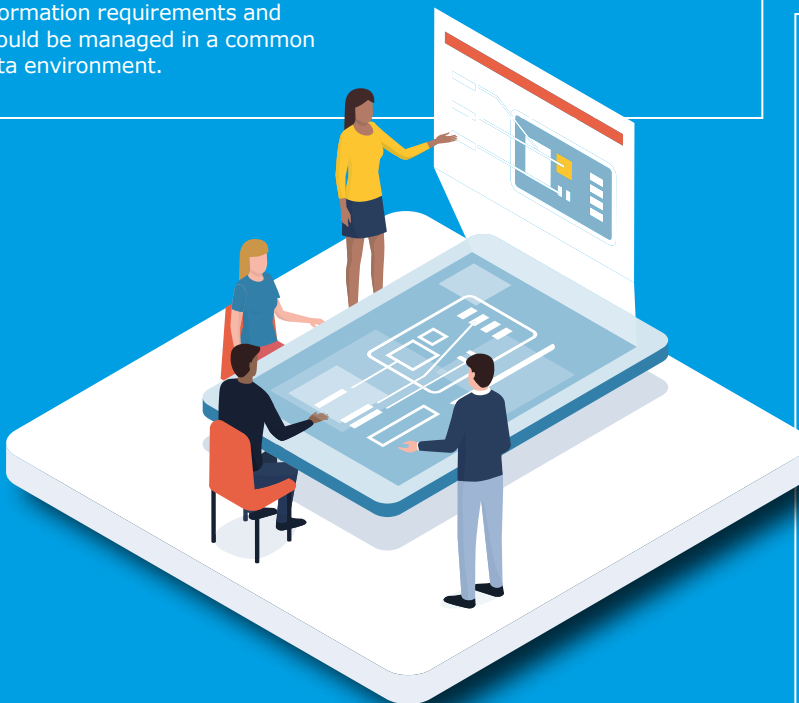
These caveats aside, DfMA could be a game changer for the UK construction industry, enhancing productivity across the entire asset lifecycle – from concept design, through delivery, operation to asset termination.



A collective change in mindset

To achieve this transition, a collective change in mindset is required. Not only will the industry have to rethink how it leads projects and apportions risk, but it will also have to reshape its training and education strategy, gearing up for a generation of multiskilled technicians. Clients will need to commit to a pipeline of -driven projects, and contractors will also have to work more openly and transparently.

The adoption of DfMA could be incremental, or it could happen faster if more disruptors enter the sector. But there is no doubt that a more process-driven industry is here to stay. Those organisations that adapt to it early, will be leading the vanguard for the next generation of building.



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Market focus

Singapore's smart city strategy:

can the construction industry keep up?

Lisa Chong, Director, Turner & Townsend



Singapore's vibrant tech-led economy is a magnet for multinationals and home to some of the region's most exciting new projects. But to maintain construction momentum, local contractors urgently need to embrace smarter ways of working.

Since gaining independence from Malaysia in 1965, Singapore has been catapulted from a fishing village into one of the world's most successful economies.

Constrained for space and with limited resources, the government is calling on engineers to tackle some of the island's most pressing challenges, such as the goal of becoming self-sufficient in water production, creating more efficient transport routes through multiple-tier vertical transport corridors or building giant underground substations to service the power networks.

The Singapore government is ahead of many other countries in its construction strategy – it has been mandating that submissions for

regulatory planning approval must be filed via 3D building information modelling (BIM) since 2015. Quite rightly, the government sees BIM as the flagship technology that underpins its status as a leading smart nation.

Government planes have also been flying across Singapore with laser scanners, creating a 3D digital model of the entire island, enabling digital master planning that is integrated with BIM.

A growing number of multinationals are using Singapore as a springboard into the region, including British pharmaceutical giant GlaxoSmithKline (GSK) who officially opened its Asia headquarters in Singapore in 2018. Another example is Facebook, who is building a SGD\$1.4bn data centre, its first in the Asian market.

The new projects, together with public sector investment, are expected to create thousands of construction-related jobs in Singapore, but this poses a challenge for the local construction market – where traditional procurement and contracting approaches are not suited to the delivery of such precision-built facilities.

To address the labour challenge, the country's Building Construction Authority (BCA) is exploring ways of increasing productivity through design for manufacture and assembly (DfMA) techniques for builders to complete projects faster and to a higher quality. The Singapore government is also looking to generate lead demand in both private and public sector with new frameworks such as Productivity Gateway Framework (PGF) and Building Innovation Panel (BIP) for continual support in innovation.

“World-class projects aside, there is still resistance to modern ways of working on many Singapore sites, with some organisations effectively operating in a pre-digital world.”

Many are paying lip service to BIM, creating 3D models that still lack interoperability. The majority of contracts are still traditional lump sum. This creates a hierarchical structure that discourages collaborative working and is poorly suited to the precision-built facilities



required by the world's leading tech companies.

The widening cultural gulf within Singapore's construction sector risks creating a two-tier system: blue-chip clients and government will soar ahead; local contractors, unable to keep pace with the technological change, will lack the technical capability and expertise to compensate for their inefficiencies.

Singapore has reached a crossroads in its development: the increase in construction activity and the looming labour crisis could be the catalyst that this country needs to take its construction sector to the next level. Local contractors must seize this opportunity to embrace change, or fall behind, damping down Singapore's potential for growth.

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How Singapore is building a smart nation:

Drones for public health

Singapore is using drones to survey potential hotspots for dengue fever, a mosquito-spread illness that can spread fast through densely populated areas in warm climates. Drones are conducting systematic checks on hard-to-reach mosquito-breeding habitats, such as roof gutters at height.

Transport on demand

The country is at the forefront of pioneering driverless vehicles. Trials are underway to road-test autonomous shuttles that visitors can hail from their smartphones.

Citizen apps

The **OneService App** provides a convenient way for citizens to report problems or municipal issues without having to track down the relevant agency.

Smart planning and urban design: The **Virtual Singapore** app allows scientists and urban planners to run simulations through a data-rich, 3D model of the country at the touch of a button. For instance, the planner can use the app to assess the solar potential of certain buildings through simulated placement of solar panels. It can also be used to develop solutions to improve urban accessibility.



Client interview

Driving the future of Australia's infrastructure: **Sydney Metro**

Interview with

Peter Hynd

Acting Project Director,
Sydney Metro Northwest

How will the successful opening of the new North West Metro in Australia influence the next generation of infrastructure projects?

In May 2019, Sydney's new North West Metro opened its doors for the first time; on time, under budget, operating to plan and to the obvious delight of the travelling public.

"This project had been proposed over multiple forms and over many decades," explains Peter Hynd, Acting Project Director, Sydney Metro Northwest. "We knew the demand was there, the question was, what was the best way to deliver it?"

As the first turn up and go metro line in the city, Hynd points out that a lot of thought went into the concept design, not just to create an effective and efficient new automated railway, but crucially, to integrate the metro stations, the transport interchanges and the roads that sit alongside it and feed the metro with passengers.

The delivery and operation of Sydney Metro Northwest comprised three main contract packages awarded between 2012 and 2014.

An AUS\$1.15bn contract awarded to CPB John Holland Dragados (CPBJHD), for the tunnels and stations civil works, an AUS\$340m contract was awarded to the Impregilo-Salini joint venture for the surface and viaduct civil works.

But at the heart of the project's success was the government's decision early on to deliver the operations, trains and systems contract via an AUS\$3.7bn, 15-year public private partnership (PPP) contract awarded to the Northwest Rapid Transit consortia. This contract included delivering eight new stations, a train maintenance facility, 4,000 commuter car parking spaces, the new metro trains and upgrading the existing rail line between Chatswood and Epping.

As one the biggest PPPs ever awarded in Australia, bringing the operator on board early to help establish the right measures for success was critical to making the entire project work.

“We were very focused on customer service outcomes; reliability, availability and the customer touchpoints in terms of how the stations are designed.”

"Outcomes are structured around our customers and the outcomes that they would like. Our design decisions were highly influenced by the operator – and recommendations were taken on board in the light of their experience."

"We also spent a lot of time looking at accessibility. We did testing of station and train prototypes with different user groups. The final design was well received, with feedback such as "manoeuvring through most transport feels like you are stepping onto a ladder, this project is like walking into a lift".

The North West Metro is described as "the spine for the region's growth for generations to come, connecting communities and customers with a fast, easy and reliable metro system". As a turn up and go service, this is the first stage of a future metro network for Sydney that aims to relieve pressure on the existing transport network and will ultimately provide connections to western Sydney and the new Western Sydney Airport.





Over the coming decades, some 200,000 extra people are expected to move into Sydney's North West region, taking its population above 600,000, and ramping up demand for transport into and around the city. The new 36-kilometre railway has 13 stations with trains arriving every four minutes at peak service times.

"It is a truly integrated transport solution that includes car parks, buses and everything needed to support existing transport systems," Hynd says. "We will learn from the line's operation, but the challenge for us is to ensure that Sydney people start to love the metro."

Success certainly breeds confidence. The lessons from this project will now be taken forward to the next stages as the line is extended south with the Sydney Metro City & Southwest project – expected to open in 2024 – and then further, with the Sydney Metro West and Greater West projects following on afterwards.

To achieve success, Hynd explains that the client team spent time

scoping and defining the project at the start and drew on experiences and expertise from around the world. This work led to the project being designed with very clear priorities and, with just three main work packages, structured in a very simple fashion.

Two key objectives, says Hynd, were enshrined into his business plan:

1. The operator must be successful
2. The PPP contracting model must be validated

Sydney Metro and its partners met these objectives by delivering the project on time, on budget and in a safe manner. To achieve this the project team adopted different and innovative approaches to project management and governance.

“For all the talk of collaboration, teamwork and shared objectives across the world of infrastructure planning and construction today, the reality for major projects around the world is still that many are over budget and not on time.”

Not so at Sydney Metro, where this project, with its 15-kilometre twin tunnels between Bella Vista and Epping – the longest railway tunnels ever built in Australia – and four kilometres of elevated railway, has been completed just six years after breaking ground.

"Whatever the form of contract, clients are constantly looking at ways to manage risk, while contractors are constantly looking for ways to maintain profitability," explains Hynd, pointing out that, as a client he was very much part of the delivery team and spent time working on the way that he wanted to do business with his partners.

"On this project, I have been as interested in our contractors being successful as I have been in ensuring we deliver for our customers," he adds. "Our approach was to be very honest and open with contractors from the start. We made it very clear that we would always be there to support our partners through the delivery phase."

Of course, on a project of this scale not everything goes to plan and it meant that effort was constantly



Technology for a new breed of railway

The use of digital technology has been at the heart of Sydney's Metro Northwest project and will continue to be critical throughout the operation and maintenance of the railway.

During the design and delivery phases, the project team embraced the use of building information modelling (BIM) and cloud-based software tools to control and exchange information, manage quality and maintain up-to-date and accurate records of progress. This enabled a step change in efficiency, but has also created a digital data platform from which the operator can benefit throughout asset management.

However, Sydney Metro has also embedded technology into its operation by specifying driverless trains and the first fully automated metro rail system in Australia. This uses a mature and proven signalling solution, operating with real-time information to deliver a safe and integrated system.

Sydney Metro Northwest wanted to use proven technology. They spent time talking to the market about what they needed and really wanted to embed the operation of the railway into the project from the start. It is now, of course, up to the operator to determine the best use of those systems to deliver efficient and reliable services for their customers.

Systems integration is always the challenge. Sydney Metro Northwest had a tight programme driven by their public commitments on the opening date and had to look carefully at the transition points and client interfaces, as a significant amount of their management focus and effort was on managing interface risk.

needed to work on the relationship. But as a result, while there have been robust conversations – “the civil contracting market in Sydney can be a tough business”, says Hynd.

Robust change control processes were put in place, looking carefully at the cost and impact of each on delivery and the operational phase. It meant having very tight management of budget and holding a number of independent peer reviews across the project to monitor progress as the project evolved.

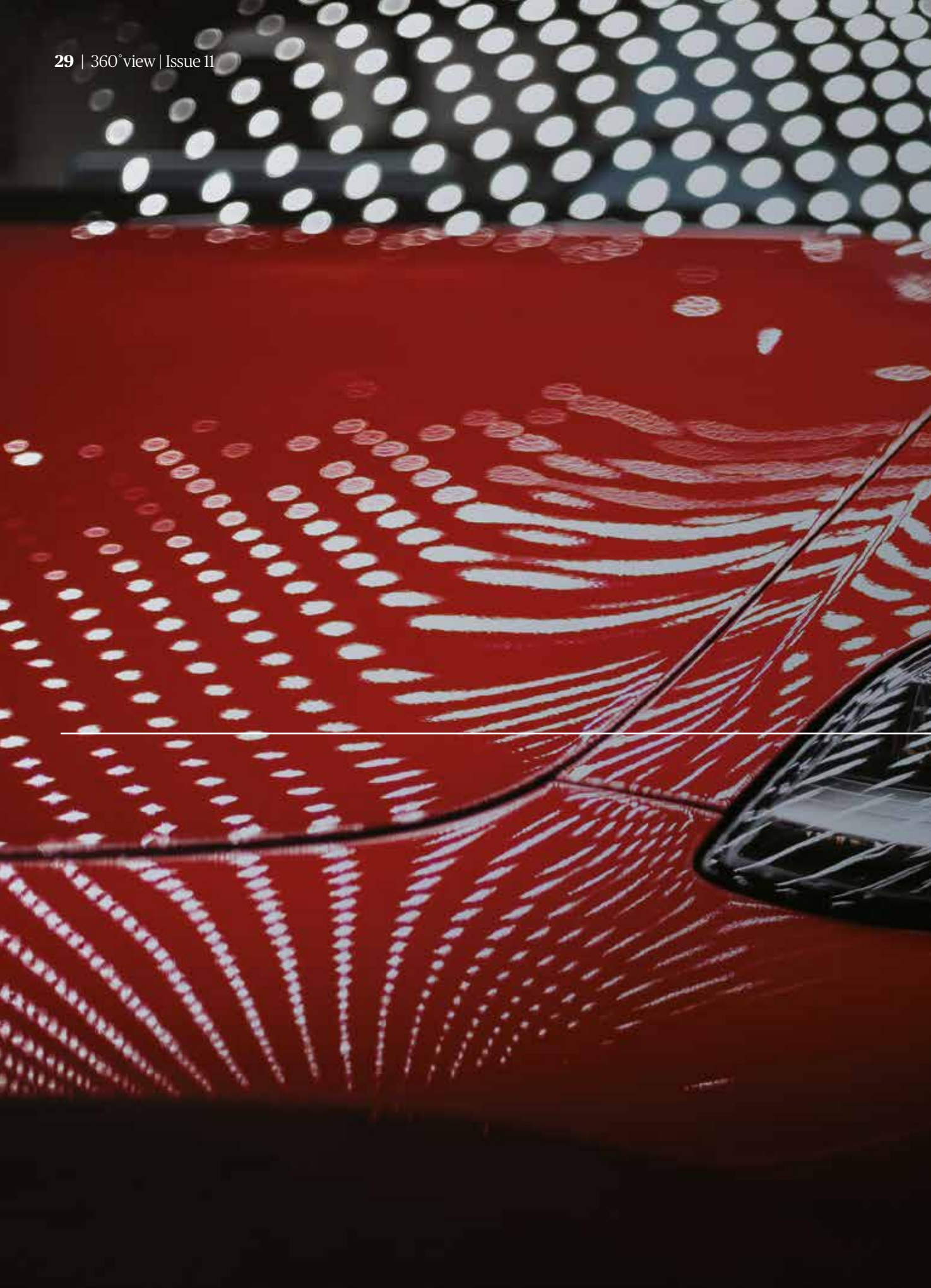
“We have never been shy of putting a mirror up to ourselves to monitor our performance,” says Hynd, highlighting that, working with its partners, the project did a major resequencing of delivery plans to ensure there were no project delays.

“All big projects have their problems and challenges. The key to success was setting up really good frameworks that enabled us to work with our partners to manage change and challenges as they arose.”

“Firms like Turner & Townsend have been key to this process, providing strong advice, leadership and management to the PPP contract and being able to draw on experience and bring resources from all over the world. This breadth of skills enabled Sydney Metro to always place the best resources they could find.

“Australia has had some unsuccessful PPP projects in the past. To be an informed client, you have to understand the challenge and the drivers of your supply chain,” he says.

“Looking forward, trust and collaborative relationships will certainly be key to our success,” he adds. “After all, we know that the next projects will be even more complex.”



Navigating a **lithium-ion** age boom: from mobile phones to mass mobility

Mark Wainwright, Managing Director, Turner & Townsend

- Global demand for battery minerals is rocketing, as technology evolves.
- The extractive industry will be a major beneficiary of the lithium boom, but needs to heed the lessons of previous commodity cycles.
- The sector equally needs to be aware of the complex geo-political climate of producing regions.



The world is in the grip of a lithium-ion battery-powered revolution, accelerating demand for raw and refined minerals, such as lithium, cobalt, and copper. But the mining sector will need to adapt and learn the lessons of the last commodities boom if it is to navigate and survive this rapidly changing marketplace.

From London to New York, Beijing to Sydney, the new battery-powered revolution is sweeping through modern life.

High-performance, lithium-ion power packs drive the mobile phones in our pockets, the laptops in our backpacks and are at the heart of the next generation of mobility; powering the electric cars, bikes, buses and scooters as a key part of the vital transition towards creating a greener economy.

This is creating something of a global boom: between 2015 and 2018 shipments of lithium-ion batteries increased year-on-year by 24 percent in terms of capacity, reaching over 148,000MWh. The figure is set to top 500,000MWh by 2025. Add in the global Electric Vehicle (EV) explosion as nations ditch the internal combustion engine in favour of cleaner electric power, and the growth potential is almost exponential.



From boom-bust to boom-growth

As a result, the supply of raw and refined “new-age minerals” – the resources needed for lithium-ion batteries – is setting a new direction for automotive, energy and electronics supply chains.

The mining and processing sector is set to become a primary beneficiary of this revolution. Yet amid this race to lead the market, the sector must heed the lessons of former commodities boom and bust cycles; resisting the temptation to abandon sound capital processes in the rush to service changing markets.

“The challenge is readying the sector for potential steep growth, but managing the risks associated with the unpredictable pattern of demand.”

In treading this difficult tightrope, it is essential that industry develops the right commercial models that optimise extraction and minimise cost.

As historic volatility in commodities pricing demonstrates, it is no easy task to get these models correct, leading either to an oversupply that depresses prices or an undersupply that slows the innovation the minerals bring.



The challenge of increasing demand

There are a huge number of factors impacting the sustainability of growth in the EV and lithium-ion battery markets which will govern demand for these raw minerals. The development of regulations that will drive the impetus towards battery power and renewable energy varies hugely between governments around the world, as do the strategies employed by vehicle manufacturers in response to the fast-changing pace of consumer demand for electric vehicles.

Meanwhile on the supply side, advances and development of new extractive techniques is accelerating. However, this must be weighed against evolving technologies that may eventually supersede the lithium-ion battery, leading to a potential drop in demand.

Successful navigation of this conundrum will be to manage risk so that pace of production is finely tuned to the nuances of the marketplace.

To prepare for the uncertainty, mining and processing organisations should be taking immediate steps to de-risk their supply chains.

Adding to the complexity of supply, China, for example, is not only ploughing vast investment into the battery manufacturing sector, but also into the lithium and cobalt extraction market, forming local joint ventures and tying up the supply to meet its expanding domestic demand. Ultimately, this could give China the potential to dominate global market supplies.



Understanding the supply risks

Lithium is predominantly found in Australia, Chile and China, and supply is dominated by four mega organisations – Albemarle, SQM, FMC and Tianqi. The latter recently paid more than US\$4bn to become the second-largest shareholder in SQM, a deal which gives it effective control over nearly half the current global lithium production.

Cobalt, on the other hand, is a comparatively scarce resource. Recovery faces some interesting geopolitical risks given that a high proportion of deposits are based in the unpredictable legislative and political environment of the Democratic Republic of Congo.

The geological spread of mineral deposits impacts on corporate strategy: for cobalt extraction, the proximity of copper and nickel can be necessary to make this a viable business proposition. As a result, investment in increased cobalt supply could easily be impacted by changes in demand and prices for copper and nickel.



A complex picture

This boom in highly sought-after minerals brings a raft of new risks for the mining sector on both the demand and supply sides and to avoid the pitfall of past commodity booms, it is critical that the entire supply chain understands these dynamics and looks to address the risks that lie ahead.

It is a complex and difficult challenge. Getting it right involves navigating exciting new opportunities that allow individuals, society and, perhaps most importantly, our environment, to benefit over the long term from this energy revolution.

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Market focus

The winner takes it all: unlocking the potential of Sweden's construction sector

Nima Aase, Director, Turner & Townsend



Sweden is celebrated for its work-life balance and vibrant eco-system of innovation. But cultural change is necessary to bring delivery of construction and infrastructure projects up to global standards.

On many fronts, Sweden is a desirable place to live and work: the country scores highly in global happiness surveys; its work-life balance is the envy of other nations, as is its high earning potential and strong social protections.

The country's reputation as a pioneering innovation hub is also soaring. Consider this: in Stockholm, a city of less than one million people, there are more private start-ups valued at more than US\$1bn per person than anywhere else on the planet.

Unsurprisingly, multinationals view Sweden as a highly attractive location for doing business. But, despite the country's vibrant commercial culture, business is not always easy to do in Sweden, particularly when it comes to construction.

For outsiders embarking on building or infrastructure projects, the country's processes, methodology and ways of thinking can be difficult to navigate. In our experience, this potential clash of cultures can hinder uptake of best practice: despite Sweden's incredible business strengths, its construction sector has not fully unlocked the benefits of project control, oversight and transparency.

We can speculate on the cultural reasons for this. Swedish enterprises tend to be organised in a collaborative structure with flat hierarchies. Relationships are based on trust and built on long-term foundations.

There are many social benefits to fostering a trust-based culture: it tends to encourage a pleasant working environment that is low in conflict.

“But this can also lead to problems. You might think that such environments would make people feel comfortable in engaging in vibrant debate.”

In our experience, this is not always the case as people feel reluctant to do anything that risks disrupting the harmonious atmosphere.

As a result, advisors often take costs and variations at face value, leaving them unchallenged.

This has profound implications for the long-term health of complex projects. In recent years, Sweden has experienced several major project failures. Although the reasons for this are undoubtedly complex, a lack of contract administration, inadequate cost control and poor management of contractor performance have been contributing factors.

The Karolinska hospital was delayed by more than two years and suffered a budget increase of more than 400 percent. In infrastructure, the E4 Bypass and the Mälaren Canal projects have had contracts terminated and suffered budget overruns or delays respectively, in part due to strained collaboration between local clients and international contractors.



So how can these problems be overcome? Redefining the notion of trust is critical, as is a shift to working within the framework of a robust contract, and the development of a well-defined execution plan.

It is important to invest time inducting clients into new approaches and ways of thinking on Swedish projects. The contractor also needs to understand the importance of documenting changes in order to manage risks.

Project execution can be streamlined through rigid project controls, and if the project is set up correctly, the data generated in even the most complex situations can be analysed against the trusted framework and used to provide analytical outputs. This alignment enables us to proactively manage the live project status to our clients and, drive decision-making from them.

“By taking this educational approach, we see that the ‘fear of the unknown’ dissipates, and we deliver the project as a unified team.”

This approach has successfully been used in the delivery of both real estate and infrastructure delivery. Clients that have benefitted from this approach include Zurich Insurance and Mojang.

With a number of major infrastructure projects in the pipeline, including road, rail and airport improvement works, the potential for those who want to venture into the Swedish market is huge. International collaboration is essential, as the local sector does not have enough capacity to deliver on its own.

Sweden produces some of the world’s most sought-after technology – from healthcare innovation to the phenomenally successful Spotify app. This kind of smooth end-user experience should be transferred to the construction sector. Instead of relying too much on trust, clients should strive for process, transparency and discipline.

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Opportunity awaits

Sweden’s vibrant demand for new construction and infrastructure projects is likely to pique the interest of international clients and investors.

The booming retail sector is seeing a steady churn of mixed-use redevelopment in Stockholm’s city centre. The capital is also facing an acute shortage in commercial space: vacancy rates are at less than one percent, and this is resulting in expansion of the central business district. Major cities like Gothenburg and Malmö face similar challenges.

The region’s data centre sector is also booming, thanks to natural local cooling and reliable local infrastructure. Amazon, Google and Facebook have invested in data centres in Sweden and throughout the Nordics.

There are also plans to develop all Stockholm airports in order to try and solidify it as a Nordic hub, as well as improving and expanding transportation links to accommodate the ever-growing business districts.

Diversify now!

Why construction needs to
widen its recruitment net

Haidee Gonsalves
Director, Turner & Townsend

UK construction businesses face a looming skills crisis. They risk paying over the odds for under-qualified staff unless they can attract different types of people into the industry. Haidee Gonsalves, Director, hi-tech and manufacturing, outlines why the construction industry needs to diversify.



Q Why is diversification so important in the construction industry?

It is no secret that UK construction has the twin challenges of an ageing population and insufficient pipeline of younger workers. Our inability to attract more women to the profession is compounding the skills shortage.

It's also becoming increasingly difficult to recruit and retain experienced individuals in mechanical and engineering roles. As someone who works closely with a lot of engineering professionals, I often feel this when I walk into a meeting or onto site. There just aren't that many female faces. Our workplace is not reflective of the communities we live in, and that's both a loss for business, and for society.

The issue runs deeper than getting the 'look' of the industry right. We're facing a fundamental skills crisis that can only be solved by diversifying our talent.

Q How does the UK construction sector compare to other countries recruiting women into the industry?

The UK has got the lowest percentage of female engineering professionals in Europe – less than 13 percent! This is not a surprise for anyone working in the construction industry, but disappointing when you compare this to Bulgaria, Cyprus and Latvia. In those countries women make up 30 percent of the construction workforce.¹

Q How can the industry attract young talent?

We've been encouraging children to engage with STEM (science, technology engineering and maths) subjects for years now. But there is more we could do to expose young people to the sector's employment possibilities, such as taster days and on-site placements for women and girls.

For instance, last year we launched a primary school programme with the National Literacy Trust to run skills workshops and encourage involvement in STEM subjects, and we're also an industry partner to the Design Engineer Construct (DEC) accredited qualification in secondary schools.

It's also reinforced by Innovate UK (part of UK Research and Innovation, a public body funded by the UK government) as it says there is clear evidence that this kind of approach will open doors to a more diverse workforce.

Q What can businesses do to address the industry skills shortage?

One thing businesses could do immediately is close the gender pay gap. It's a good starting point for levelling the playing field and making a career in the industry a much more appealing option. A positive shift in recruitment and retention practices of construction companies will lead to a significant change in the gender imbalance, while addressing the skills issue at the same time.

¹ WES, *Useful Statistics*, January 2018
www.wes.org.uk/content/wesstatistics (accessed 31.07.2019)







Another important step is making it as easy as possible for women who have had significant periods of time off, such as those who have taken maternity leave, to integrate back into the business. People who have had time away, for whatever reason, can bring skills and experience that will strengthen, enhance and diversify our teams. At Turner & Townsend, we have recently launched our career returners programme in the UK, which was a hugely important step towards reaching this group.

Q How do we make the industry as diverse as the society we live in?

It's important for businesses to provide visible role models for those in minority ethnic groups, and those from the LGBTQ+ community.

Building and supporting strong networks around diversity and inclusion is crucial for an organisation that genuinely wants to promote this sense of inclusivity and belonging. These internal networks give people a safe space to share their experiences, offer advice and support each other's career decisions. It can work as an informal kind of collective mentoring.

Q What benefits would a more diverse workforce bring?

Increasing diversity helps to shift traditional attitudes away from what might once have been an adversarial environment towards a more collaborative one – after all, diversity breeds respect. This in turn improves the perception and attractiveness of the construction industry to younger generations.

A larger, more effective and dynamic workforce will take the construction industry forward. Diversity has been proven to enhance innovation; widen the available skill set within a team and boost employee performance. People are happier in environments that foster inclusivity.

Q Why are you passionate about this topic?

We all need to be passionate about diversity. For me personally, it's about modernising the perception of the industry so women do not feel that a career within it is out of bounds. I am part of Turner & Townsend's Addressing the Gender Balance network and am committed to driving this change. I am also part of our People Committee and our EDI network and the RICS Women of the Future group.

I use my experience to mentor and support those within the business to realise their full potential. It's both rewarding and fun!

If we're going to widen out the pool of talent and make it more accessible, we need to throw open the door, demystify the construction industry and better promote the huge range of interesting roles within it.

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Turner & Townsend is an independent professional services company specialising in programme management, project management, cost and commercial management and advisory across the real estate, infrastructure and natural resources sectors.

With 110 offices in 45 countries, we draw on our extensive global and industry experience to manage risk while maximising value and performance during the construction and operation of our clients' assets.

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