RIB
running together

A REVOLUTION IN CONSTRUCTION:

Advancing Our Recovery Through Digital Transformation

CONTENTS

FOREWORD

It's no secret that in early 2020, the global advent of COVID-19 brought about a series of wide-ranging problems that would shake the foundations of our already challenged industry. Projects were paused indefinitely and future investments shrouded in uncertainty, as it quickly became clear that construction activity would not simply revert to the status quo.

The recovery is now well and truly on, but this enforced industry standstill has afforded decision-makers the time and space to reassess their methods and plan for a more productive future. The consensus is clear; we must take the leap and transform our processes to unlock the latent potential in our economically significant industry.

Industry frontrunners have already demonstrated that new and integrated techniques can help push the bounds of productivity, from design and planning phases through to long-term asset operation.

Across this document, we have detailed some best-practice advice for enterprises willing to embrace their own digital transformation in construction. This advice relates to the construction industry in general, with emphasis placed on the role that integrated collaboration software can play across entire project lifecycles. At RIB Software, our mission is to support enterprises looking to unlock this end-to-end value for projects large and small, from design and execution through to operation.

Ultimately, we must rise above the manifold challenges of our current situation to find scalable and long-term solutions that break the deadlocks we're labouring against. Given the broad economic consequences at stake, it's vital that the next steps we take lay a practical and positive foundation for the future.

"The consensus is clear; we must take the leap and transform our processes to unlock the latent potential in our economically significant industry."

COVID-19 AND CONSTRUCTION

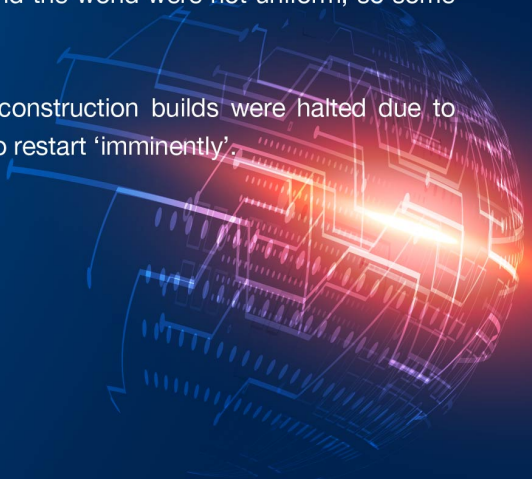
Worldwide Impacts and Future Implications

It's difficult to accurately quantify the current impact of COVID-19, given the size and complexity of our industry and the breadth of contributors who work within it. Clearly, there will be direct and recurrent implications on jobsites around the world, until such a time as a vaccine is readily available. What cannot be denied is the importance of our industry's recovery, considering the broad economic implications at stake.

Global research into the short-term damage of COVID-19 in construction indicates some notable downward trends. The respected Royal Institution of Chartered Surveyors recently published their Global Construction Monitor for Q2, which detailed the tangible impact of global lockdowns on several fronts. (5)

The RICS Global Construction Activity Index, a wide-ranging metric that details current and expected market conditions, produced a result of -24 for Q2. This aggregate figure is a weighted composite, that takes into account a wide number of variables related to current and anticipated market activity. In certain regions the downturn was more significant than others; the Americas only saw a -14 metric, while the Middle East & Africa result was -40. The length and nature of lockdowns around the world were not uniform, so some regions and industry segments were more impacted than others.

As for projects being placed on hold, RICS reported that 25 per cent of construction builds were halted due to COVID-19 across Q2, with only a small proportion of these projects expected to restart 'imminently'.



The Long Road to Recovery

The comprehensive RICS report also painted a bleak picture of the short-term future, with a quick rebound seemingly unlikely. This is in large part due to productivity concerns, with onsite methods needing to be adjusted so that appropriate social distancing measures are in place. A global productivity contraction of 11.7 per cent is anticipated by respondents to the survey, as defined by the labour costs required to produce the same output. Underbidding on tenders was also reported to RICS, with 44 per cent of respondents saying they were consistently receiving bids that fell short of realistic cost estimates.

Construction has long since had a productivity problem. New innovations have often been implemented without appropriate research or scale, eventually being dropped in favour of tried-and-true methods after an insufficient trial period. While reliable manual techniques will always have a place on worksites, it's becoming increasingly clear that methods must advance for construction to fulfil its potential and keep pace with other burgeoning industries.

The construction industry's efficiency gains have nearly flatlined over the last 70 years, whereas other industries have seen dramatic improvement. There is a correlation between the lack of digitisation and the lack of efficiency gains that cannot be ignored. ***Phillippe Delorme: 'The Reinvention of Buildings in the Digital Age' (2)***

With many projects and enterprises mired in an indefinite holding pattern, decision-makers have had the breathing space to truly consider the way they do business. It's quite possible that this break in play will fast-track the arrival of new digital tools and solutions that will serve the industry well on the road to recovery.

A Changing Landscape for Quantity Surveyors and Estimators

Cost consulting professions are built upon precision and risk minimisation, both of which have been mitigated by the lack of industry clarity and confidence since the onset of COVID-19. Quantity surveyors and estimators are skilled in identifying market trends and anticipating likely outcomes, but the scope of this pandemic is a variable that none will have ever had to deal with.

Given these challenges, cost consultants who are still contributing to projects have sought to do all they can to improve the productivity potential of their business. Cloud-based integrated software has helped quantity surveyors and estimators to switch to remote workflows without a shortfall in output, even while onsite visits were not a possibility. Businesses have used this time to establish clearer collaborative processes, enhance their BIM knowledge and even upskill in preparation for a more digitised future.

Of course, working from home is not a possibility for many construction disciplines. In the pages ahead, we will consider how digital transformation can be achieved across the broader construction industry, at a time when business agility and collaborative potential has never been so important.

DIGITAL TRANSFORMATION: REVOLUTIONISING YOUR BUSINESS FOR THE DIGITAL AGE

Most who work in construction industries will have encountered the phrase ‘digital transformation’ in recent years, but like many recent concepts it can be difficult to truly define.

Effectively, digital transformation refers to the overhaul of established methods or technologies in pursuit of better solutions. The changes may seek to address pain points or improve value for customers or stakeholders. It’s not just about the technologies themselves, as people and processes are also integral drivers in bringing about fundamental change.

There’s no one rule for what constitutes a digital transformation. Many consider it to be a foundational overhaul of all digital aspects of an enterprise, but it could be as simple as a small business getting started with a collaboration system to help break down information silos.

There are four aspects of digital transformation that are often cited, although framed in different ways. Typically, the four pillars will look something like this…

1. A Unified Vision: Clear Digital Strategy and Enterprise Investment

Digital transformation is initiated and driven by business leaders; every step of the process must be assessed and re-assessed to ensure that the vision is realised.

2. An Empowered Culture: Upskilling, Reskilling and Team Building

By building a workforce with relevant, diverse and transferrable skills, your enterprise will be able to react with agility in an evolving business landscape.

3. An Innovative Set of Processes: Achieving Goals Through New Methods

Your new methods of working must be efficient, productive and sustainable. Solutions must be based around the customer’s journey and expectations.

4. An Enhanced Platform: Underpinning Technologies and Capabilities

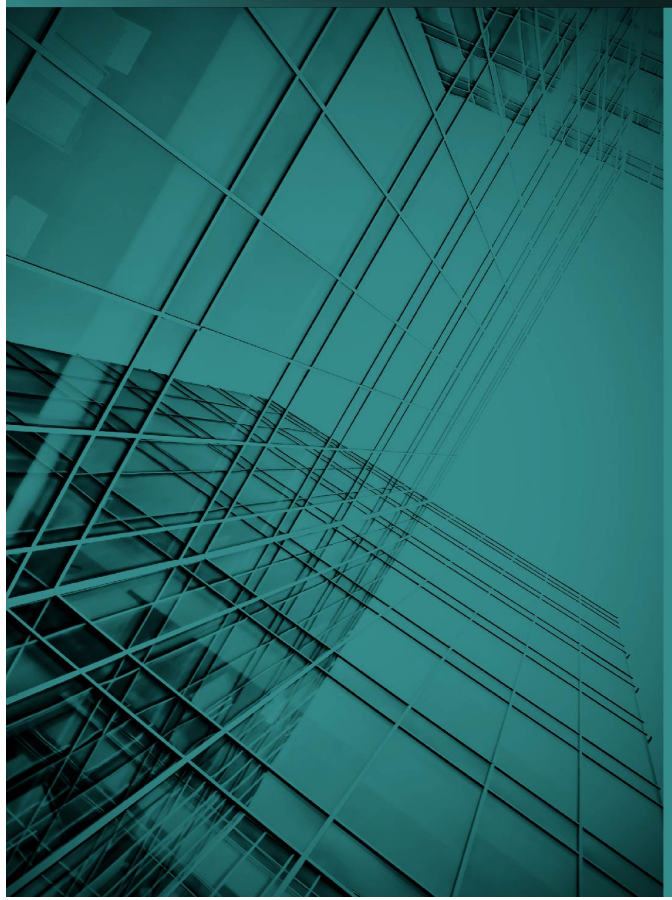
Identify and implement the new innovations and defining technological framework that will help to deliver your goals and transform your business.

Many industries have experienced transformative success through fundamental shifts in the way they do business. For construction however, the next evolution is still to come.

Why is Digital Transformation So Difficult in Construction?

In construction, the potential for industry-wide improvement through data analytics, technological innovation and improved collaboration is plain to see.

> Collaboration is, or should be, a hallmark of the construction industry itself: the industry's future success will rely heavily on effective collaboration among all stakeholders.
>
> World Economic Forum: 'A Breakthrough in Mindset and Technology' (8)



It's not hard to understand this conclusion, given the divergent workflows that are all too common throughout our industry. Construction is a difficult industry to transform by its very nature. The current state of affairs is not down to a lack of interest in innovation, but rather due to an inability to apply new solutions at scale thus far.

In a McKinsey & Company report on 'Decoding Digital Transformation in Construction', the writers list four industry characteristics that summarise our current challenges. These attributes are **fragmentation**, **lack of replication**, **transience** and **decentralisation**. (3)

Fragmentation of stakeholders is plain to see in construction, with specialists operating throughout the value chain and several small companies often involved in larger projects, if only for a short time period. Lack of replication refers to the bespoke nature of most construction builds, with transformative processes perhaps only able to be established on multi-year projects.

As for transience, new projects often bring about completely new sets of businesses working together for the first time, so it's difficult to carry over lessons learned from one job to the next. Finally, decentralisation refers to the federated nature of certain business units where a wide span of techniques or processes are used, making it difficult to track overall efficiency.

Different businesses in the construction chain might experience these shortfalls to varying degrees. Despite the challenges, top leaders in construction have been able to take lessons from other industries and begin navigating the path to enterprise transformation. On pages 10 through 12, we will lay out an action plan for those planning to institute a foundational change in their people, processes and technologies.

THE TECHNOLOGIES THAT WILL SHAPE OUR FUTURE

New Innovations on the Construction Site

Construction's new digital landscape will feature a wide variety of tools and technologies that serve to improve safety, productivity, data analysis and much more. Many of these techniques can add value across the entire engineering and construction value chain, from planning through to long-term operations.

The World Economic Forum, in collaboration with The Boston Consulting Group, recently published an expansive series of reports on 'Shaping the Future of Construction.' Within their findings, they established '10 Technologies That Can Improve IU Industry Productivity' (7). These innovations are explored below.

01 Prefabrication and Modular Construction

The practice of building components offsite and transporting them onsite for installation continues to grow, with more consistent outcomes, shorter construction duration and reduced waste all able to be achieved.

02 Advanced Building Materials

Traditional building materials are being replaced on certain projects with more innovative solutions. Concepts such as self-healing concrete and strand rods can improve cost efficiency, but may also address common environmental or durability concerns associated with certain builds.

03 3D Printing & Additive Manufacturing

Many industries have solved long-term issues through the advent of 3D printing, and there is significant scope for the concept in construction too. In the long-term, we could see certain labour-intensive tasks replaced by smart manufacturing orders.

04 Autonomous Construction

Automation machines such as driverless wheel loaders may seem like a pipe dream, but innovators believe they will become a viable option for commercial construction sooner rather than later.

05 Augmented Reality & Virtualisation

AR innovations are growing in prominence on major construction projects, with such tools used across design and modelling phases as well as the building phase itself. For example, AR-enabled apps can be a handy tool for inspections as part of the defects process.

06 Big Data & Predictive Analytics

Capturing and applying big data has been integral to digital transformation in many industries, and construction is no different. The potential is enormous, with forward-thinkers able to mitigate risk, improve budget control and streamline day-to-day site processes through predictive analytics.

07 Wireless Monitoring & Connected Equipment

Digital monitoring solutions are another potential gamechanger, giving project controllers the ability to optimise maintenance cycles, track potential problems, ensure HSE requirements are met and more.

08 Cloud & Real-Time Collaboration

Integrated software solutions connect a variety of stakeholders throughout the lifecycle of a project in a seamless cloud environment. Improved productivity can be achieved by eliminating information silos and collaborating in real-time.

09 3D Scanning & Photogrammetry

Progress reporting and regular monitoring of project milestones can help to eliminate unnecessary rework. 3D scanning and photogrammetry tools including drones can provide an accurate summary of real-time progress to aid managers.

10 Building Information Modelling

BIM is well-established in our industry as a valuable tool for numerous disciplines across entire project lifecycles. Everything from improved cost estimation to effective sequencing and clash detection can be achieved by experienced BIM teams.

Many larger projects are already exploring or utilising some of these fast-moving techniques, but they are quickly becoming a realistic option for dynamic smaller businesses as well. Some of the above options, such as modular construction, carry significant short-term potential during the COVID-19 pandemic. For example, prefabrication can allow small teams to work offsite in a safe and controlled environment, minimising travel and social interaction.

Enterprise Software for Cost Consultants, Developers and Other Roles

Collaboration and integration are key themes for the future of construction, as evidenced by the rise of all-in-one software solutions for contractors, project owners, quantity surveyors and other construction disciplines.

Businesses often accumulate several software systems as their operations develop, which can lead to challenging information silos and oversights. Team members may find themselves cross-referencing data with other programs which may have outdated figures, or else finding it difficult to collaborate with peers who don't have the exact same setup.

Fully-integrated enterprise solutions are being readily adopted to mitigate such challenges. Owners on complex construction projects are investing in cloud-based management software that all stakeholders must engage with. This means that processes and communication related to all project stages are stored and managed in the one place; everything from planning and tendering through to construction and long-term asset management. Managers can even set permission controls so that participants only have access to the software modules they need for their role.

When intelligently deployed, these solutions can add value for all stakeholders, ranging from C-Level management to BIM teams, quantity surveyors, schedulers, financial controllers, onsite staff and more. Everyone involved can gain a clear understanding of their role requirements, stay up-to-date with relevant communication and work confidently within a unified data repository that is updated in real-time. Progress milestones can be ticked off more confidently and efficiently by adopting serial or parallel workflows, as they allow for remote collaborative input and authorisation throughout the process.

In 2020, major construction enterprises are utilising these all-in-one software solutions across multiple projects, so companies who regularly collaborate with the same people can enact consistent processes for how they do business with one another.

Navigating Your Digital Transformation: A Five-Step Action Plan for Construction

There is much to consider once the decision has been made to step forward with new technologies or processes for your enterprise. As we have established, no two digital transformation journeys are alike; despite this, there are many lessons we can take from the successes and setbacks that other industries have experienced.

The following five step framework can be applied to both cost consulting and construction enterprises in general.

Lay The Foundation

As with any construction project or other new endeavour, the planning phase is integral to an effective digital transformation. Successful transformations require a company-wide change in mindset, and it's not about bringing in new technologies just for the sake of it. Deploying new tech without an underpinning aim or support structure is often cited as a contributing factor in failed system changes.

The aim of your innovation should be in addressing inefficiencies or pain points for your customers or other stakeholders in the construction chain. Think of new innovations as the enabler, not the end result that you're striving toward. From the start, the values that you are looking to uncover should be very clearly defined. A good practice is to start by identifying the operational shifts that are integral for moving forward, before even thinking about the technologies that will help to deliver this.

When it comes to convincing workers and stakeholders about business change, it's easier to find an accord regarding the problems that need to be resolved. From here, it can be simple to define a use case that is based around new processes and digital enablers. For a QS firm, an example might be 'reduce project turnaround time by 15 per cent by implementing a cloud-based software solution that promotes effective collaboration between peers.'

In any case, it's integral that every step in the transformation process is defined and monitored by a unified team, all of whom are willing to see the plan through to completion.

Invest in People and Upskilling

People, not systems, drive innovation and realise its full commercial potential. *PricewaterhouseCoopers: 'The talent challenge' (4)*

As of late 2020, more and more enterprises are looking to evolve their culture and workforce as a means to accelerate digital transformation. It's well established that the construction industry has often stuck with established techniques in the face of new innovations. Ineffective deployment of such new techniques may erode your workforce's conviction that there is a better way to do business.

Successful upskilling or reskilling will likely be integral to any transformation of a construction business, especially given the skills shortage that our industry already faces. The broader construction sector requires a digitally savvy and adaptable workforce, with an influx of people from different professional backgrounds, in order to transform. New opportunities are being created to suit data analysts, strategists, programmers and other digital natives, and companies must offer a compelling value proposition and future prospects to attract the best talent in these fields.

In addition, it's vital that we look to take advantage of the untapped potential of existing workforces. It's increasingly common for professionals to move into a different role within the same company or industry sector, utilising their earned experience to good effect. Businesses must make an ongoing commitment to dynamic and relevant training for existing staff. It's even possible to embed digital training into existing workflows, to help ease the transition from traditional methods to digital techniques that will better serve our industry's future.

Place an Emphasis on Collaboration for Digital Use Cases

Regardless of the industry in question, the ability for teams to collaborate more effectively is a vital consideration for businesses looking to revolutionise processes. This is especially true in construction, which we know can be characterised by disparate elements across many stages of the project lifecycle.

To achieve this aim, top leaders can look to formulate use cases that encourage consistent interaction between project groups. Unstructured or anecdotal handover processes can be common on project builds, leading to avoidable oversights and potentially expensive rework. Issues of this nature can be eliminated by apps that feed into a Common Data Environment (CDE), so that teams can provide structured data or capture pictures to inform the next participants in the project delivery chain.

For cost consultants, the advent of BIM has already unlocked a range of collaborative benefits across project teams. Some problems with implementation still abound, but significant progress has been made through the release of well-researched standards such as ISO 19650. Fully- integrated BIM software solutions are now readily available for QS and construction businesses, offering extensive file interoperability to support seamless collaboration with other project teams.

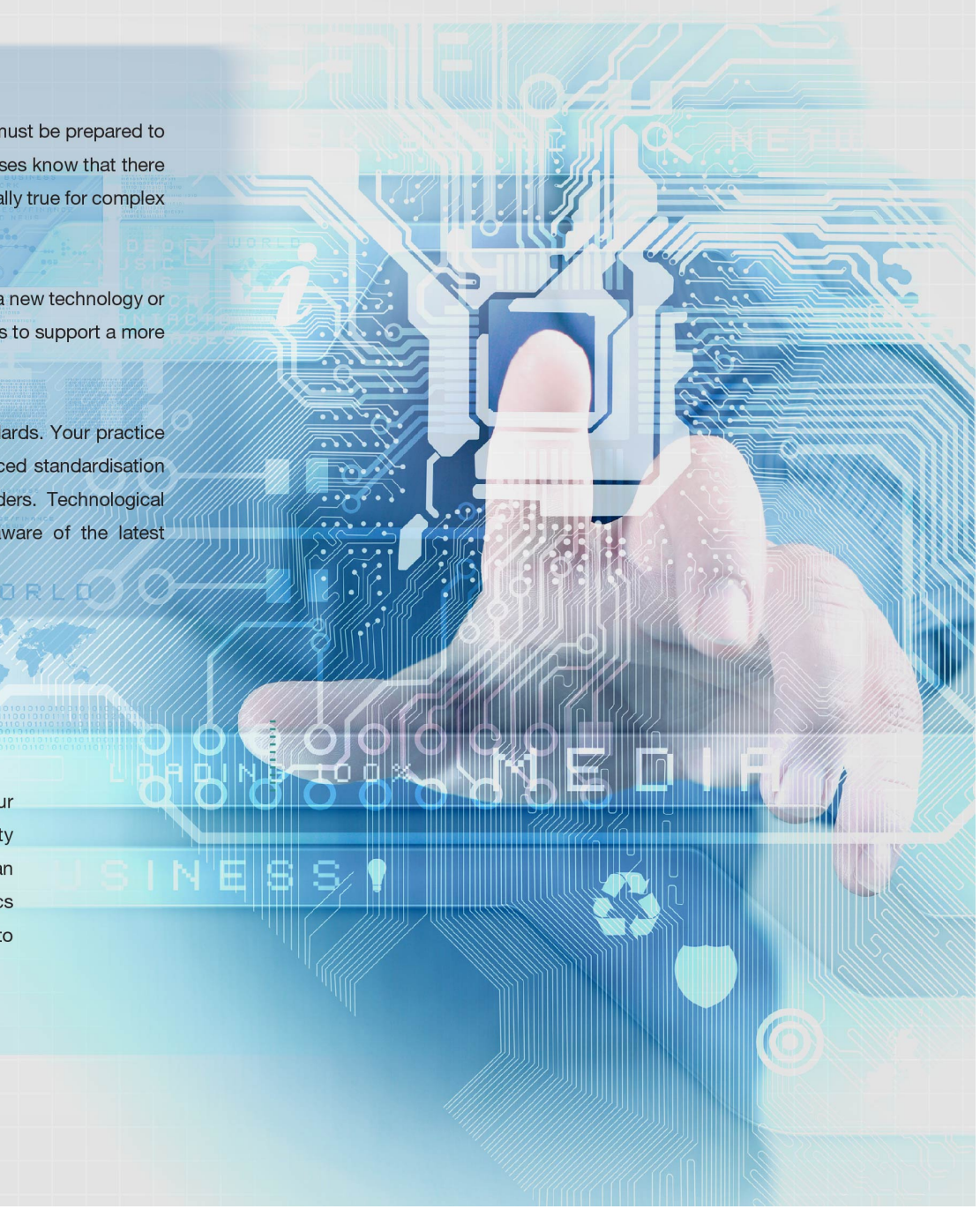
Implement a Master Plan

Earlier in this piece, we spoke about how a lack of replication from one project to another is a roadblock for digital transformation in our industry. While no two construction projects will ever be the same, business leaders can still create new standard practices that will benefit future workflows.

For coordinators on major construction builds, this might mean implementing an enterprise software solution that allows for deep financial analysis across multiple projects. Access to this level of up-to-date industry data can help with a multitude of common challenges, such as allowing managers to confidently control bidding and tendering to protect profit margins.

The benefits of digital solutions extend to disciplines within the value chain as well. For example, modern cost consultants can access real-time cloud repositories where useful templates and designs are stored. These setups can be saved for a variety of configurations and project types, allowing for more efficient workflows.

Digital transformation is all about finding efficiencies at a macro and micro level. Some of the benefits encountered during business shifts may not have even been considered at the planning phase, but can play a role in the future master plan for your enterprise.



05 Be Prepared for Rework

Business agility is a vital consideration for modern enterprises, and top leaders must be prepared to alter and augment their transformation plans on the path to success. All businesses know that there is not always a straight line from ideation through to execution, and this is especially true for complex construction builds where any number of extenuating circumstances can have an impact.

Some planned aspects of your digital transformation may fall by the wayside as time passes. If a new technology or process is failing to meet projected targets, don't be afraid to shift focus or reallocate resources to support a more productive measure that has been put in place.

For cost consultants, an example of this could be the use of a certain set of BIM object standards. Your practice may have committed to a long-term adherence plan to help drive collaboration, but if enhanced standardisation becomes available there may be value in switching immediately if it benefits all stakeholders. Technological progress has never been so swift, and it's incumbent upon business leaders to stay aware of the latest developments in their field.

The steps outlined above form a practical basis for digital transformation in construction, but your enterprise may be able to eclipse previous performance with a bespoke plan of its own. Ingenuity from a single thought-leader in a specialised field might just unlock industry-wide value that can be successfully replicated. Technologies such as bespoke cloud environments, AI, data analytics and more have long since proven their potential; it's time that we make a concerted effort to harness them in support of a revolution in construction.

Conclusion

As we've established in this document, the onset of COVID-19 has precipitated an industry downturn that's difficult to accurately quantify. The implications are far-reaching, and it's vital that we act proactively on the road to recovery, given the broader economic significance of a thriving construction sector.

Project owners and industry professionals have been left with a crucial decision to make. We can either try to build ourselves out of this situation with the same techniques that have fallen behind the productivity curve, or we can seek to collectively embrace the next generation of construction.

Businesses large and small can future-proof their enterprise and establish a strong competitive advantage by implementing appropriate digital solutions to address pain points. That said, a comprehensive digital transformation is not necessarily a panacea for businesses looking to fix their flagging fortunes. Without the right vision, planning, budget and execution, any well-meaning endeavour can fall short of the intended target and create a new set of issues.

In this piece, we have explored just a few of the technologies that have been tipped to revolutionise processes both onsite and in the office. It may be that some of these concepts are more relevant to your business than others, but there is no shortage of technological opportunity for all disciplines involved in the construction value chain.

For those willing to take the leap and undertake digital transformation, it's vital that your efforts are preceded by comprehensive planning processes and defined by a unified team of leaders. We have posited a five-step framework for construction businesses that can serve as a helpful reference point, but it's important to remember that no two enterprises will follow the same path to digital transformation.

With the next evolution of our professional practices just over the horizon, it's vital that those who set the tone for our industry are working towards a common goal. Our fragmented processes must be unified, our industry must attract new digital talent, and our overall output must improve as we strive to achieve our considerable potential. We simply can't afford to fall short.

For more information on how RIB is helping companies with their digital transformation, visit **www.itwocostx.com** and **www.itwocx.com**

List of References

1. Boulton, C. (2020) *What is digital transformation? A necessary disruption.* Retrieved from the CIO Australia website: https://www.cio.com/article/3211428/what-is-digital-transformation-a-necessary-disruption.html.

2. Delorme, P. (2018) *The Reinvention of Buildings in the Digital Age.* Retrieved from the Schneider Electric website: https://blog.se.com/building-management/2018/11/15/reinvention-buildings-digital-age/.

3. Koeleman, J., Ribeirinho, M., Rockhill, D., Sjodin, E., Strube, G. (2019) *Decoding digital transformation in construction.* Retrieved from the McKinsey & Company website: https://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/decoding-digital-transformation-in-construction.

4. PricewaterhouseCoopers (PwC) (2018) *The talent challenge: Rebalancing skills for the digital age.* Retrieved from the PwC website: https://www.pwc.com/gx/en/ceo-survey/2018/deep-dives/pwc-ceo-survey-talent.pdf.

5. Royal Institution of Chartered Surveyors (2020) *Q2 2020: Global Construction Monitor - Construction activity contracts, outlook muted amid mounting cost pressures.* Retrieved from the RICS website: https://www.rics.org/globalassets/rics-website/media/market-surveys/construction-monitor/rics-global-construction-monitor-q2-2020.pdf.

6. Schneider Electric (2020) *5 things you need to know about digital transformation.* Retrieved from the Schneider Electric website: https://www.se.com/au/en/work/campaign/digital-transformation/.

7. World Economic Forum (2018) *Shaping the Future of Construction: An Action Plan to Accelerate Building Information Modelling (BIM) Adoption.* Retrieved from the World Economic Forum website: http://www3.weforum.org/docs/WEF_Accelerating_BIM_Adoption_Action_Plan.pdf.

8. World Economic Forum (2016) *Shaping the Future of Construction: A Breakthrough in Mindset and Technology.* Retrieved from the World Economic Forum website: http://www3.weforum.org/docs/WEF_Shaping_the_Future_of_Construction_full_report__.pdf

Globally Located, Serving Locally

Australia
BRISBANE / SYDNEY
+61 (0) 7 3300 6222

Singapore
+65 3159 0466

Hong Kong
+852 5804 4622

United Arab Emirates
DUBAI
+971 4 550 9358

Malaysia
KUALA LUMPUR
+60 3 4065 7060

United Kingdom
LONDON
+44 203 597 7566

New Zealand
AUCKLAND
+64 (0) 9 309 2026

United States
AUSTIN
+1 (512) 768 8111

RIB
running together