

**MEED**

Middle East business intelligence

# DIGITAL AWAKENING

The digitalisation of construction in the Middle East

MAY 2021



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The best opportunity to deliver impact is through the greater digitalisation of the construction process

# SWITCHING ON TO TECHNOLOGY

**W**ith regional budgets under increasing pressure from oil price uncertainty and from the impact of the Covid-19 pandemic, the vast amount of time, money and energy lost on wasteful construction practices represents a real threat to the region's development visions.

Calls for reform in Middle East construction centre on the need for greater collaboration on projects, and the earlier completion of finalised designs. The best opportunity to deliver these changes is through the greater digitalisation of the construction process.

But as the regional construction industry comes to terms with the need to leverage technology to achieve greater efficiency and maintain quality on project delivery, the market is diverging.

While the UAE, Qatar and Saudi Arabia have made significant strides in the digital transformation of construction, other countries in the region are proving slow to adopt digital solutions.

As part of its drive to position itself as a leading destination for business and tourism, the UAE pioneered the region's use of digital technologies in construction such as building information modelling (BIM) on landmark projects including Dubai's Museum of the Future, Dubai Metro, the Louvre Abu Dhabi and Expo 2020.

As Expo 2020 draws near and the effects of a growing oversupply in high-end commercial and residential real estate are felt in the UAE, the focus of efforts to reform the regional construction industry is shifting to Saudi Arabia.

Riyadh's drive to develop Saudi Arabia's infrastructure to deliver the kingdom's Vision 2030 economic development plan is set to make it the centre for regional construction for many years to come.

As well as housing and infrastructure developments, ambitious gigaprojects such as the \$500bn Neom future city, the \$16bn Red Sea Project, and \$6.5bn Qiddiya entertainment city will showcase the benefits of digital technology in construction to deliver leaner, faster, safer projects while maintaining construction quality.

With so many innovations that have the potential to transform the industry, from drones, robots and 3D printing to BIM and digital twins, one challenge for companies is to know where to focus their digital investment.

The additional financial pressures caused by Covid-19 mean that there is not always capital to invest in new technology.

Partly due to its subscription-fee model, the most popular technology investment for construction professionals at the moment is cloud computing, which supports the use of web-based software as a service (SaaS). SaaS is flexible, enabling data to be accessed from any device with an internet connection, but it is also convenient as the responsibility for server, database, and code maintenance is on the host rather than the user.

With both the opportunity and the need to change, the coming years are set to see a rapid acceleration of digital transformation in the Middle East construction industry.

# CLOUD DRIVES DIGITALISATION

Digital technology is making inroads into the region's construction industry

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**D**espite low levels of adoption, the potential for digital technology to deliver significant improvements in efficiency, build quality and worker safety, is becoming increasingly understood by the region's construction industry.

In a poll of 50 GCC construction professionals conducted by MEED in the first quarter of 2021, 100 per cent of respondents said that digital technology improves project delivery. About 58 per cent of respondents said that digital transformation would have the biggest impact on overall project management and performance, while 29 per cent felt that the most benefits would be seen in speed of delivery, accuracy and collaboration.

But while there is widespread acceptance of the value of digital technology across the construction industry, its deployment is uneven.

Asked to provide feedback on the extent of digitalisation of the construction industry in each of the GCC markets, along with Egypt, survey respondents reported that the UAE is leading the way in the region's construction industry technology transformation.

This is perhaps unsurprising. BIM was first mandated by Dubai Municipality in 2013 and an increasing number of companies in the UAE are using drones to map, survey and monitor construction projects. In 2019, Dubai became the home to the world's first 3D printed building.

Not far behind however is the region's biggest construction market. With some \$1,137bn of

construction and transport projects planned or underway, including a \$298bn pipeline of future projects, Saudi Arabia accounts for about 45 per cent of the value of construction market in the GCC and Egypt.

And with high-profile projects such as Neom future-city, Qiddiya entertainment city, and the Red Sea Project being used to showcase the Saudi Arabia Vision 2030 agenda to transform the kingdom into a globally competitive technology hub, Saudi Arabia is set to be a major driver of construction digitalisation in the region.

## GIGAPROJECTS

"The appetite for the use of digital techniques in the delivery of gigaprojects is high," says David Glennon, digital delivery director at the Red Sea Development Company (TRSDC).

"These are ambitious projects that cannot be effectively delivered through traditional methods," says Glennon. "The time, cost, quality and sustainability improvements offered through digital ways of working at scale becomes a very compelling reason for change."

With an eye to diversifying economies and positioning themselves on the world stage, the UAE and Saudi Arabia have an incentive to promote digitalisation in their high-profile tourism developments.

In other markets however, where economic development plans are focused more on traditional transport and infrastructure projects, there is less appetite to explore new digital solutions.

# THE DIGITAL OPPORTUNITY

The level of digitalisation in construction vs the value of planned construction projects (\$m)

5

## OUTER SPACE

Digital solutions such as BIM are expected on most projects



4

## SKY HIGH

BIM is mandated by most leading project clients

3

## LIFT OFF

Digital solutions such as BIM used on some projects

2

## LOOKING UP

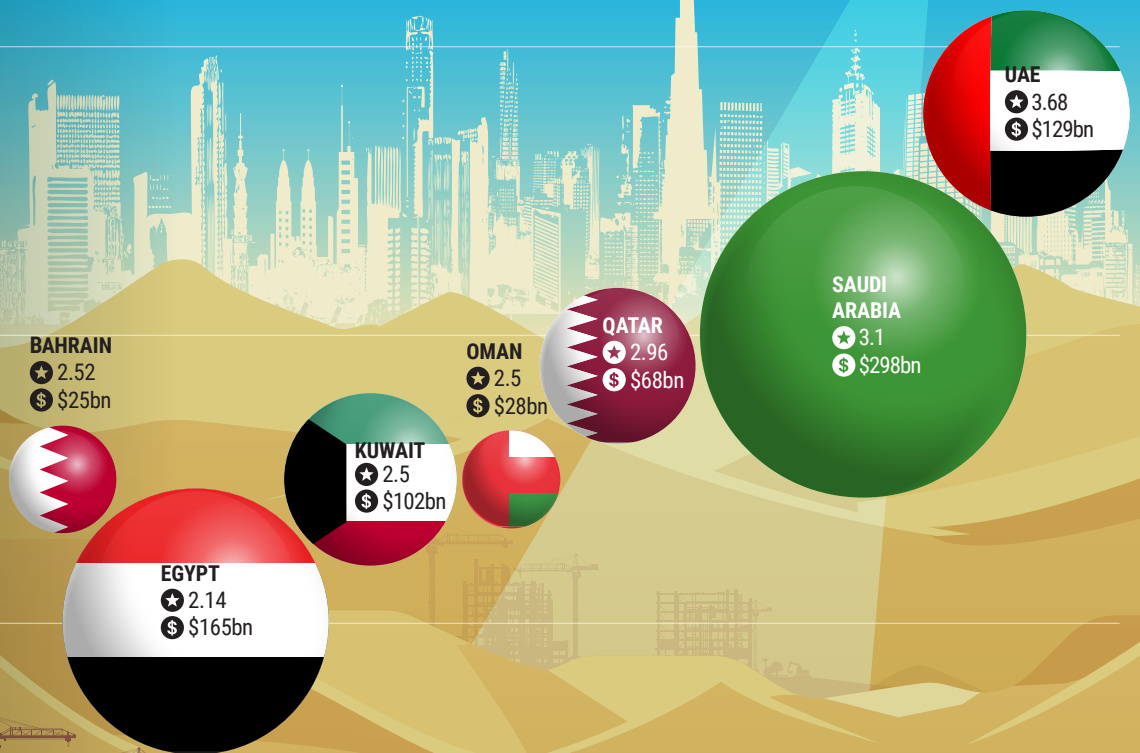
Some interest in digital solutions. But usage is rare

1

## GROUND ZERO

Advanced digital solutions are not being used in construction

0



★ Digitalisation rating  
\$ Value of planned construction projects (\$bn)

Source: MEED Industry Survey, MEED Projects

The MEED digitalisation rating indicates the degree of digital transformation in the construction sector and is based on the perceptions of respondents to the MEED Construction Industry Survey 2021.

Over 41 per cent of respondents to the MEED survey stated that they used BIM on less than 25 per cent of their projects in the region.

“The UAE is the early adopter of technology in the construction sector [in the GCC], but the others will follow,” says Maged el-Hawary, CIO at Dubai-based construction company ASGC. “This is the cycle of technology. You have leaders in adoption and the others follow at a later stage.”

### IN THE CLOUD

Despite early concerns in the region about data security, especially in government projects, cloud computing is gaining traction.

The MEED survey shows that while BIM is the most widely adopted digital technology on construction projects in the GCC and Egypt, cloud computing is now a close second.

“Since 2018, the market has improved,” says El-Hawary, “especially since Covid.”

This confirms the findings of a 2020 Trends Insight survey on construction technologies conducted by data analytics and research firm GlobalData, which found that, of all the technologies analysed, cloud computing received the highest proportion of respondents confirming that

they had already invested in this and had further investment planned within two years.

“Companies are starting to move from a capital expenditure model to an operational expenditure model,” says El-Hawary.

“So instead of acquiring new technologies, they use subscription services,” he says.

He further explains that software as a service (SaaS) can deliver applications over the internet, which is easier for a company than installing and maintaining their own software.

“Software as a service, storage as a service, infrastructure as a service is the easiest way, and the most secure way to do this is to go to the cloud.”

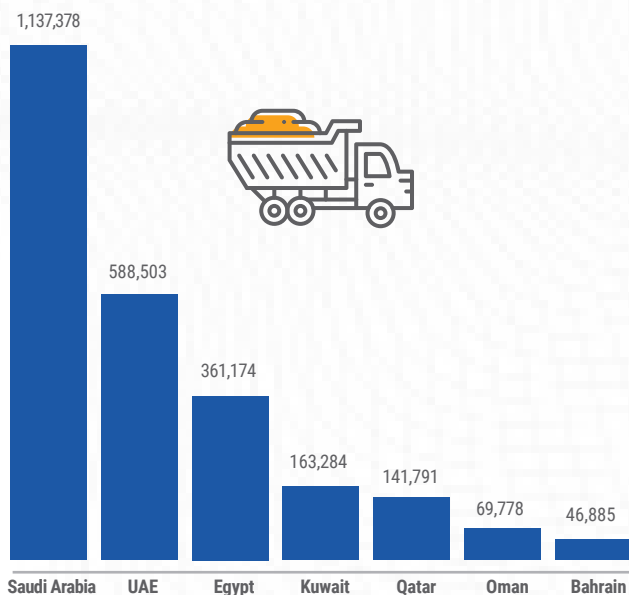
Anas Bataw, director at the Centre of Excellence in Smart Construction at Heriot-Watt University Dubai says that cloud-based technologies are the most important digital investment opportunities for companies today.

“They offer a host of benefits – flexibility, security, cost effectiveness, mobility of use and are future-proof,” says Bataw.

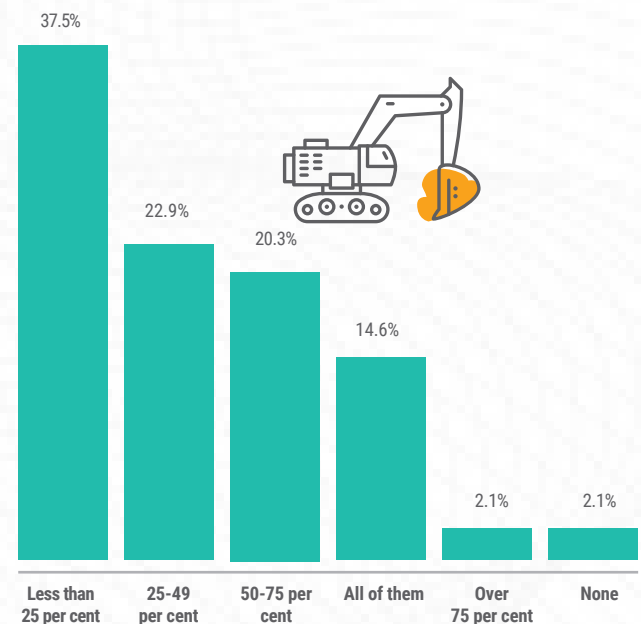
“Most importantly, as this pandemic has shown us, the economic damage caused by long-term lockdowns and reduced personnel on work sites, means that the infrastructure that support remote

## MEED CONSTRUCTION INDUSTRY SURVEY 2021

Value of construction projects planned or underway in the GCC and Egypt (\$m)



What percentage of your projects involve advanced digital construction solutions?



working is critical and cloud-based technologies fulfil this need.”

In the UAE, BIM has been used on a number of projects as far back as 2008 and by 2014, major projects such as Al-Maktoum International Airport, Palm Jumeirah and Expo 2020 were mandating the use of BIM 3D, later updated to BIM 4D.

In Saudi Arabia, the use of BIM is also becoming more widespread.

“BIM been very successfully embedded at The Red Sea Development Company,” says Glennon. “We have seen a shift to a ‘model first’ working practice which has allowed us to automate a number of tasks, driving efficiency and data to improve decision making.”

“We are increasingly seeing this approach being adopted on other projects,” he says.

### DATA REVOLUTION

Glennon says that data capture and data visualisation are growing areas of digitalisation in construction in the kingdom, with the use of drones becoming common place.

He also says that Geographical Information Mapping is particularly strong in Saudi Arabia.

“There is a lot of high quality local talent driving value from the tools,” says Glennon. “This is a skill-set that is important when working on projects of this scale and will continue to grow in importance as we create our first ‘digital twins’ in the Kingdom of Saudi Arabia.”

### COVID IMPACT

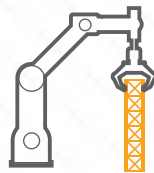
Even before the Covid-19 pandemic, the digital transformation of construction was already well underway in the region. But the pandemic has accelerated the process. Practices forced on companies during the global lockdown are demonstrating the power of technology to enable remote work and collaboration, to streamline operations, and to automate manual processes.

Companies that have not yet leveraged technology in their businesses are likely to fall behind.

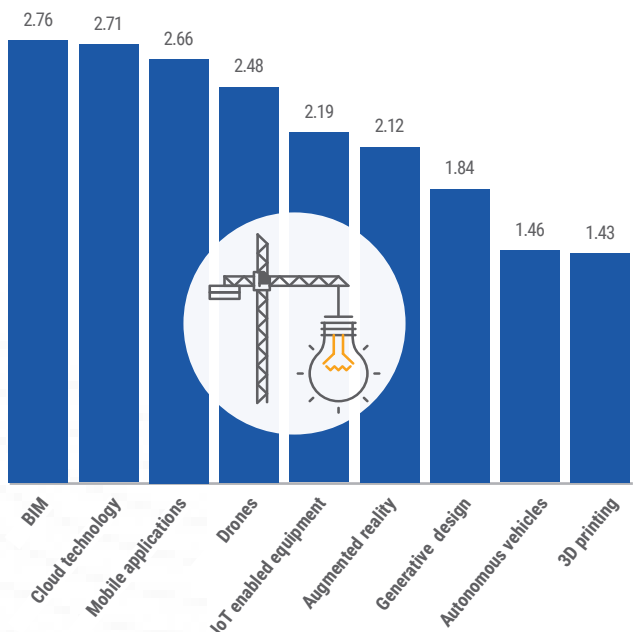
“Digital transformation in the construction industry means that all construction companies are now under pressure to evolve and adapt or lose out,” says Bataw. “And for the ones who have taken up the challenge, they are realising several benefits such as increased operational efficiency, lower costs, improved coordination between project delivery teams and much more.”

What phase of the project cycle can be most improved through digital transformation (% of respondents)?

- 56%** Site execution
- 52%** Design development
- 38%** Operations and maintenance
- 29%** Documentation
- 29%** Pre-construction
- 25%** Planning and briefing
- 15%** Handover



Biggest areas of digital investment by construction companies over the past two years (weighted index)?



# RIDING THE DIGITAL WAVE

Consultant Khatib & Alami finds long-term benefits in digital solutions

**K**hatib & Alami (K&A) was an early adopter of cloud computing, and found that it already had the foundations in place to respond to challenges such as remote working. All that was needed was to provide the office-based staff with a computer and an internet connection to ensure a smooth transition.

The biggest challenge for K&A was time. Instead of being able to pilot, test and roll out its home-working programme over several months, the urgency created by the pandemic demanded an immediate transition.

Other challenges included the logistics of ensuring everyone had the equipment they needed, as well as fast and secure internet connectivity. It was also important to consider the human element by ensuring colleagues felt supported.

K&A was quick to deploy remote working strategies, followed by an extensive training programme across its design centers to ensure digital solutions were consistently and efficiently used for communication and collaboration on projects.

The two main collaboration platforms used by the company are Autodesk BIM 360 (BIM Collaborate Pro formerly, BIM 360 Design) for technical design and Microsoft Teams for non-technical collaboration, document and project management.

A dedicated Microsoft Teams site was created for every project and all of K&A's BIM families and libraries were pushed to the cloud to ensure on-



**ENSURING A SMOOTH TRANSITION**

- ✓ Remote working strategies
- ✓ Extensive design training programmes
- ✓ Use of collaborative platforms
- ✓ Change in mindsets





**Digital tools have improved timescales and efficiency for K&A projects such as the concept design of Fahaheel Expressway upgrade in Kuwait (above)**

line accessibility and production standardisation, unified across all design centers.

Tools such as Autodesk BIM360 and Teams played a vital role in supporting collaboration and communication among K&A's remote-working, geographically dispersed teams.

**EFFICIENCY**

Visibility was improved for project managers, ensuring they were better equipped to monitor and control project tasks and schedules.

Although K&A's digital transformation was already well underway, the pandemic was responsible for catalysing adoption, both technically and behaviourally.

The company estimates that the efficiency of its project delivery and collaboration has improved

by more than 40 per cent compared to traditional methods, resulting in higher productivity, lower costs and greater consistency.

For K&A, the past 12 months have swung the door open to greater digitalisation in the construction sector.

Although it will take time to change some elements of the ecosystem, the company finds that there has been an acceptance of new ways of working which are likely to remain post-pandemic, such as holding some meetings virtually instead of face-to-face.

At a deeper level, K&A has also observed a change in mindsets, and has entered dialogue with some clients and partners about digital solutions which would never have been considered previously.

# SEIZING THE OPPORTUNITY

Al Gurg Consultants turns to digitalisation to ensure employee safety

One of the biggest challenges for Dubai-based engineering firm Al Gurg Consultants during Covid-19 was creating a safe working environment for its staff without impacting continuity of operations and productivity.

Early on in the pandemic, prior to the government announcing its precautionary measures, the engineering firm took the initiative to reorganise work environments to ensure social distancing, and prepared IT systems in order to accommodate remote working for most of its staff.

The firm managed to enable over 90 per cent of its office staff to work from home a couple of weeks before the national disinfection programme started and work from home guidelines were introduced.

In order to minimise contact between staff, many of the paper-based processes were shifted to being purely digital. One of the biggest changes the firm is currently undergoing is shifting to a full Revit and BIM 360 (BIM Collaborate Pro formerly, BIM 360 Design) cloud-based workflow.

“People are always apprehensive to change in the beginning,” says Al Gurg managing director Saud Al Gurg. “However, once they start to experience the improvements in efficiencies, they then buy into the new way of working.”

Moving the company to an integrated digital workflow has helped both both the speed and quality of work. It has encouraged people to be more collaborative and to resolve potential issues early

on in the process. Ultimately, says the managing director, the pandemic will be seen as a challenging, but positive event in the firm’s history.

“It has made us realise the benefits being lean and agile in our operational setup and processes,” he says. “And I believe that the same will be true for the wider construction industry.

“The pandemic forced us all to do a lot of things differently, and in the process, we discovered areas of improvement that we didn’t notice before.

“I believe it will encourage a lot of innovation in the industry over the coming period.”



Saud Al Gurg, Managing Director, Al-Gurg Consultants

## AL GURG'S APPROACH TO SAFETY

- ✓ Social distancing environment
- ✓ Digitalising paper-based processes
- ✓ Integrated, cloud-based workflow

## CASE STUDY



*Al Mahsama agricultural drainage treatment, recycling and reuse plant in Al-Ismailia, Egypt*

# ACCELERATING AGILITY

Hassan Allam Holding champions digitalisation



Engineer Aly Kouriem, Group IT Director, Hassan Allam Holding

**A** holistic business response to the Covid-19 pandemic has enabled Egypt-based Hassan Allam Holding to be more agile, more efficient and more profitable. In common with almost every large-scale organisation around the world, Egypt-based engineering company Hassan Allam had to adapt quickly to minimise the disruption to its operations caused by the Covid-19 pandemic.

At the top of the list of challenges was the need to respond to the sudden surge in the number of staff working from home during lockdowns. This created an immediate need to provide remote access to a large number of business applications and online meetings, as well as raising awareness among users of the potential cyber security risks of working through the internet.

The company also had to find ways to support collaboration and the secure sharing of project data among different teams that were not physically placed together.

“We responded by expanding and promoting new intelligent and innovative solutions to ensure agile business processes,” says Hassan Allam Holding Group IT Director Eng Aly Kouriem.

Kouriem says that the new technologies activated across the company covered the internet of things (IoT), virtual/augmented reality, 3D printing, and business information online dashboards. Crucially, the new technologies were integrated across the company’s projects and subsidiaries.

As well as expanding digital services to enable day-to-day operations such as video conferencing and activating new security management cloud



*The National Museum of Egyptian Civilisation, Cairo*

solutions, the company introduced processes aimed at ensuring continuity on project activities.

“These new technologies have supported the Hassan Allam engineering workforce to manage, monitor and control project progress accurately, plan more effectively and also to take the proper corrective action remotely and swiftly,” says Kouriem. “We accelerated the digitalisation of our engineering works using the BIM technologies. And we enabled the cloud migration of projects’ data using the Autodesk BIM 360 (BIM Collaborate Pro formerly, BIM 360 Design) platform in order to keep the continuity of our engineering production of works.”

A single cloud-based repository of engineering data and project documents has enabled greater collaboration with other project stakeholders.

“Hassan Allam Engineering & Construction engineering teams have accessed the BIM models remotely from their homes,” says Kouriem. “This supported us to meet the deadlines of our committed deliverables”.

Kouriem says that Covid-19 has accelerated a digital transformation that was already underway at Hassan Allam, and he says that the benefits of the digitalisation will continue long after the pandemic.

“For sure the success that has been achieved during the pandemic will have a powerful impact on the business operations of Hassan Allam Holding and its competitive advantages against its competitors,” says Kouriem. “Due to the pandemic, Hassan Allam Holding transformed to be more agile, more efficient in utilising business resources, and more effective in building on available capabilities.

Meanwhile, Hassan Allam users have become more knowledgeable and educated about new technologies, business solutions and, most important, about their duties regarding security threats and vulnerabilities.”

#### ENSURING A SMOOTH TRANSITION

- ✔ 7,000 working-from-home employees
- ✔ 5 million remote working hours
- ✔ Increased profit during the pandemic
- ✔ Zero remote working security issues

# DELIVERING DIGITAL TRANSFORMATION

Government mandates and contractual requirements may be required to drive transformation in the construction sector

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**A**round the world, architects, engineers, contractors and asset owners are recognising the benefits of digital technology and are innovating not only in the way that they deliver work, but also how they work with each other throughout the entire process. The uptake of digital technology in construction however is neither universal nor complete across the region.

MEED's survey of construction professionals showed that 30 per cent of respondents felt that there was very little use of digital solutions – BIM, cloud-based project management platforms, generative design or drones – on construction projects in Egypt, while a mere 5 per cent said that they had knowledge of projects that mandated the use of technology.

Even in the UAE, which is viewed as the regional leader in terms of the digital transformation of construction, only 18 per cent of respondents said that BIM was established and mandated on most projects in the market.

Given the benefits to efficiency, quality and safety that can be delivered by digitalising construction, it is in everybody's interest to boost technology adoption across the region.

### ENGAGING CLIENTS

A vital aspect of accelerating the digitalisation of construction is to foster a supportive environment and communicate the vision of a more

progressive industry. This involves engaging with key stakeholders from governments and clients to contractors and suppliers.

Industry events such as conferences, think tanks and workshops can be used to reach out to lagging markets, while social media can be leveraged to enable networking and the development of contacts.

The sharing of information, knowledge and success stories can foster an atmosphere across the industry and align peoples thinking.

### MODELLING SUCCESS

Despite the drive to diversify economies in the region, project spending remains heavily reliant on government spending, which is underpinned by oil revenues.

Since the sharp fall in oil prices in 2014-15, there have been massive cuts on project spending across the region leading to intense competition and increasingly slender profit margins at construction companies.

In this economic climate, it is difficult to persuade cash-strapped companies to invest in emerging technologies. While there is a degree of consensus that increased productivity through digitalisation could deliver savings of up to one third of the spend on many construction projects, hard evidence of the benefits of technology is required.

Demonstration projects driven by government and private sector clients can be used to prove



Image source: WAM

Dubai ruler Sheikh Mohammed bin Rashid-al Maktoum attends ceremony to mark the completion of the facade on the Museum of the Future

the value of innovations and share success stories in a more open, collaborative environment. This approach would go a long way towards encouraging investment.

### **BUILDING A FRAMEWORK**

In any technology ecosystem, the innovation comes first and legislation follows behind. But without a working understanding of the new technology, it is impossible to understand the outcomes and risks in order to generate an effective regulatory framework.

Sandboxes, pilot projects and data from more advanced markets can provide guidance, but it still takes time for governments to produce country-specific legislation that will ensure the safe and fair rollout of an innovation.

It is difficult for stakeholders to engage in a process without a clear understanding of the potential contractual risks that could arise, particularly

through the use of shared data. Contracts are often being written by lawyers who may not be familiar with the technology terminology, or the issues involved, while clients may also not sufficiently understand the technology enough to give clear instructions.

A standardised framework for data processes as well as skills, tools and guidance would provide stakeholders with the confidence needed to embark on the digitalisation journey.

But, even the above actions may not be enough. The construction industry is notoriously resistant to change, and it may not be possible to persuade sector stakeholders to invest in new technology and update their tried-and-tested processes.

In this case the drive for transformation must ultimately come from the top, with clear mandates from governments and clients to incentivise digitalisation.

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