bsi.

...making excellence a habit.™

Digital Transformation:

How to build the future, today

Contents

Digital transformation: how to build the future, today

Until now, achieving true digital transformation within the built environment has been a near impossible task.

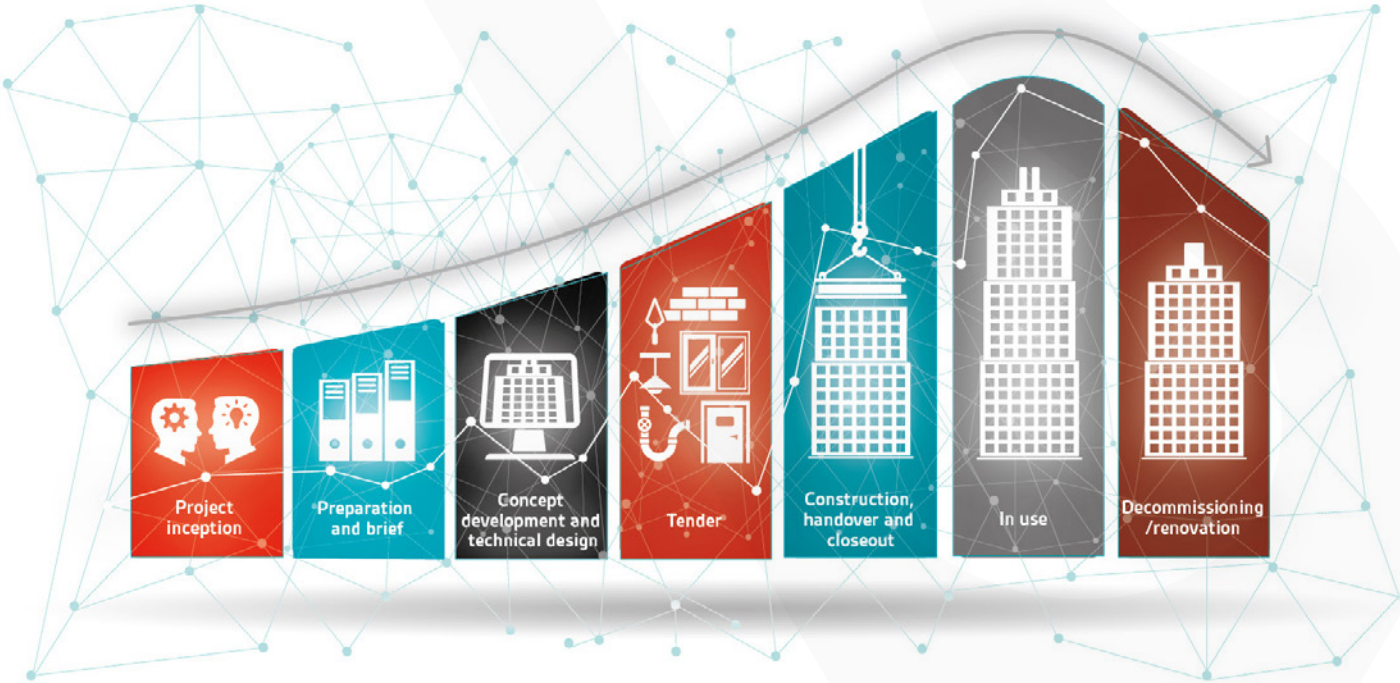
Stalled by a backlog of unusable data, a lack of standardization and poor cross-project communication, organizations are falling short on their ability to deliver 2020's vision of digital construction.

In today's competitive market, it's no longer enough for organizations to sit back and wait for change to happen.

With exclusive insight from leading industry influencers, including **Alex Lubbock** (Head of Digital Construction, HM Treasury and Cabinet Office), **Gary Pattison** (Certification Technical Expert for BIM and Digital Construction, BSI) and **Dan Rossiter** (Sector Lead, BSI), with survey results from over 100 built environment professionals, this report helps readers overcome their digital transformation pitfalls and challenges with expert advice and tangible steps.

Whether you're a supplier, manufacturer, constructor, consultant or client, this report will guide you through your digital transformation journey and explore:

- Industry 4.0's impact on today's built environment
- The role data plays in the future of digital construction
- How to create a strong foundation for technology buy-in and rollout
- Ways in which your organization can boost competitiveness in global markets



ASSET LIFECYCLE

Built environment in 2020: journey towards digitalization

Built environment in 2020

In today's built environment, projects are being designed, constructed and managed against a backdrop of fluctuating pressures.

From uncertainties such as Brexit in the UK and compliance requirements to urbanization and sustainability demands, organizations are on a tightrope, balancing these priorities whilst trying to modernize their services.

However, with the right digital transformation strategies and support in place, this balance is easier to achieve. Not only because organizations will have the technology in place to help them remain compliant, but because the collection of meaningful information and the use of automation will help businesses move towards the collaborative and connective standards of Industry 4.0.

Organizations are on a tightrope, balancing these priorities whilst trying to modernize their services.

Industry 4.0: the architecture of opportunity

What is Industry 4.0?

The fourth industrial revolution is centred around the cyber-physical transformation of manufacturing[1], with a focus on the connectivity and automation of data.

Industry 4.0 is arguably one of the most evolutionary eras the manufacturing industry has ever experienced, and also describes the automated/digital trend.

Centred around the exchange and automation of data, this wave of digital transformation moves physical assets from static structures into connected ecosystems.

Technology like Big Data, Internet of Things (IoT) and Building Information Modelling (BIM) is improving the way buildings are designed, made and maintained as they allow for communication between human and machine, and machines with each other.

And this is just the beginning.

Industry 4.0 is built from the convergence of technology including:

- **IoT**
- **Big data**
- **Additive manufacturing**
- **Automation and autonomous controls**
- **Cloud computing**
- **Artificial Intelligence**
- **Wearable technology**
- **Building Information Modelling (BIM)**
- **Robotics**

Industry 4.0 builds the foundation for tomorrow's smart assets and smart cities.

Using IoT networks and sensors, smart assets collect data from their surroundings so that they can adapt to their environment and adjust their operational performance accordingly. Not only does this increase the efficiency, sustainability and security of buildings and infrastructures, but it also transforms facilities management.

This technology creates the framework for smart cities, where assets, buildings and infrastructures can not only communicate with each other, but also with an interconnected network of work, travel and living spaces.

Investment in smart cities is expected to reach **$135 trillion** in the next two years[2], making this urban evolution a reality you can't ignore.

"Being able to plan for the future adoption of technologies at scale is critical. We have to have vision."

Alex Lubbock

Head of Digital Construction, HM Treasury and Cabinet Office

The reality of Industry 4.0 & digital transformation in 2020

81% of organizations have invested or are planning to invest in BIM over the next 12 months. **44%** have invested in cloud computing[3].

The opportunities that Industry 4.0's technologies present for the built environment are astounding.

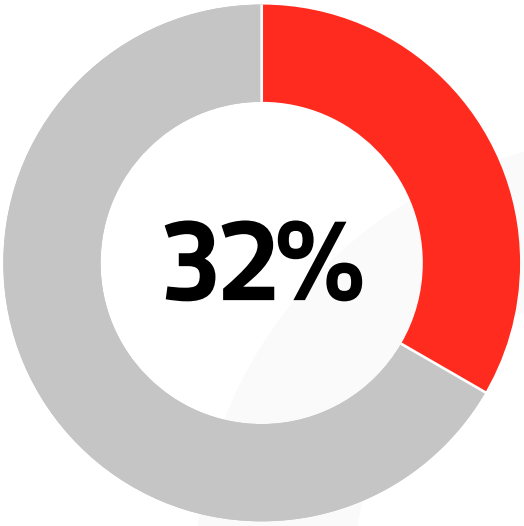
Not only will this combination of technology unify today's fragmented landscape – connecting building owners, designers, construction teams, facilities managers and occupants through shared asset data – but integrated workplace management solutions allow multidisciplinary teams to better collaborate and communicate.

As a result, projects will become more efficient and profitable in the long term.

Top five innovations predicted to have the biggest impact on the built environment over the next five years[4].

1. BIM
2. Cloud computing
3. IoT
4. Automated construction and system processes
5. Artificial Intelligence

How ready are we to adopt and invest?



32% of professionals feel unprepared and behind in delivering digital transformation standards in **2019**[5].

Despite their investment intentions, only 12% of organizations we surveyed would consider themselves as leaders in their field in terms of their digital transformation strategies. This lack of confidence is hindering the ability of organizations to modernize and deliver better services for their clients.

To move towards Industry 4.0's shared goal of an open and collaborative built environment, we must adopt a growth mindset that will allow us to invest in our future, today.

This begins by breaking down adoption barriers and creating a strong foundation of useable data to light the spark of digital transformation.

Only 12% of organizations would consider themselves as leaders in their field in terms of their digital transformation strategies[6].

Spotlight on data: the foundation of digital transformation

The foundation of digital transformation

“An integral part of smart cities is the collaborative sharing of data from separate disciplines and sources.”

Gary Pattison

Certification Technical Expert for
BIM and Digital Construction, BSI

No matter what your role within the supply chain, data sits at the heart of almost every technology your organization is likely to adopt during your digital transformation journey, and is at the centre of effective project delivery.

However, our research shows that only 16% of professionals have invested, or are planning to invest in, IoT technology in the next 12 months and only 20% have invested in Big Data. This striking revelation suggests that the industry underestimates the true power of data, unaware of how it can unlock opportunities and streamline construction processes.

So, what’s stopping organizations from investing in data-driven technologies?

Digital transformation hesitations and barriers

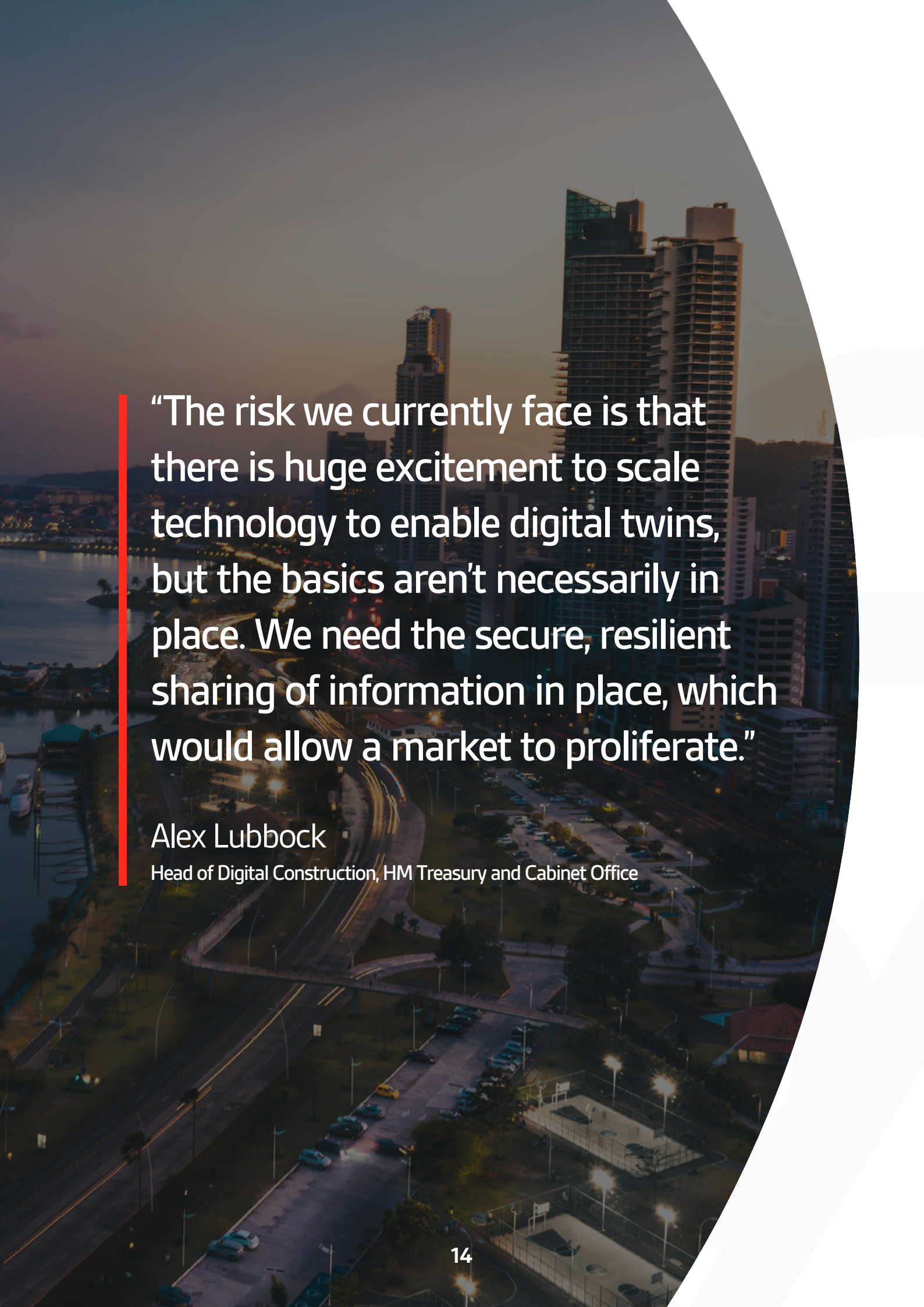
Top three barriers to implementing digital transformation strategies[7].

It's not only budgetary concerns that stop digital transformation becoming a reality. Often, not having a clear understanding of how new processes and technologies can benefit organizations (or individuals) leaves questions like "what's in it for me?" unanswered and strategies not committed to.

There is also an undercurrent of uncertainty and hesitation that stops senior management from being able to see the long-term benefits of technology like IoT – it can be deemed too technically difficult, too big a task to undertake or too challenging, as their teams will need to change the way they work.

Often, this is because past investments haven't proven their worth – or because there isn't the right education, standardization and implementation strategy in place to ensure its success.

To overcome these barriers, organizations must take small steps to establish strong foundations on which they can build. This begins with swapping paper and spreadsheets for data automation and process digitalization.



"The risk we currently face is that there is huge excitement to scale technology to enable digital twins, but the basics aren't necessarily in place. We need the secure, resilient sharing of information in place, which would allow a market to proliferate."

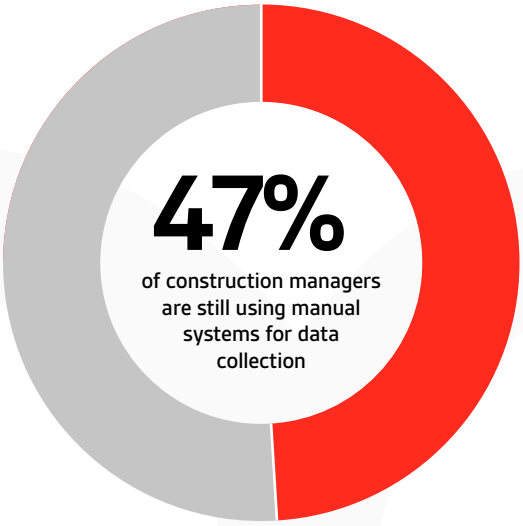
Alex Lubbock

Head of Digital Construction, HM Treasury and Cabinet Office

Unlocking the value of data

Effectively collecting, standardizing and utilizing your data must be made a priority, regardless of where you sit in your digital transformation strategy, because, shockingly, 47% of construction managers are still using manual systems for data collection[8].

Whilst many built environment organizations are collecting vast amounts of real-time data from sensors and systems, particularly within design, manufacturing and construction sectors, many digital transformation projects have failed because organizations don't have the tools to contextualize or create value from this data.



"People are collecting data but not collecting information. If you give a number, say 172, then it's not useful on its own – you need some form of context to make it meaningful."

Dan Rossiter

Sector Lead, BSI

Information management tools like BIM and IoT solve these issues by collecting contextualized asset data across the lifecycle, that can be used by multidisciplinary teams from across the supply chain in everything from project planning phases to asset management.

These systems also make data more secure – protecting organizations from the public cost and damage of having intellectual property stolen or sensitive information held at ransom.

With a strong foundation of data and information in place, organizations are one step closer towards achieving their digital transformation goals. The next step is creating an open ecosystem where supply chain partners can easily collaborate across project delivery processes.

Collaboration & communication: making digital construction a reality

Making digital construction a reality

Bringing standards into your organization is a positive first step towards achieving your digital transformation goals.

But no one can deliver digital construction by themselves; it requires teamwork, communication and collaboration to deliver successful projects on time, on budget and to high standards.

By following these three steps, professionals can achieve true digital transformation by creating a solid framework that encourages growth, partnership and quality from across the built environment.

Step 1: adopt a standards-based approach

The competitive and fragmented nature of the construction industry often creates an adversarial[9] culture amongst built environment professionals.

Reluctant to disclose their digital transformation successes and failures, organizations are left without useful tangible advice or recommendations from their peers.

However, a standards-based approach to multidisciplinary workflow design solves this conflict. Alex Lubbock, Head of Digital Construction at the HM Treasury and Cabinet Office, has revealed that some of the most successful digital transformation rollouts have begun with culture and consistency across people and supply chains from a technology and practical perspective.

By embedding standards and certification into the heart of your practices, particularly with data use, you can ensure the processes and technology you implement meet industry-wide levels of compliance. These standardizations can also provide you with a recognized framework for success around which you can build a platform to educate and train your teams. Ultimately, you can evidence best practice through independent third-party certification or product testing.

With a universal reference point to use across business cultures and supply chain processes, organizations can be held accountable for their actions and work with their supply chain partners to create a better level of service.

This level of standardization shows customers and clients your commitment to quality, including giving small organizations a stand-out competitive advantage in tender pre-qualification and the opportunity to reach new markets by exporting digital expertise or products into the marketplace.

"We need to create an environment where everyone can succeed. That means at a really basic level we must collaborate on even simple things like repetitive paperwork."

Alex Lubbock

Head of Digital Construction, HM Treasury and Cabinet Office

Step 2: break down barriers with communication

The majority of BSI's survey respondents think better communication will make projects more effective[10].

With agreed standards in place, organizations must then work towards creating an open, collaborative space for teams across built environment projects to work in.

For every professional in the supply chain – whether you are a client, customer, manufacturer, supplier, contractor or designer – this begins with clear communication. Because 23% of professionals rated their organization's communication and work processes as ineffective[11].

As Alex Lubbock explains, "clients need to be clearer and more confident about what they're asking for from the rest of the supply chain. Often their requirements are diluted by confusing languages of inputs, outputs, performance and outcomes".

Ditch the jargon that surrounds technology to explain to clients, stakeholders, supply chain partners and employees the long-term benefits your proposed technology will create, and what you need from them to make this a reality. This, partnered with standardized processes, will set project-wide expectations and reduce any misinterpretation of requirements.

With everyone on the same page, processes like BIM and tools like IoT can be implemented to create collaborative environments, where project stakeholders from every phase can work together to overcome challenges, reduce delays, improve trust and increase project profitability. Research shows that using BIM processes to resolve issues contributes to an average project time saving of 15%[12].

"Where sectors have been more successful, they have worked with supply chains to develop the outcome."

Alex Lubbock

Head of Digital Construction, HM Treasury and Cabinet Office

Step 3: build momentum for buy-in support

"A departmental-based approach is very effective. This allows for the flexibility to develop processes in a controlled and focused manner. Lessons learnt can then be applied across the business at large."

Gary Pattison

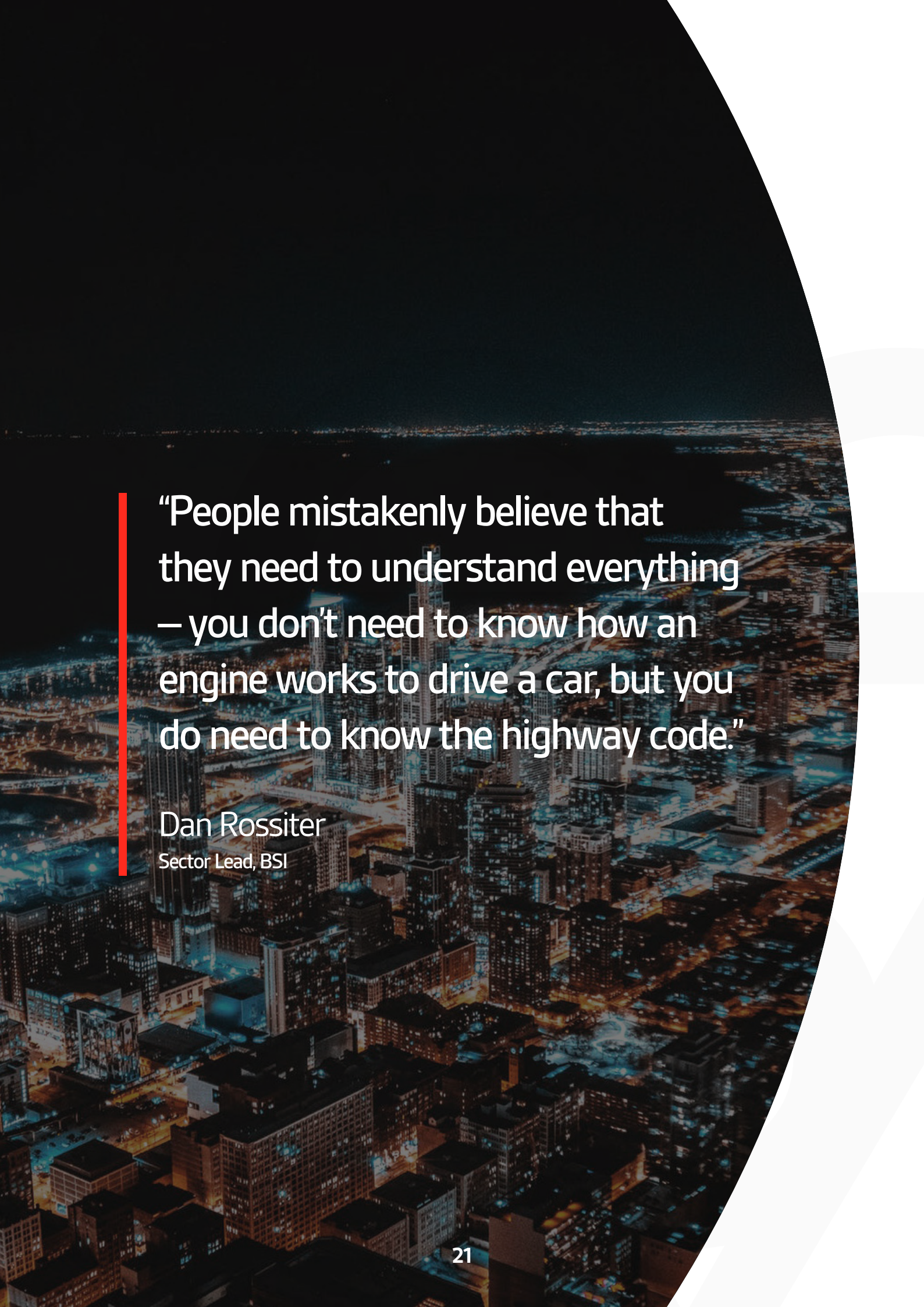
Certification Technical Expert
for BIM and Digital Construction, BSI

The most important things to show your stakeholders and clients are the logistics and value of your digital transformation strategy.

This starts at the beginning of projects. Just because a client or customer hasn't asked you to use processes like BIM or additive manufacturing in their project, it doesn't mean it won't be a worthy investment. It is often up to constructors, suppliers and manufacturers to show specifiers and designers the value of processes like these during early project phases and explain the long-term benefits it can create through to facilities management and building maintenance.

Organizations who have implemented successful digital transformation strategies have often done so by appointing an internal 'Champion' who helps their organization (from the top-down) understand the benefits of their new approach, and who is responsible for driving its adoption. This includes creating a swell of support from stakeholders, managing the certification, education and adoption of technology, and working with clients, suppliers and facilities managers to ensure everyone is on the same page. This way, organizations can see the long-term benefits of a digital transformation investment from the perspective of an in-house expert.

Remember – everyone doesn't need to know how the technology works, but they do need to know the principles and why it's in place.



"People mistakenly believe that they need to understand everything – you don't need to know how an engine works to drive a car, but you do need to know the highway code."

Dan Rossiter
Sector Lead, BSI

Propelling organizations into international markets

With standards in place, built environment professionals will be able to make digital construction a reality for their organization in 2020.

Not only will this modernization allow them to create stronger buildings, stronger relationships and stronger profits for years to come, but it will give them a competitive edge in international markets today.

Digital construction isn't an overnight project that can be achieved with a single piece of technology. It begins with the standardization of data and continually evolves with the gradual improvement of processes and systems.

True transformation happens when the collaboration and partnership of the built environment industries are used to build better, stronger, more connected cities for citizens of the world.

"Standards like ISO 19650 are opening up opportunities for companies to go beyond borders and work worldwide."

Dan Rossiter

Sector Lead, BSI

Standardization in action: BIM

In 2019, the first international standards for information management using BIM were published under ISO 19650.

Not only does ISO 19650 give all companies global opportunities to share their BIM knowledge and expertise, but it ensures that both international and local projects are managed consistently.

This standard has created new opportunities for companies to improve trust and communication across the supply chain, as well as addressing the need to share information throughout the asset lifecycle.

This demonstrates the long-term, global impact standardization can have on local projects.

Building blocks for success: your digital transformation checklist

How to secure your place in the smart cities of tomorrow, today

Go beyond mediocracy and unlock the potential of your organization with your next digital transformation strategy. To ensure that your foundations are strong, follow our implementation checklist and secure your place as construction leaders in the smart cities of tomorrow, today.

Create a strong foundation

- ☐ Test the quality and value of your data collection methods across systems and processes.
- ☐ Work with multidisciplinary teams to identify and prioritize which areas of your project delivery processes need to be improved.

Refine your business case

- ☐ Design a 12-month, three-year and five-year technology roadmap with clear actions to show which steps you need to take, when. If you haven't already, make BIM part of your roadmap today so that you don't fall behind your peers.
- ☐ Before rollout, make sure every team understands the benefits of these new solutions and has training on how to use them.

Roll out technology

- ☐ Ensure your new technology/processes meet industry certifications and standards (think global). Use independent third-party certification to validate your adoption of digital construction.
- ☐ Put measures in place for open communication across the supply chain with key stakeholders and teams throughout planning, rollout and use of new processes/ technology (through cloud-hosted meeting spaces or information management tools).

Manage performance and development

- ☐ Continually evaluate the successes and failures of your digital implementation and use incremental product/system changes where necessary.
- ☐ Work towards the next level of certification and training for your chosen technologies/ system so that you're always at the forefront of your field.

Why BSI?

A global brand and network – trusted and recognized around the world.

- A global network of **4,600** people supported by **12,200** industry experts
- Over **100 years' experience** across almost every sector
- Global specialization focused on **standards, training, certification and Entropy Software**
- Industry specialized auditors **constantly trained** on new standards and processes
- Our Credo "**Making Excellence a Habit**" keeps BSI **client focused, valued and appreciated** by our clients - BSI assessors score 9.25/10 in our Global Client Satisfaction Index

By Royal Charter

BSI, by Royal Charter is the business standards company that helps organizations all over the world make excellence a habit through standards creation, system certification, supplier verification and training activities that help organizations manage risk, reduce costs and ensure sustainability.

We also help organizations implement collective best practice, training 134,000 delegates and spending 191,000 days evaluating and certifying management systems each year.

We enable organizations to be more trusted. More secure. More responsible. More robust. More innovative. More agile. Combined, this enables an organization to be more resilient, ultimately enabling them to stand the test of time.

To find out more
Call: 02 294 4889
or visit: bsigroup.com/en-th

References

1. searcherp.techtarget.com/definition/Industry-40
2. www.bigrentz.com/blog/construction-trends
3. 2019 BSI survey results – Digital transformation of built environment and construction industries
4. 2019 BSI survey results – Digital transformation of built environment and construction industries
5. 2019 BSI survey results – Digital transformation of built environment and construction industries
6. 2019 BSI survey results – Digital transformation of built environment and construction industries
7. 2019 BSI survey results – Digital transformation of built environment and construction industries
8. www.digitaljournal.com/business/improving-data-collection-for-construction/article/525835
9. www.balfourbeatty.com/media/317639/balfour-beatty_collaborative-construction_july-2018.pdf
10. 2019 BSI survey results – Digital transformation of built environment and construction industries
11. 2019 BSI survey results – Digital transformation of built environment and construction industries
12. www.bsigroup.com/globalassets/localfiles/en-gb/bsol-construction/bsi-building-information-modelling-report.pdf