●The DNA of innovation 2023

How industry leaders are delivering scalable success within the built environment.

- ● Attitude
- ● Listening
- ● Creativity
- ● Collaboration
- ● Vision
- ● Structure
- ● Agility
- ● Fearlessness
- ● Proactivity

●Contents

●Introduction

From artificial intelligence and offsite construction to low-carbon materials and the circular economy, the built environment is experiencing a wave of change. But, while technological development may be facilitating the industry's digital transformation, it isn't the only catalyst for innovation. Nor does it guarantee scalability and organizational resilience.

So, what is the key to innovation success?

In this report, experts from the built environment explore the DNA of innovation: **the characteristics, mindsets, tactics, and strategies leaders and organizations must adopt to meet their carbon-neutral, circular economy and fourth industrial revolution goals.** Furthermore, BSI provides professionals with a framework that'll help those within the built environment go even further by demonstrating which innovative technologies and processes will help organizations deliver responsible, scalable, and sustainable success.

With practical advice and real-life examples of how organizations within the built environment have benefited from these principles, this report demonstrates how **innovation is not only necessary to remain competitive in the market but how it directly strengthens organizational resilience.**

BSI standard BS 65000 defines Organizational Resilience and the value it delivers as: "the ability of an organization to anticipate, prepare for, respond and adapt to incremental change and sudden disruptions in order to survive and prosper." **Organizational resilience** is much more than risk management. It's a holistic view of business health and success.

BSI's panel of built environment and innovation pioneers is led by:

Andrew Butterfield

Managing Director,
Global Built Environment,
BSI

Natasha Bambridge

Global Director,
Consumer Promise Practice,
BSI

Section 1

● Technology vs. innovation: The great debate

Technology is instrumental but insufficient alone to achieve true innovation.

● Technology vs. innovation: The great debate

Technology is instrumental but insufficient alone to achieve true innovation.

Whether you're trying to become carbon-neutral, or want to embrace the fourth industrial revolution, **big goals require big changes.**

When an organization invests in new technology to pursue ambitious goals, does that make it innovative?

Yes and no.

In the built environment, technology and innovation are often seen as identical. They're not. Innovation is the process of creating something new which delivers value – often through technology. But innovation itself goes beyond technology.

Innovation often uses existing technology in inspiring ways.
And sometimes innovation spurs the creation of new technology with untold potential for change. Take the development of Building Information Modelling (BIM), which was created with a clear vision to revolutionize the built environment, and has become the platform for yet more innovation.

"Innovation can be something that keeps you where you are, and **ensures that you're surviving**, or it can be **something that accelerates you**, so that you're thriving as an organization. It's about ensuring that you remain resilient and relevant in your sector."

Natasha Bambridge

5

●Not all innovation is equal

Innovation is more than the sum of its parts. For example, the circular economy isn't just smart materials or photovoltaics or clever logistics.

Innovation goes beyond any individual product or outcome. On their own, for example, smart materials or sustainable processes wouldn't have revolutionized sustainability within the built environment. Innovation embodies an overarching vision, culture, framework and process.

Innovation sits above the enabler of technology. Investments in solutions such as BIM, artificial intelligence (AI), and virtual reality (VR) offer significant advances for built environment professionals, but on their own they are simply tools. But with a culture of innovation and a structured process for applying these technologies, organizations can maximize their impact and potential benefits.

Truly innovative businesses share a mindset. They are always asking:

"What comes next?"

"How can we do this better?"

"Where are the untapped opportunities?"

"What do our customers need?"

Because risk, resources, and rivals don't stand still, neither do resilient organizations. They're able to turn visionary goals into tangible results because their innovation strategies benefit from a clear purpose and principles, and they leverage technologies and processes effectively, often using standards to underpin them.

"**Technology is an enabler of the outcome you're trying to drive.** But all too often, organizations invest in the technology without thinking through what they want to achieve. You need to think more holistically – it's about embedding the right culture and processes within the organization."

Andrew Butterfield

"Listening to customers and developing solutions that address a specific need, or a **future need**, is considered one of the fundamental ingredients of our innovation success at Polypipe"

Jason Shingleton, Marketing and Development Director, Polypipe

6
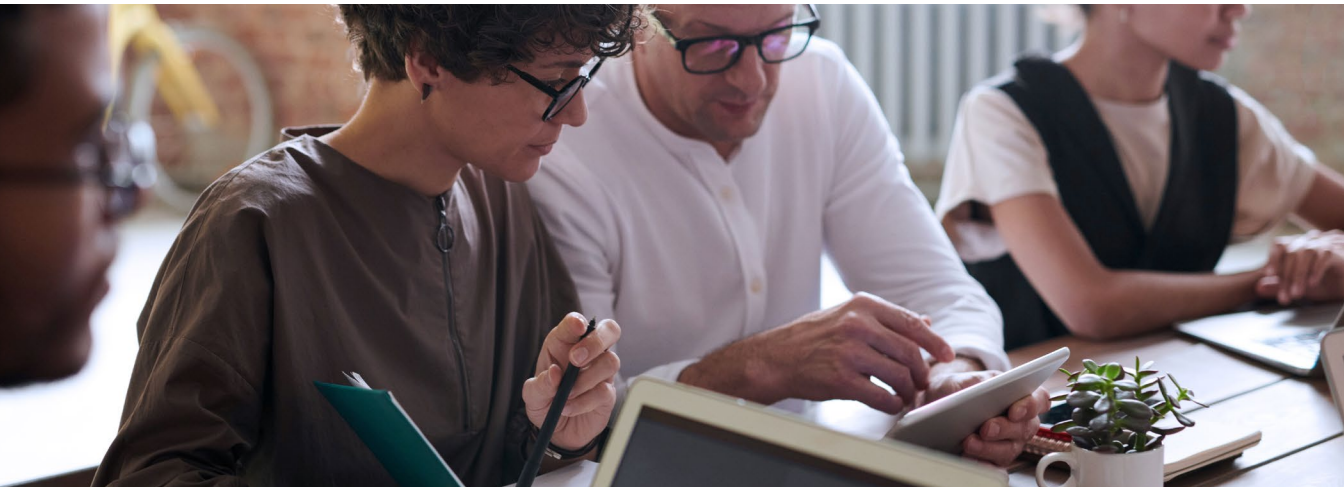
● Innovation principles

As we begin to slowly move towards a post-Covid landscape, all stakeholders within the built environment must ensure they operate ethically, safely, and with agility, if they are to maintain organizational resilience. When it comes to investing in new technologies, solutions or processes to help organizations achieve that, they must choose to innovate in ways that are both responsible and sustainable. Frameworks like **PAS 440** or the **UN Sustainable Development Goals** are vital for organizations looking to innovate in today's complex landscape.

"The role of standards is to convene relevant expertise so that we create an ecosystem for collaboration to thrive. Standards are developed through collaboration, where experts define and agree what best practice looks like, helping to achieve a more consistent and coordinated approach to driving innovation.."

Andrew Butterfield

● Responsible innovation

In **PAS 440**, responsible innovation "seeks to eliminate, minimize or mitigate any potential downsides from the perspectives of the company, its employees, suppliers and customers, and stakeholders who might be impacted, directly or indirectly, by the innovation. It is an attempt to improve our collective futures by taking responsibility for, and improving, today's innovation practices."

● Sustainable innovation

With the **UN Sustainable Development Goals** as the lodestar, sustainable innovation covers processes and frameworks that help organizations go beyond the industry's carbon-neutral and circular economy goals to deliver spaces that improve the health, safety and wellbeing of people in every aspect of their lives.

●Case study

Innovation culture in action

●**Skanska UK:** Fearlessness, creativity and agility

Skanska is one of the world's leading development and construction companies, with the core purpose of its innovation strategy focused on delivering better outcomes for customers.

Vaibhav Tyagi, Business Improvement Director at Skanska UK, outlines what this means in the real world:

●Fearlessness

You can have the right processes and systems in place, but it's actually people who innovate. We motivate and empower our people to do just that, channelling ideas and harnessing the creativity that exists across the business.

●Creativity

We focus on creating the right partnerships and working collaboratively with our customers, design partners, construction partners, and specialist consultants. Creating an environment in the early stages of a project that allows people to openly exchange ideas and thoughts on its delivery can lead to benefits later on in the project lifecycle.

●Agility

Our innovation plans and strategy for 2020 had to be adapted to the new world of Covid-19. With hundreds of sites around the UK, we realized early on that we needed an efficient way to allow our people to collaborate on problems and come up with quick solutions. We introduced a new platform where people can share knowledge, innovation and good ideas across the business to improve productivity and continue to work safely.

"For us, the BSI Kitemark for Innovation Management provides a structured framework for innovation which enables us to be agile, adaptable and to innovate at scale. The BSI certification also helps to differentiate us in the market by providing an independent seal of approval for our approach to innovation."

Section 2

● **The innovation cycle: What's needed for success?**

Innovation can't be switched on and off – it must be embedded into your culture.

● The innovation cycle: What's needed for success?

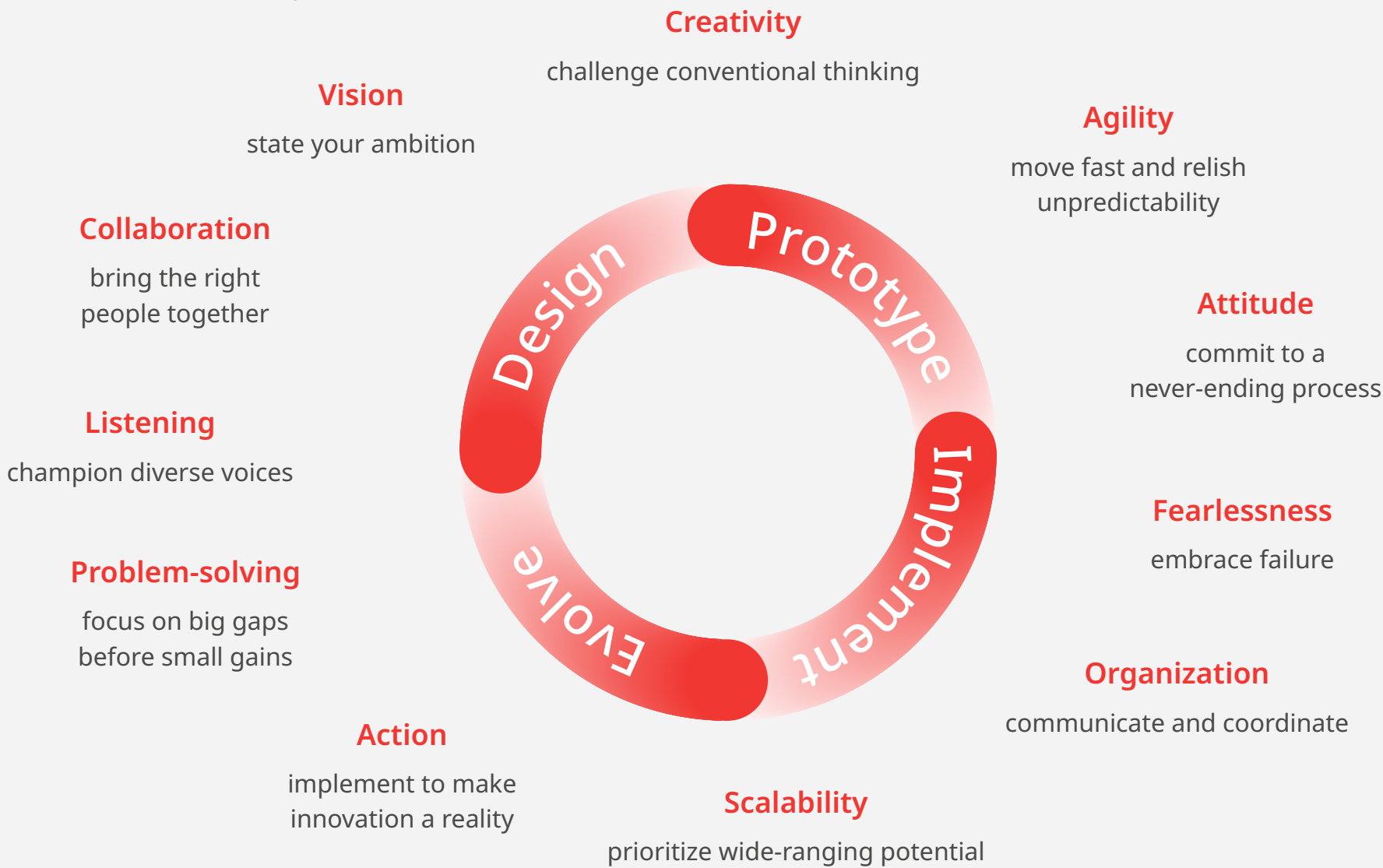**Innovation can't be switched on and off – it must be embedded into your culture.**

Industry leaders agree that successful innovation is born out of a managed, inclusive culture of innovation nurtured across all parts of an organization. **Organizations which actively allow individuals to participate, and who include a feedback loop, may find themselves to be more sustainable and resilient**.

Innovation isn't always a linear process, and it certainly isn't a tool you can pick up and put down. It's a continuous process that requires a range of different actions and attributes from individuals, teams and business leaders. In this section, we not only explore the DNA of innovation, but the framework that facilitates change.

"**Standards are an enabler that allow you to be agile.** They provide you with a framework to shape your business, with agility actually enhanced in a more consistent and structure way

Natasha Bambridge

The BSI innovation culture cycle

Creativity
challenge conventional thinking

Vision
state your ambition

Agility
move fast and relish unpredictability

Collaboration
bring the right people together

Attitude
commit to a never-ending process

Listening
champion diverse voices

Fearlessness
embrace failure

Problem-solving
focus on big gaps before small gains

Organization
communicate and coordinate

Action
implement to make innovation a reality

Scalability
prioritize wide-ranging potential

Design Prototype Implement Evolve

10

● The DNA of innovation

The BSI innovation culture cycle described on the previous page highlights the attributes that BSI has found to be shared by highly innovative businesses over the past 100 years.

These attributes – **Attitude, Listening, Creativity, Teamwork, Vision, Structure, Agility, Fearlessness, and Proactivity** – represent almost everything organizations need to embrace positive change and leverage technology with purpose.

Through them, your business can bring together the right people, embed the right culture, and implement the right technology.

That leaves just one more one key ingredient – the right framework.

Here, standards offer the solution. They provide a proven, reliable framework to enable your business to bring ideas to life and transform the ingredients of innovation into tangible results.

"BSI has a track record of convening experts and creating an ecosystem of support for businesses. Organizations can draw on this incredible resource when they adopt standards in order to innovate rapidly and effectively."

Paul Evans, Executive Director and CTO at Gammon Construction Limited

"BSI convene an ecosystem of experts; based on their shared experience and knowledge, organizations can adopt the standards to i**nnovate rapidly and more effectively**."

Natasha Bambridge

The Innovation guide, **PAS 440**, provides a template and framework for built environment organizations developing new products, processes, or services.

The International Standard **ISO 56002**, provides guidance for the establishment, implementation, maintenance, and continual improvement of an innovation management system for use in all established organizations.

● Encouraging a positive learning journey

Good ideas can come from anywhere. That's why **successful organizations are inclusive, championing innovation at all levels** from the shopfloor to the boardroom, seeking input from a diverse range of relevant stakeholders.

They also adopt a 'fail fast' philosophy, which means that when an idea won't fly they drop it quickly. They don't expect every new concept to work, but nor do they allow failures to slow the overall pace of innovation. Crucially, they capture key learnings from setbacks as well roaring success stories.

"At Skanska UK, we believe that **creating a collaborative culture is key to driving innovation**. We motivate and empower our people to innovate – channelling ideas and harnessing the creativity across the business.

We also create the right partnerships and work collaboratively with our customers, supply chain, industry and academia. This brings more diverse thinking and leads to improved productivity and better outcomes for our customers."

Vaibhav Tyagi, Business Improvement Director at Skanska UK

●Case study

Innovation culture in action

●**Polypipe:** Structure, problem-solving and active listening

Construction manufacturer Polypipe operates in tough, competitive markets, where the need to differentiate itself from competitors is key to its ongoing success. New and improved products are a crucial point of difference, requiring innovation to be embedded in the company's culture.

Jason Shingleton, Marketing and Development Director at Polypipe, talks more about his company's approach to innovation:

●Structure

In recent months, we've become even more focused on innovation by setting vitality index targets for the group, which is typically calculated as the percentage of net sales revenue generated from recently launched products. This challenges the various parts of our business to come up with growth-generating breakthrough innovations, as well as more routine enhancements, as part of a balanced innovation mix.

●Problem-solving

For me, the key to developing a commercially viable product or service is finding solutions to customers' problems. That's the easiest way to commercialize because you've already got a customer there once you've developed the solution. We challenge our team to try and spot customers' problems – even before they do themselves sometimes – that we can solve for them.

●Active listening

Collaboration is key because the more people work together, the faster and better innovation is likely to be. We also like to be involved in innovation at the project level by collaborating with contractors and consultants, because some innovations are about how we apply our products and how we can use them from a design perspective.

"Adopting ISO 56002 for innovation management gave us an opportunity to systemize and standardize our procedures for innovation. This, in turn, has helped make the process more visible and our people more productive. Achieving the BSI Kitemark to go with the standard is not only a great endorsement of the good work that Polypipe is doing, but also demonstrates that our innovation processes are rigorous."

"That's important for all our stakeholders, not least our shareholders, who want to see that level of materiality in what we're doing. It shows that our vitality index score is not just a 'nice to have' aspiration, but a genuine target that will drive real value, with a robust process underpinning it."

● Measurement and reporting make it real

If something is worth innovating, it's worth measuring. Stakeholders and leadership teams must agree on what quantifiable metrics to track, and how they will capture and share the evidence. This will provide essential feedback to refine or refocus innovation roadmaps, and reassure investors, customers, and regulators. Regular or continuous measurement, reviewed at agreed stages in a project, helps to avoid setbacks and identify opportunities that would otherwise be overlooked.

What outputs can you measure?

Commercial success, customer satisfaction, cost, speed, energy performance, resource efficiency, emissions reductions, elimination of waste, ease of maintenance, longevity, health and safety, economic impact, employment opportunities...

● Will it scale?

As every Government agency, contractor or manufacturing business knows, there is a world of difference between a successful trial and a scalable product or process. Organizations that adopt a standards-based approach, together with robust measurement and reporting structure, can make **more informed investment choices to develop repeatable, reliable innovations and unlock future opportunities**.

"**For any innovation management programme, the key is to be able to measure the results**. The BSI Kitemark for innovation management is a rigorous solution for organizations looking to realize true value from their innovation management programmes because we test the input, output, and throughput of the process for incrementally improving results, going beyond a management system audit."

Kareem Aboul-Fadl, Client Manager – IMETA Global Scheme Manager – BSI Kitemark for innovation management, BSI

14

●Frameworks make innovation scalable

As projects or organizations scale and achieve critical mass, it's all too easy for people and processes to start to follow different paths. Establishing a **shared framework from the outset facilitates collaboration and communication of information**, so everybody is working in a coordinated way.

"One of the biggest challenges for scaling up innovative projects is **going from a concept, which is controlled and ringfenced, into something that's actually implemented across the whole organization**. With the built environment, you've got teams which are often dispersed, you've got projects that are already in flight – how do you then drop in a significant change or innovation into something that's already up and running?"

"**Standards provide that backbone and guidance** that you can then work through to identify, 'What are we doing today?', 'Where are our gaps?' and 'What's our roadmap through shortcutting, effectively, to what best practice looks like for us to successfully innovate?'"

Natasha Bambridge

15

●Case study

Innovation culture in action

●Gammon Construction:

Organization, teamwork and scalability

At Gammon Construction Limited, pioneering change is an intrinsic part of the Hong Kong-based engineering contractor's culture, contributing to its long-term resilience and sustainability. The company has internal departments dedicated to innovation and technological advancement, ranging from digital transformation to AI and robotics.

Paul Evans, Executive Director and Chief Technology Officer, and Dr David-John Gibbs, Senior Digital Manager, discuss what innovation means to Gammon:

●Organization

Innovation is driven right from the top, from our CEO and Executive Board. There's a clear expectation in everything we do, and on every project, to constantly look to do things better, whether that's improving processes, upskilling staff, or adopting new technologies.

We run a broad range of recognition programmes that includes an annual innovation competition to reward our staff for demonstrating creativity and seeking out new ideas and technology to benefit our operations. We also promote interdisciplinary collaboration through a number of initiatives that enable the cross-fertilization of ideas.

●Scalability

We seek out and collaborate with industry experts and academic institutions on the latest methods and technology that will benefit both our business and the industry as a whole. It's exciting to get involved on this level, because these specialists generate some great ideas and products that we can make 'Gammon-specific' and scale up across projects.

●Teamwork

We don't just contain innovations within Gammon, but try and share them with our clients, our subcontractors, and the broader construction industry, to simply try to do things better.

"Creating a common framework and language around innovation helps with collaboration and dissemination of information, so everybody's working in a coordinated way.

"If you don't put the processes in place, you risk losing out on the benefits of effective collaboration – and this is a key area where the ISO 56002 standard for innovation management, and the BSI Kitemark certification scheme, can add so much value."

Section 3

● **Putting innovation into practice**

With foundational principles in place, technology becomes transformative.

●Putting innovation into practice

With foundational principles in place, technology becomes transformative.

For your business to remain competitive and resilient, you need to make Innovation happen. That means selecting and combining the right solutions.

"We work very collaboratively with our clients to turn ideas into products and solutions for clients to drive to commercial success. That sounds quite hard-nosed, but it's realistic, it's pragmatic, and it proves we're trying to live the innovation we talk about."

Tim Embley, Group Research and Innovation Director, Costain

"Innovation is a process of continual improvement. Organizations should consider how they continually review past innovation and how future innovation can constantly build upon this and drive even better outcomes in the future."

Andrew Butterfield

18

● Navigating the technology landscape

The top 12 tools and systems for built environment innovators

Many new or emerging technological solutions have the potential to support innovation in different organizations. Selecting the right solutions for your business is the key to smooth implementation and a strong return on investment.

5 3-D printing

6 Offsite Construction

1 AI and ML

2 Analytics

8 Drones

3 VR

9 BIM

12 Quality control

10 Digital twins

4 Remote auditing

11 Supply chain optimization

7 Robotics

AI (artificial intelligence) and ML (machine learning).

"AI and ML are rooted in data… For example: how is a building really operating? How are its structural components doing over time? What are its real-time energy, lighting and water uses? How do they get to and from the building? How do people actually use the building in practice, and what do they really want?"

Will Cavendish, Arup

VR (virtual reality) technology.

"From initial design mock-ups, to project collaboration, through to the finishing touches that make a building design go from good to great, virtual reality possesses the capability to really sell an idea better than any other medium."

TMD STUDIO LTD

Robotics.

"In the past, robots were used for specialist jobs that were too dull, too dangerous or too dirty for people to do. Today, thanks to their ability to process sensor data in real time, robots do an incredible range of things. They already clean your house. Soon they'll be able to help design and build your house too."

Alvise Simondetti, Global Leader, Arup Explores

Building Information Modelling (BIM).

"A passport to global opportunities and collaboration. BIM enables efficient, consistent, and transparent communication throughout an asset's entire lifecycle – by giving the right people shared access to the right data."

BSI

Remote auditing.

"Using video calls, remote auditing can reduce the number of people required on site, which helps minimize the risk of a COVID-19 outbreak and prevent unnecessary delays in the review of a site – all whilst allowing more people to share their expertise quickly."

BSI

●Case study

Innovation culture in action

●**Costain:** Attitude, action and vision

Innovation is core to Costain's work, its people, and its business as a smart infrastructure solutions company. It defines what it does and how it serves both clients and society. It also helps the company leave a legacy of better, greener, and digitally optimized infrastructure that improves people's lives.

Tim Embley, Research and Innovation Director, explains how:

●Attitude

On a major project to upgrade the A14, we were struggling to find a way to build two bridges over the existing A14 without significantly impacting drivers or our schedule. A young engineer with a 'can do' attitude responded to our call for suggestions. He put forward a plan to construct the bridges off-site, transport them to the area, and lift them into position. The result was that two bridges were installed in one weekend, which meant we avoided 80 night-time full closures of the A14.

●Action

An example of innovation in action came from our role as the key delivery partner for Network Rail in the redevelopment of the UK's fourth-largest railway station, London Bridge. The key to delivering the upgrade, while keeping the station open to the travelling public, was collaborative engineering, enabled by using computer-aided design and digital programme delivery. Our specialists used sophisticated new technologies, such as augmented reality to visualize the end station before construction started, and laser-scanned 3D models to use 'right first-time' offsite manufacture to address the constraints on the build programme.

●Vision

Looking ahead, we aim to push the pace on digitization and innovation in infrastructure through a new cloud-based platform called the Intelligent Infrastructure Control Centre (IICC). The IICC will harmonize the vast quantities of intelligence that UK infrastructure projects generate and drive greater productivity and resilience through the capture of efficiency measures and innovation. This will contribute to a radical culture change in how the industry designs and delivers projects and will offer a completely different way of managing operations that will save time and money.

"Collaboration and innovation work hand in hand. Having processes for both ISO 44001 [for collaborative business relationship management] and ISO 56002 [for innovation management] allows allows a common language and clarity in delivery that cements quality service. Applying both standards ensures that we are consistently improving productivity and providing the best solutions to our clients."

"Independent BSI audits provide an impartial view, offering suggestions for improvement on what we are doing. Being both collaborative and innovative means we have to be agile in the way we go to work, embracing partners and their approaches, but also bringing innovation together to deliver greater value to our clients."

Section 4

● The forefront of innovation

Three groundbreaking technologies and practices advancing the industry.

● The forefront of innovation

Three groundbreaking technologies and practices advancing the industry.

Many of the technologies described in the previous section are now well-established. So what comes next? **Any organization that wants to become or remain an industry leader will already be investing in the next wave of innovation**. The following are some of the most promising technologies poised to advance the cbuilt environment in the forseeable future.

"The enabling technologies of the fourth industrial revolution are a set of complex systems that combine technologies, such as smart materials, with embedded, bio-inspired sensors. Therefore, each of the following **categories can only unfold its potential when combined with others, as a part of systems and technological frameworks.**"

European Commission

● **Case study**

A 'living building'

"The OME is an experimental biological house that forms a key part of the £8m Hub for Biotechnology in the Built Environment (HBBE). A joint initiative between Newcastle and Northumbria Universities in the UK, **the HBBE is "creatively harnessing biotechnology to develop a new generation of sustainable 'living buildings'.**

"The OME will study a wide range of technologies "from new materials grown from microbes through to waste systems which generate power from the output of the toilet. It will sit above a laboratory, where processes will be developed to convert domestic waste, including human waste, food waste, cardboard, and plastics, into fuel, electricity, and other useful products.

"There is nothing quite like the OME anywhere in the world. The building will create a space to develop technologies which are well beyond the state-of-the-art."

Professor Martyn Dade-Robertson, Co-Director of the HBBE at Newcastle University[2]

● **Bio-inspired technologies and smart materials**

Smart construction materials adapt to changes in their environment, including mechanical stress, magnetic and electrical fields, temperature, moisture, pH, and light. They hold the promise of creating responsive environments with enhanced performance and energy efficiency. Bio-inspired materials take this one step further, **exploiting natural mechanisms to achieve various advantages**, including self-repairing surfaces and intrinsic traceability.

●Case study

Limitless possibilities in the world's first virtualized city

Virtual Singapore is one of the first digital twins of an actual city. The dynamic 3D model is still in development but is already getting community buy-in for numerous sustainability innovations.

"Virtual Singapore serves as a **convenient platform for citizens to visualise upgrades to their estate, and allows them to provide timely feedback to the relevant agencies**. For instance, the Yuhua estate is a test-bedding site for the Housing and Development Board's Greenprint initiative, which features sustainable and green features such as solar panels, LED lights, pneumatic waste conveyance system, enhanced pedestrian networks and extended cycling networks. With the completion of Virtual Yuhua, it could be used to showcase the possibilities and benefits of the HDB Greenprint initiative in other estates."

National Research Foundation, Prime Minister's Office, Singapore

●Building a digital twin

'Digital twins' are digital representations of actual assets, processes and systems; typically using Internet of Things (IoT) sensors and actuators to maintain a dynamic, bi-directional relationship. Leveraging analytics and AI, **developers can interpret the vast amounts of information being received to support decision-making** around use cases such as process optimization, preventative maintenance and energy use.

These digital twins can form the basis of models used to simulate the political, economic, social, and environmental impact of any conceivable changes or events; allowing organizations to optimize investments in everything from energy efficiency to the introduction of autonomous vehicles.

●Case study

Flying factories generate efficiency savings on Britain's biggest road project

●Flying factories and modular construction

Flying factories are temporary facilities used to manufacture prefabricated components. Typical offsite construction facilities require a lot of upfront investment and high transportation costs. Flying factories can be located close to or on construction sites, or where materials are sourced, to reduce transportation costs and speed up the process. They can also be scaled up or down to meet demand.

Skanska UK has successfully implemented the 'flying factories' approach on a number of projects, including the award-winning A14 Cambridge to Huntingdon improvement scheme.

Delivered by a joint venture bringing together Skanska, Costain and Balfour Beatty with Highways England, the A14 is a vital transport corridor linking the major ports in East Anglia with the West Midlands and the north.

The team created an adjacent temporary **flying factory that could manufacture precast concrete slabs for the new 750-metre River Great Ouse Viaduct**, a critical structure on the A14. The slabs were manufactured in a controlled, weather-sealed environment to exacting technical specifications.

Thanks to the close proximity of the flying factory to the viaduct, slabs could be built larger than would otherwise have been possible if they needed to be transported to site on main roads. This also meant that 5,500 fewer crane lifts were required.

The offsite approach generated efficiency savings of £4 million and allowed the viaduct to be completed two months ahead of schedule.
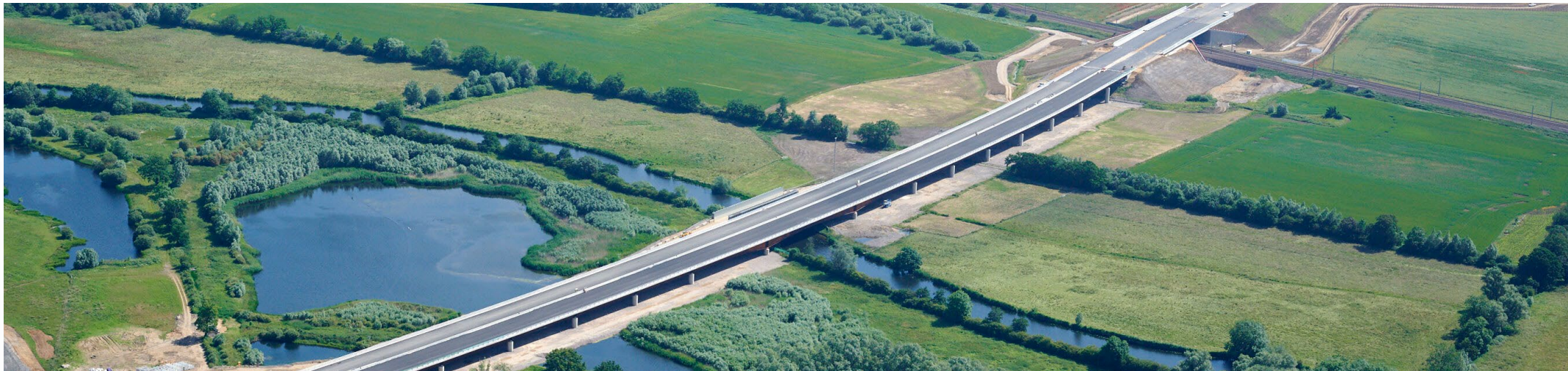
Section 5

● **Taking the next step**

● Taking the next step

Built environment organizations can achieve resilience and sustainability by adopting a culture of innovation underpinned by a standards-based approach. Individuals, teams, and entire businesses must leverage technology, systems, and processes in new ways that bring **clarity, creativity, and collaboration to deliver a scalable, sustainable future**.

"The first step is to make sure that innovation is an open process – that means selecting a diverse team with different backgrounds, ideas and experiences. It's also about thinking, '**Who else can engage in this innovation?', 'What suppliers or partners do we work with?'** Risk mitigation is also really important. And the other thing is definitely culture. **Innovation needs to feel like it's part of everyone's responsibility.** It's not just something that sits on the side, but is integrated into the business – it's what our strategy is, **it's how we think, it's how we operate, it's how we are.**"

Natasha Bambridge

27

🔴 Benchmarks for innovation

BSI provides the standards, training and certification to help you achieve meaningful change. Below is a selection of some of the most important resources for organizations pursuing innovation in the built environment.

Develop your own PAS - a fast-track standardization document

ISO 19650-0/1/2/3/5
Organization and digitization of information about buildings and civil engineering works, including building information modeling (BIM).

Standards for IT and Cyber security

Smart cities
Enabling collaboration and an open eco-system for city partnerships

PAS 440
Guidance on how to achieve and demonstrate responsible innovation.
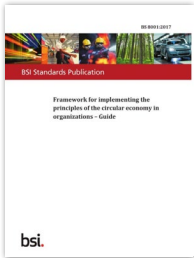
BS 8001
Framework for implementing the principles of the circular economy in organizations guide.
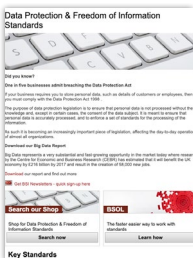
Privacy and freedom of information standards

ISO 56000 series
The ISO 56000 family of standards provide guidance and support for creating value in your organization.

ISO 27001
Information technology. Security techniques. INformation security management systems. Requirements
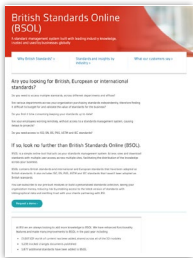
BSOL
British standards online for cyber security, information management and more.

BS 6079
Project management. Principles and guidance.

Standards for all construction and building materials
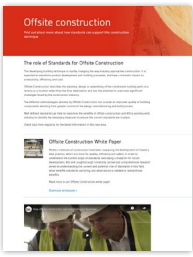
Offsite construction
Transforming product development and building processes

🔴 Training and assurance solutions to help you embed and validate best practice in your organization.
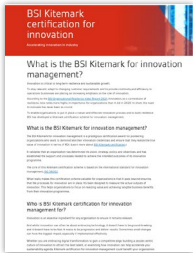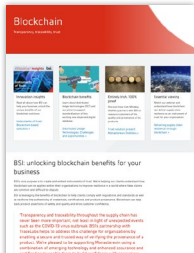
BSI Kitemark for innovation management

BSI Kitemark for BIM asset lifecycle
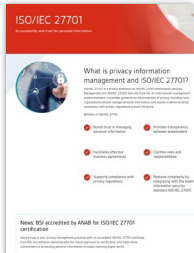
ISO 27001
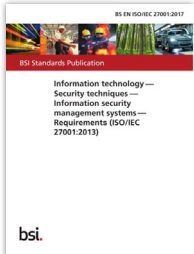Keep your confidential information safe.

Blockchain and immersive technology solutions
Transparency, traceability, trust.

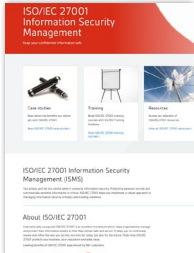**BSI Kitemark for BIM design and construction**

BSI Kitemark for BIM software

ISO 27701
Accountability and trust for personal information.

BSI Kitemark for BIM asset management

BSI Kitemark for secure digital applications

IoT connected assets
Enabling a smart and secure world by creating best practice.

BSI Kitemark for BIM objects
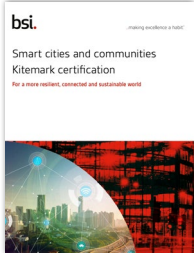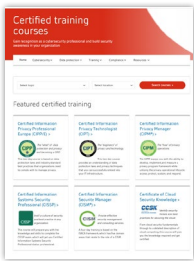
BSI Kitemark for smart cities and communities
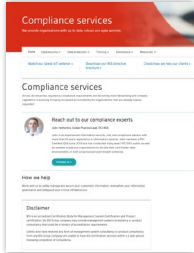
Compliance services for information security and risk management

Training

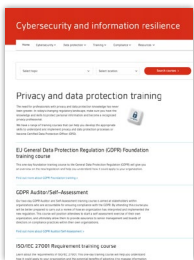● Training solutions to help you embed best practice in your organization.
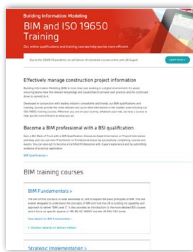
BIM training courses. From fundamentals to training on specific BIM standards
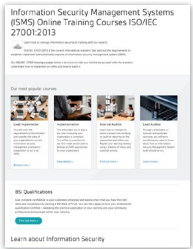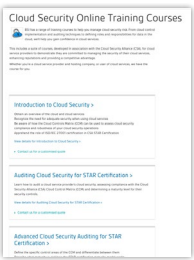
Cyber security training

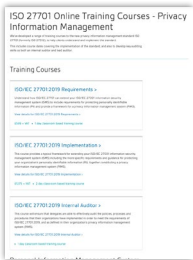**BIM qualifications for project management and asset management**

Data protection training

ISO 27001 training

Information Security Management systems

Cloud security auditing training

ISO 277001 training

Privacy information management training

BSI/UK/1976/BUILT/0721/EN/DR

bsi.

● To find out more **call: +974 40 29 9001**or **E-mail: bsi.me@bsigroup.com**