

Leadership Perspective

Connecting Physical and Digital Infrastructure for a Smarter Water Future

Stephen Slessor
CEO, RSE



Digitalisation is becoming increasingly essential as organisations look to replace or upgrade existing assets and enable more intelligent, responsive infrastructure. But barriers to widespread adoption remain, and the RSE Group is working with organisations to help them navigate the digital transition.

Unlocking the full potential of digital systems, however, means designing them to be integrated and future-ready, with cybersecurity embedded from the outset and managed throughout the asset lifecycle. We can look across sectors for insight into good practice, while considering digital and physical infrastructure as parts of the same system rather than in isolation.

Why now is the moment to accelerate digitalisation

The UK water sector is at a critical moment for infrastructure investment. Utilities face mounting pressures to deliver billions of pounds of major upgrades to enhance infrastructure resilience and operational performance, while meeting ever-evolving regulatory requirements.

It's testing the sector's ability to deliver at unprecedented scale – but it also offers an opportunity to set the industry on the right footing for decades to come. Utilities must also consider how they navigate the digital transformation happening simultaneously.

As part of the RSE Group, DPS provides digitalisation and cybersecurity across sectors. For water treatment infrastructure, it works alongside our wider engineering and manufacturing capabilities, enabling us to help utilities bring physical and digital systems together to improve performance and long-term operational value.

Together, we see firsthand the pressure to digitalise, which goes beyond bringing systems up to today's spec. Systems also need to be designed with the future in mind, as technology advances and further strains such as climate change, population growth and new industrial usage become more prominent.

Digital systems ultimately underpin how the sector supports delivery objectives and achieves better performance. They provide the eyes and ears, gathering critical data to enable sound operational decisions and give operators greater visibility of asset and process performance.

Despite this, there is a notable confidence gap between organisations' perceived digital capabilities and confidence in delivering regulatory commitments. RSE's recent survey of more than 85 organisations across the water supply chain found that while 87% of respondents felt fully or mostly prepared to deliver overall, just 56% said the same of their organisation's digital requirements.

“There is a notable confidence gap between organisations' perceived digital capabilities and confidence in delivering regulatory commitments.”

This gap matters because digital readiness affects how well organisations can use data from their physical assets. A lot of operational data already exists but is often used primarily for control and compliance rather than improving processes and performance. Unlocking its wider value requires the right data to be available where and when it is needed, supported by appropriately designed connectivity.

But technology is only part of the larger infrastructure challenge. Capacity and skills are another. The same survey found that 54% of respondents view workforce and skills as a separate barrier, while more than a third identified improving organisational capability and skills as an opportunity to help meet regulatory commitments.

The broader opportunity within the current investment period is therefore to consider physical and digital infrastructure alongside the skills needed to support it. RSE's relationship with DPS enables us to bring these perspectives together – combining physical treatment infrastructure with the controls, data and digital systems needed to operate it. Many assets will remain operational long after the current regulatory cycle, meaning decisions made about them now will have implications for decades.

Challenging the mindset on digital connectivity and security

Greater digital connectivity, of course, brings its own concerns and challenges – from compatibility with ageing and fragmented systems to alignment with long-established ways of working. Overall, 52% say that cybersecurity is a main barrier to digital integration.

Digitally integrated ecosystems also raise concerns about additional security vulnerabilities. While that hesitation isn't entirely misplaced, it can reinforce a perception that less connectivity inherently means better security.

Disconnection can reduce particular forms of exposure, but it's not a complete cybersecurity strategy. Without robust monitoring, organisations can essentially be flying blind, with limited visibility of what's happening across their operational technology systems. That in itself can be a security risk, making it harder to spot anomalous activity and respond when something goes wrong.

The National Cyber Security Centre's (NCSC) water-sector example on secure connectivity illustrates the necessary balance particularly well. Its principles emphasise limiting unnecessary exposure and controlling how systems connect and communicate through measures including network segmentation, secure and monitored access and hardened operational technology boundaries.

The sector's concerns are legitimate, but ultimately, cybersecurity is compatible and intertwined with the benefits of digitalisation. Risks can be managed more effectively when cybersecurity is considered from the early design and throughout the asset lifecycle.

“RSE's relationship with DPS enables us to combine an understanding of physical treatment infrastructure with the controls, data and digital systems needed to operate it.”



Designing and delivering future-ready systems

Future-proofing digital infrastructure is less about predicting which technologies will dominate in ten or twenty years and more about designing systems that can adapt progressively as the demands on water infrastructure change.

Across the RSE Group, we increasingly see digitalisation as part of an integrated infrastructure strategy connecting physical and digital assets, rather than a standalone technology programme. DPS's approach starts with the process and operational outcome, then works backwards to design architecture that integrates instrumentation, controls, automation, operational technology, data and cybersecurity.

As part of that, security is built in from the outset, alongside standardisation – where possible – so digital systems can be supported and adapted over time without replacing the whole control environment at once.

For example, we standardise the security architecture rather than the individual site. Every RSE and DPS design starts from a common reference pattern for network segmentation, operational technology boundaries and remote access and monitoring, which is then adapted to the process. This common pattern provides a consistent security baseline across sites, making systems easier to maintain in alignment with NCSC guidance and extend as new sites are added without redesigning security each time.

Our Instrument to Cloud approach considers the whole digital chain – from the physical process and instrumentation, through the control and monitoring systems that operate equipment and provide site oversight, to the data platforms and applications used for analysis and optimisation. The aim is to make the right operational data securely available where it creates the most value, while ensuring each part works together as one integrated system.

Once the architecture is in place, the focus shifts to ensuring systems remain effective throughout their lifecycle as operational requirements and technologies change. RSE has found considerable value in multidisciplinary teams that bring process, electrical, control, operational technology and cybersecurity expertise together. We also mitigate site risk and disruption by engineering and testing off-site where we can before delivering systems in controlled phases.

The result is integrated digital infrastructure that can be supported and adapted while vital operations continue. RSE's standard model means that 85% of delivery work happens inside the manufacturing facility with the remaining 15% being finished on site. For utilities operating critical infrastructure 24 hours a day, modernising without disrupting services is paramount, and RSE's phased approach is designed to bring systems up to modern standards while minimising downtime and plant access limitations.

Today's decisions will lay the foundations for years to come, and making the most of this moment means thinking beyond individual technologies and considering how the physical and digital work together as a whole.

Through the combined experience of RSE and DPS, we see significant scope to help utilities bring those elements together into future-ready and secure infrastructure. Getting it right can avoid unnecessary complexity, make better use of existing operational data and ensure the sector can adapt as technologies and regulations evolve.

“Risks can be managed more effectively when cybersecurity considered from the early design and throughout the asset lifecycle.”

Leadership Perspective

Harnessing Insights for Cross-sector Learning

Martin Brownlee
Managing Director, DPS



Digital transformation is not unique to the water sector. While the challenges are rarely identical, other industries face similar issues around legacy infrastructure, complex industrial processes and secure connectivity. This creates opportunities to share proven approaches while recognising water's particular constraints.

Within the RSE Group, DPS works across sectors including power, food and beverage, pharmaceuticals, manufacturing and energy – drawing on that collective experience to help water companies adapt technologies and approaches to their own environment.

“Sharing collective expertise offers leaders opportunities to break down silos, challenge underlying assumptions and capitalise on transferable solutions.”

This breadth of experience is a great advantage, and many of the projects we've worked on show that no industry is navigating digital acceleration alone. Sharing collective expertise offers leaders opportunities to break down silos, challenge underlying assumptions and capitalise on transferable solutions.

Adopting a cross-sector perspective can help water modernise with greater confidence, allowing its digital transformation to progress faster and with less risk while developing systems around the sector's distinct operational needs.



About RSE

RSE is a trusted water technology company solving today's water challenges. From treatment to controls, we design, manufacture and integrate the technologies and systems that keep water moving. Working across municipal and industrial markets, we deliver solutions spanning water and wastewater treatment, chemical dosing, automation, offsite modular build and lifecycle support.

Our integrated approach combines specialist engineering, manufacturing and digital expertise to help customers improve performance, resilience and sustainability. Through innovative modular solutions and a commitment to continuous improvement, RSE is transforming how water infrastructure is designed, delivered and managed.