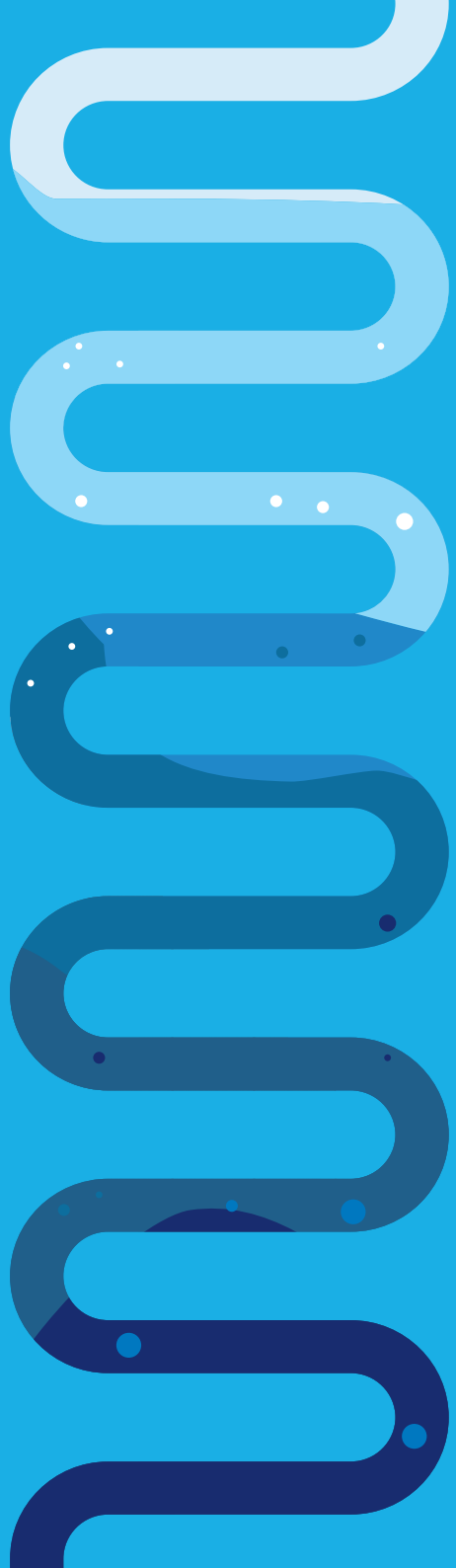


The Evolving Water Utility Through a Digital Lens

Selected themes and directions of travel

Foresight note

Professor Tony Conway
May 2026
Visiting Professor, University of Sheffield
Director, Conway Strategic Water Consulting

About Foresight Notes

Foresight notes provide a view of emerging themes and directions of travel within the water sector. They draw on a synthesis of academic research, public policy developments, advisory engagements, sector dialogue and industry observation to identify patterns, surface underlying shifts, and support informed discussion.

They offer a perspective on how the sector is evolving in relation to particular themes or topics.

Professor Tony Conway's university research on the changing nature of the water utility, together with his advisory work, contributes to the development of these foresight notes. His research activity focuses in particular on the role of digital capability, the application of systems thinking, collaborative approaches to innovation, and the leadership of transformational change.

Introduction

This foresight note sets out a number of selected themes relating to the evolving water utility, viewed through a digital lens. It does not attempt to describe a complete model of the emerging digital water utility, rather, it highlights key directions of travel that are shaping thinking about how water utilities are developing when seen from a digital perspective. Viewed in this way, the focus is on identifying shifts in how utilities are evolving in those areas where digital capability enables, accelerates, or makes possible new ways of working.

A synthesis of research, advisory insights, regulatory developments, industry practice and sector dialogue points to a number of consistent themes and directions of travel. These reflect how utilities are evolving as digital capability becomes more deeply embedded, acting as integrating capability that enables organisations to better understand their systems, improve decision-making, and optimise their activities. Taken together, these themes point towards a form of organisation that is increasingly data-enabled, better aligned across business functions, stronger in enterprise-wide decision-making, and more capable of operating with system-wide awareness.

The themes set out below are offered as a summary of these observations. They are intended as a contribution to the ongoing discussion about how the water sector is evolving from a digital perspective, and how digital capability is enabling new ways of operating.

Professor Tony Conway
May 2026

Director, Conway Strategic Water Consulting
Visiting Professor, University of Sheffield
Leadership Council, UK Water Partnership
Former Water Utility Executive Director
Past Chair, The Water Industry Forum
Former Director, British Water
Former Ofwat Innovation Competition Judge

Contents

Theme 1:
Digital as foundational critical infrastructure

Digital capability sitting alongside physical assets as critical infrastructure

Across the water sector, digital capability is increasingly being seen not simply as an enabling technology, but as part of core and critical infrastructure through which the utility operates. The ability to generate actionable insight, understand risk, make informed decisions, optimise activity, and operate a successful enterprise depends on the quality of data, models and system visibility. In this sense, digital capability sits alongside physical assets to underpin organisational decision-making, operational performance and institutional resilience.

Viewed through a digital lens, this shift reflects the growing need for utilities to operate as coherent, information-rich organisations.

The ability to bring together data from across the asset lifecycle, to maintain traceability between evidence and decision, and to generate reliable, decision-ready insight is becoming fundamental to effective operation. Connected data environments, integrated modelling, and shared decision platforms allow the organisation to see itself more clearly, understand risk more consistently, and act with greater confidence.

Taken together, these developments point towards a form of water utility that is more deeply digital, more integrated across functions and lifecycle stages, and more capable of operating as a cohesive system.

Digital capability becomes an enabling layer across the enterprise through which insight is generated, trade-offs are evaluated, and decisions are better coordinated across the organisation. In the evolving digital water utility, digital is not an overlay on the business, it is part of the architecture that allows the business to function as a whole.

Theme 2:
Legitimacy as a primary currency

Legitimacy being continuously evidenced in an open environment of sustained scrutiny

Across the water sector, stakeholder expectations demand an operating environment in which utility activity and performance are more visible and subject to open and sustained scrutiny. Environmental performance is publicly reported, regulatory expectations continue to evolve, political attention is increasing, and public trust is often low and fragile. In this context, operational performance alone is far from sufficient. Utilities must also be able to demonstrate that their decisions are sensible, evidence-based, and consistent with stakeholder and regulatory expectations.

Viewed through a digital lens, this places greater emphasis on the ability of the organisation to demonstrate that decisions are made in a way that is consistent, evidence-based and clearly justified.

Digital capability allows utilities to draw on shared information, common assumptions, and agreed analytical approaches which extend across functional boundaries when assessing risk, setting priorities, and making investment and operational decisions. The value of these capabilities is not only that they improve performance, but that they allow the organisation to show that its decisions form part of a coherent and well-founded approach to managing the system as a whole.

Taken together, these developments point towards a future in which legitimacy becomes a primary currency for the water utility.

The ability to demonstrate performance, justify investment and explain decisions becomes as important as the decisions themselves. In the evolving digital water utility, digital capability supports not only better outcomes, but also the institutional credibility needed to operate in an open, visible, and scrutinised environment.

Theme 3:
A risk intelligence engine

Risk as the organising logic of the enterprise

Water utilities have always recognised the importance of managing risk, but the shift now underway is more fundamental. The evolving utility is not simply managing risk as one consideration among many. Instead, risk becomes the central framework through which assets, operations and investment decisions are understood and prioritised.

Operating as a risk intelligence organisation means being able to evaluate risk continuously across interconnected systems, to compare exposure across different parts of the asset base, and to make trade-offs explicit. Decisions about maintenance, capital investment and operational intervention are made in the context of their effect on the risk and performance of the system as a whole.

Viewed through a digital lens, this shift depends on the ability to model the system dynamically, to bring together data from across the asset lifecycle, and to present risk in a form that can be understood and acted upon at operational, executive and regulatory level.

Digital capability makes it possible to visualise risk coherently, to test alternative scenarios, and to communicate the basis for decisions with clarity and confidence. In the evolving digital water utility, risk intelligence becomes a defining capability of the enterprise.

Theme 4:
Decision coherence as a systems capability

The utility thinking and acting as one coherent end-to-end system

The evolving water utility will be distinguished by the coherence of its thinking, and by the level of performance that coherent thinking makes possible. In complex infrastructure organisations, decisions about assets, operations, finance and environment are closely interconnected. Where decision-making is insufficiently joined up across the organisation, unintended consequences are inevitable. Effective utilities are those which understand the organisation as a system and make choices with a clear view of how different parts of that system interact.

Decision coherence requires the ability to see the organisation as an interconnected whole rather than a collection of separate functions. It means understanding how asset condition, operational performance, financial constraints and environmental obligations influence one another, and being able to translate that understanding into aligned and timely action. Decisions about maintenance, investment and operation must be made using a shared view of system performance, rather than from disjointed departmental perspectives.

Viewed through a digital lens, this capability depends on the ability to bring together data, models and insight from across the organisation into a single, meaningful picture of how the system is performing.

Integrated information, analytical tools and shared evidence sources allow the utility to understand interactions more clearly, assess trade-offs, and act with greater consistency. In the evolving digital water utility, decision coherence becomes a defining capability, allowing the organisation to think and act with the discipline of a single system rather than a set of less connected parts.

Theme 5:
An integrated organisational architecture

Aligning organisational architecture with a systems thinking approach

Systems thinking is difficult to sustain in organisational structures that are disjointed or fragmented across functions and lifecycle stages. In complex infrastructure organisations, planning, capital delivery, operations, finance and regulation often operate with function-specific objectives, timescales and information sets. Focused expertise in these areas is essential, but without sufficient alignment between them it becomes harder to optimise the system as a whole and to act in a fully coordinated way.

An integrated organisational architecture brings activity into closer alignment across functional boundaries around shared system objectives. The aim is not to remove functional specialism, but to ensure that the way the organisation is structured supports a systems thinking approach. Data flows across the asset lifecycle rather than stopping at organisational interfaces, and decisions are taken with a clearer view of how actions in one part of the organisation affect outcomes elsewhere.

Viewed through a digital lens, this level of alignment depends on the ability to connect information, models and workflows across organisational boundaries.

Shared digital capabilities help maintain continuity of information between lifecycle stages, allowing different parts of the organisation to work from a shared understanding of system performance.

When organisational structure, information architecture and operational processes are aligned, the utility is better able to coordinate activity, manage trade-offs and operate with the clarity needed to manage a complex infrastructure system. In the evolving digital water utility, integrated organisational architecture becomes an important enabler of coherent, system-level operation.

Theme 6:
Design transparency as an institutional norm

Transparency designed into the operating architecture

In the evolving water utility, performance and decision-making are expected to be visible, traceable and capable of explanation. Transparency is not something applied after the event, but something that needs to be built into the way the enterprise operates. Systems, processes and information structures must allow decisions to be followed from data to outcome, and to be understood consistently over time.

Designed transparency means that decisions can be traced from underlying data through analysis to action, that investment logic is visible and explainable, and that performance can be measured in a way that is meaningful both internally and externally. Trade-offs between cost, risk, service and environment need to be articulated clearly, and the basis for decisions needs to remain visible over time. This requires organisational discipline and system design that maintain continuity between evidence, modelling and decision-making.

Viewed through a digital lens, this level of transparency depends on the ability to maintain traceability, auditability and consistency across the organisation.

Digital platforms make it possible to connect data, models and decisions in a way that allows the utility to show not only what it has done, but why it has done it.

In this sense, transparency is not simply a matter of communication. It is part of the operational architecture of the enterprise. In the evolving digital water utility, transparency becomes a designed capability.

Theme 7:
System-level investment logic

Optimising investment through a whole-system lens

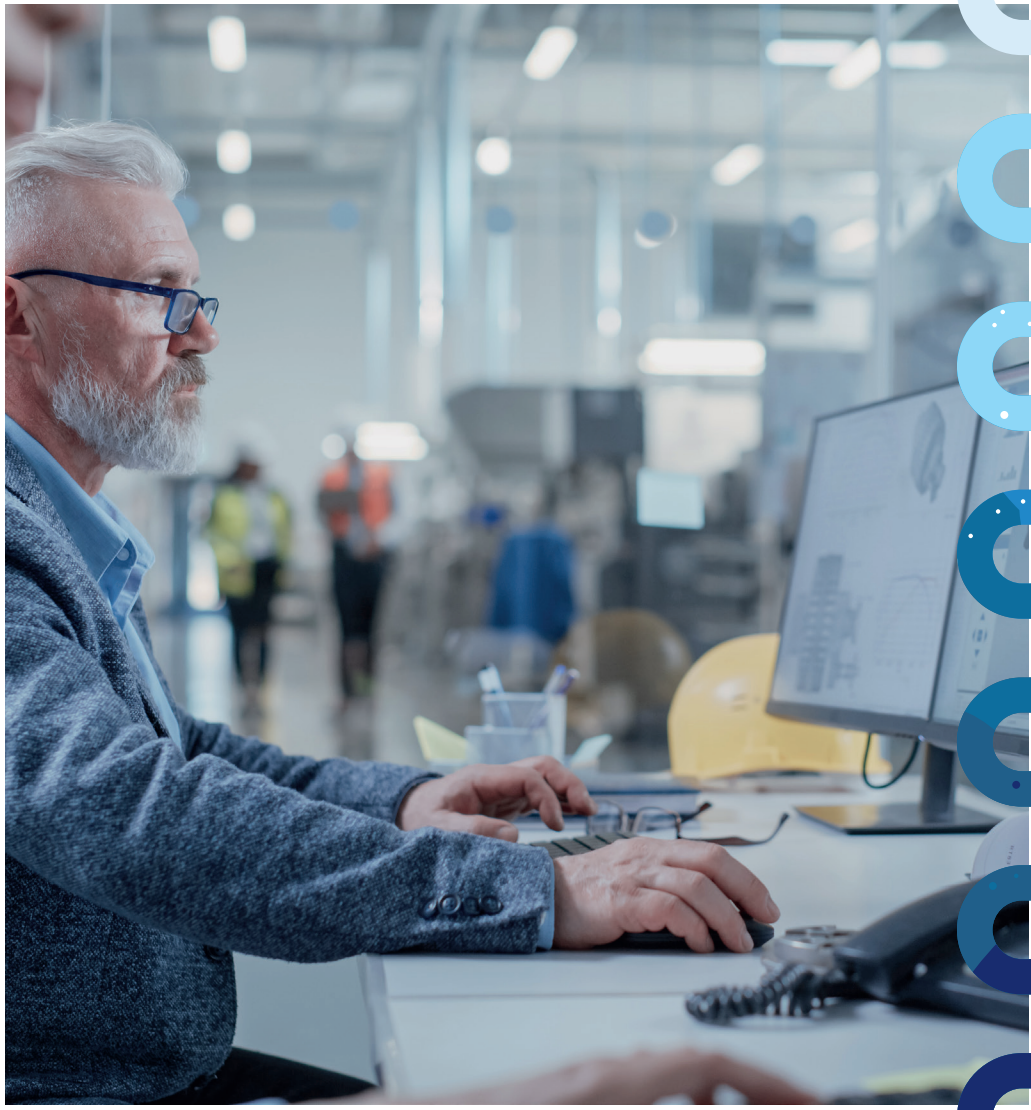
In the evolving water utility, the effectiveness of investment decisions depends not only on how individual projects are assessed, but on how investment is coordinated for maximum benefit across the system as a whole. The sector already employs sophisticated approaches to project appraisal, including multi-criteria assessment, risk-based prioritisation and wider value frameworks. The shift now underway lies in moving beyond the evaluation of individual schemes or groups of schemes towards a more explicit whole-system investment approach.

A system-level investment approach means evaluating interventions, both capital and operational, in the context of overall system performance rather than in isolation, in other words, seeing the wood for the trees. It requires understanding how decisions interact across networks, asset classes and time horizons, and how environmental, operational and financial outcomes combine. Investment choices are considered as part of a portfolio, with attention to cumulative impact, long-term risk and the balance of outcomes across the whole system.

Viewed through a digital lens, this approach depends on the ability to model the system in an integrated way and to test alternative strategies against shared objectives.

Digital platforms, integrated data environments and scenario modelling tools allow utilities to see interactions across assets, compare investment portfolios, and understand the consequences of different choices set against long-term asset plans.

In this way, digital capability supports the move from managing projects to managing system performance, allowing investment decisions to be aligned with the overall behaviour of the system.



Theme 8:
Skilled delivery of digitally driven change

The challenge and opportunity lie in how well the utility and its people navigate change

The evolving digitally enabled utility, as described in the previous themes, risk-intelligent, system-aware, integrated, transparent and operating at system level, represents a substantial change in how a utility works. It brings new behaviours, new decision habits, new business processes, new relationships and a new operating landscape. In practice, the limiting factor in digital maturity is commonly less related to the capability of the platform itself and more to the ability of the organisation to adopt and use it effectively.

Viewed through a digital lens, successful adoption depends on the utility's ability to build change capability alongside technical capability.

Investment in platforms needs to be matched by investment in skills, communication, governance, leadership and a wide range of organisational capabilities. Where programmes fall short, the causes are usually less associated with technical failure and more with gaps in adoption, alignment, behavioural change and the ability to sustain new ways of working over time.

In this context, the skilled delivery of change becomes part of the utility's core operating capability. When the organisation has the capacity to absorb new tools, adopt new ways of working and sustain change over time, digital capability can deliver its full value. When that capability is weak, even well designed systems remain underexploited. In the evolving digital water utility, success depends not only on the quality of the technology, but on how effectively the utility and its people are able to navigate change.

Professor Tony Conway

Director, Conway Strategic Water Consulting

M 07939 368810

E tony@ajconway.com

© Conway Strategic Water Consulting