

INSIGHT SMART TECHNOLOGIES



Focusing on what matters to customers



Neil Croxton, Stantec's technical director – water distribution, on why it's not enough just to adopt new smart technologies



As UK water companies await feedback on their business plans for the 2020 to 2025 period, there are key operational challenges for each of the 17 water and wastewater companies. Ofwat asked each of the companies to produce plans that deliver more of what matters to their customers, including affordable bills, great customer service, resilience in the round and innovation.

The initial 17 proposals from the companies include a reduction in daily household water to 119 litres per person compared with the current sector average of 141 litres, and a commitment from two companies to reduce leakage by more than 20 per cent, with a further 16 companies committing to a 15 per cent reduction. These performance improvements come alongside a reduction in customer bills by more than 20 per cent.

Ofwat has now started the process of assessing these proposals and will categorise each company's plan according to the level of quality, ambition and innovation they have demonstrated. In the absence of

this feedback, many of the UK water and wastewater companies will require a step change in performance to meet their AMP7 commitments.

Smart technologies

Over the past several years, the industry has increasingly reached out to new technologies to address performance gaps and improve efficiency. With the increased focus on innovation and affordability, this trend is likely to increase.

Across water network distribution systems, the use of smart technologies is becoming more prevalent. There is a drive to use data-driven technologies across networks and there is a growing array of operational technologies (OT) that can be used to meet the challenges of a 21st century utility company.

What are smart water technologies? The Smart Water Networks Forum (SWAN) defines smart water network technology as the collection of data-driven components helping to operate the data-less physical layer of pipes, pumps, reservoirs and valves. These technological

solutions seek to improve the efficiency, longevity and reliability of the network by better measuring, collecting, analysing and acting upon a wide range of network events.

However, experience in other sectors has shown that the adoption of smart technologies needs to be fully considered if the benefits proposed below are to be realised. From my own

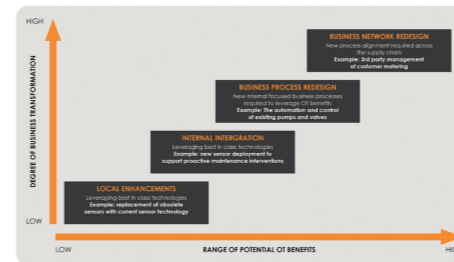
experience within the sector, many of the challenges associated with realising the true benefits of smart networks result not from the technology itself but from how successfully the new technology is embedded by the organisation attempting to adopt it.

So as water and wastewater companies reach out to embrace new and innovative operational

technologies, it may be time to take a step back and seek to learn from other industries that have already taken the path to attempted performance improvement through the adoption of new data-driven solutions.

Perhaps the most closely linked technological developments in recent decades – which could provide insight into the successful adoption of operational technology across water networks – come from the IT revolution. While the way we work and live has undoubtedly been influenced by IT, concerns remain in terms of its failure to deliver the expected benefits to both industry and to society in general.

It was once seen as a means of increasing productivity to the extent that we would have so much free time, we would not know what to do with it! I think it's fair to say that we are not quite there yet. So, whether the initial aspirational impact of IT was overplayed or it simply has yet to deliver such widespread changes, there is potentially a lot to be learnt when looking to adopt OT.



The apparent mismatch between IT investment and the observed increase in productivity has led to several high-profile research projects. Professor Erik Brynjolfsson, who led a \$4.5 million study across 800 US firms to show the correlation between IT investment and productivity concluded that "IT is significantly more productive when combined with organisational change".

Organisational change

So what level of organisational change is required to support smart networks? This starts to be answered when you build a case for investing in new smart technologies. Whether the potential benefits are a reduction in leakage or improved customer service, the development of a strong case for investment is driven by the range of potential benefits.

For example, the replacement of one range of sensors for a new one with a better battery life has only local and marginal benefits associated with it. Likewise, the degree of business change is also relatively small. However, compare that with smart solutions that have a high range of potential benefits, such as the deployment of advanced metering infrastructure (AMI), which provides customer consumption data in real time to both the utility company and the customer. The potential benefits of this AMI technology are wide ranging and significant in terms of proactively managing and understanding true network usage and leakage as well as driving behavioural change across the customers that have adopted these meters.

To achieve these significant benefits, companies will need to address a whole host of organisational and technological enablers. This will range from a potential change in the

companies' metering policy; how the company promotes the use of meters to its customer; the change in processes and personnel required to manage and respond to more informed customers; and the IT systems that can store, integrate and analyse this new and vast amount of time series data to enable it to provide better insights in network management.

The four-stage model below has been adapted from the five levels of IT-enabled business transformation developed by Venkatraman (1994). This model illustrates how companies may need to make decisions when acquiring and implementing new OT by firstly considering the value of the expected benefits and then the required degree of business change needed to successfully embed it.

The above framework ranges from local enhancements with minimal business transformation to business network redesign, which involves not only redesigning internal processes but also bringing the benefits of supply change and ensuring processes are seamlessly integrated. The example given could be the collection, transfer and analysis of meter data by a third party, external to the water and wastewater company.

Achieving significant benefits means making new OT part of the fabric of the company. So, while there are a few challenges associated with successfully embedding smart water network solutions, there are also vast benefits for having more data-driven technologies supporting network management.

A key factor in the success of smart network solutions is the way in which the technology becomes part of the fabric of a company, as the integration of the new technology can be as important as the technology itself.

SMART Solutions	Business performance outcomes impacted
Network Optimisation	Reduced interruptions to supply Reduced leakage Improved resilience Enhanced asset reliability
Water network visualisation	Enhanced customer service Reduced interruptions to supply Reduced leakage Improved resilience
Decision Support & dynamic modelling	Enhanced customer service Reduced leakage Improved resilience Enhanced asset reliability Improved customer service
Automation and control	Improved operational efficiency Enhanced asset reliability Improved customer service

NEED TO KNOW

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- Stantec has 22,000 employees
- The company operates in 400 locations across six continents

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