



**BEING A DIGITAL WATER UTILITY:
LOOKING BEYOND
TECHNOLOGY**

From virtual currency to artificial intelligence, digital is disrupting entire industries. According to the American Water Works Association 2018 State of the Water Industry Report (SOTWI), water utilities are increasing investment in technology and data mining, yet many are unconvinced about the long-term promise of Big Data and the Internet of Things (IoT). This gap raises the question: How should the water industry prepare for a disruptive future?

Digital transformation is most powerful when it is strategic and addresses both the technological and human elements of implementation.

SETTING THE STAGE

Water utilities in North America are facing unprecedented challenges to their business model. They are forced to balance increasing costs associated with the repair and replacement of aging infrastructure with stagnant or declining revenue resulting from rate hike fatigue, flattening demand, and limited government support. SOTWI reveals that more than 25 percent of utilities are struggling to meet the cost of providing water services, while an additional 31 percent anticipate they will struggle over the next five years.

Facing this reality, the appeal of digital solutions is easy to see—better use of existing assets can increase efficiency, reduce operating expenditures (OpEx), and improve water quality and service for customers. However, there is no shortage of skepticism about the value major information technology projects can deliver. According to a report by McKinsey & Company, on average, large information technology projects run 45 percent over budget and seven (7) percent over time, while delivering 56 percent less value than predicted. It is not surprising that utilities retain a certain amount of uncertainty when advancing digital initiatives.

A slower rate of digital disruption fuels the disbelief of those that do not believe major changes are coming to the water industry. But the digital disruption already experienced by other industries, such as telecom and retail, demonstrates that the first step towards realizing a great return on investment from digital technology is to recognize that the dramatic advances in information technology are real and can be applied across industry boundaries.

For example, with access to massive amounts of structured and unstructured patient data across a wide range of data sources, healthcare providers are using predictive analytics to aid in diagnosing patient conditions, match treatment with best outcomes, and predict patients at risk for disease, which is reducing costs and saving lives. With the amount of data in the water industry and the critical role water plays in sustaining our social, environmental and economic ecosystems, it's plausible that Big Data and predictive analytics could be transformative in similar ways.

While major changes can require time, water utilities should start acting now. This paper explores how utilities can create a sustainable future by examining digital through the lenses of technology alignment and cultural change.



WHAT DOESN'T WORK

BLINDLY CHASING THE NEW

For early adopters and technophiles, it is tempting to go for the very latest gadget. Countless new and innovative products enter the market each year. This presents both an opportunity and a significant risk. Many new products can be “solutions in search of a problem.” The companies behind such products may be largely unaware of utility needs or the ultimate benefit of implementation. While innovative utilities are finding creative and powerful ways to collaborate with these companies to tailor technologies to their needs, others are taking on significant risk by relying solely on unproven off-the-shelf products that are unfit for purpose.

ADOPTING PEER TECHNOLOGIES

Those skeptical about technology, but fearful of being left behind, might opt for whichever technology others are choosing without the proper due diligence. This approach appears less risky than early adoption. It avoids working through a technology maturation curve but may still deliver a solution misaligned with utility needs.

Both approaches are likely pathways to disappointment. Uninformed decision-making can lead to costly outcomes, regardless of the technology.

It is essential for utility leaders to first gain an accurate understanding of their business needs and constraints, and then develop a strategic plan with digital investments built in.

Creating a digital strategy that runs parallel to a business strategy can be costly and will likely not achieve the sustainable outcomes desired by water utilities.



WHAT DOES WORK

RECOGNIZING THAT ONE SIZE DOES NOT FIT ALL

Embracing digital also requires recognizing that every water utility faces its own unique set of circumstances. To successfully implement a digital transformation, it is fundamental that water utilities fully define the problem to be solved and the culture within which the technologies will be deployed.

MINING EXISTING DATA

To guide digital investments, utilities must make use of the abundance of data that is already at their disposal. Enabling enterprise decision making through analytics is not only sound, but defensible. It should consider all the available data, not just the data that we prefer to look at to support our pre-conceived ideas. Water is one of the richest industries from a data generation point of view. Most water utilities in the United States use Supervisory Control and Data Acquisition (SCADA) for controlling and monitoring assets. This provides real-time trends and enough data granularity to monitor, operate, and analyze their systems.

Some utilities are effectively mining data to address financial challenges. By putting their data to work, they can optimize chemical and energy usage. In some cases, this step is unlocking value without the need for significant investments.

MAKING DIGITAL TRANSFORMATION HUMAN

While advances in data analytics may help identify opportunities, a utility's best resource for meeting the challenges it faces today is its people. Ironically, using our human resources and attracting the new talent and skills that will be required in the digital era are also some of the biggest hurdles. Utility leaders must understand and communicate that digital goes beyond learning and applying new technologies. The term digital implies the recognition of new business realities driven by the ability to instantly connect people, physical assets, and machines resulting in unprecedented analysis and decision-making. These concepts need to be integrated with the utility's business strategy and help shape it.

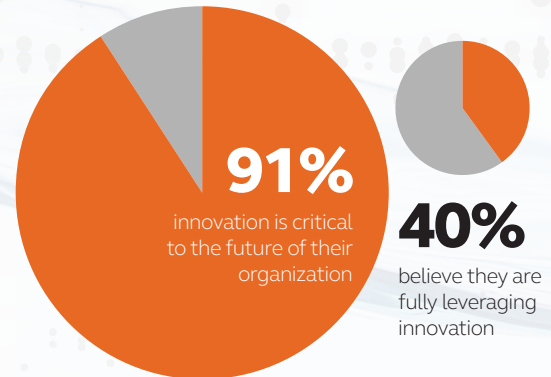
But understanding digital concepts, goals, and processes will not ensure a successful digital transformation. The critical ingredient is achieving ownership across all levels of the organization, and that may require a cultural shift. Technology initiatives often begin with an assessment of culture. Culture is multi-faceted, but two key elements include the desired direction and current environment of the utility.



FOSTERING A CULTURE OF INNOVATION

According to the Arcadis Empowering Water Utility Innovation report and associated Water Research Foundation study, 91 percent of globally surveyed utilities believe that innovation is critical to the future of their organizations, while less than 40 percent believe they are fully leveraging it. The SOTWI report lists multiple barriers to innovation or change. Among them are resources and risk, but also a lack of openness to new ideas or willingness to pursue innovation.

A lack of innovation is perhaps understandable from a conservative, risk-averse industry, especially given the financial pressures it is currently experiencing. However, this reluctance to change is a value killer for digital transformation. Utilities that do not address cultural aspects of digital initiatives run the risk of system rejection or, at best, creating a “digital twin” of current business practices. Either pathway misses the opportunity to unlock the potential value of digital.



CREATING NEW WAYS OF WORKING

There is an element of digital transformation that specifically applies to different ways of working. While techniques like design thinking have been historically linked to information technology companies in Silicon Valley, the reality is that they are effectively used across multiple industries, and that they will play a key role shaping the future of the water industry. These techniques not only enable effective ways of problem solving, but also create the work environment necessary to attract and retain the human capital and talent the industry will need.

REAL-WORLD EXAMPLES FOR MINING EXISTING DATA

THE CITY OF AKRON, OHIO

Akron saw treatment costs rising due to challenging source water quality. They took a deeper look at operating data using affordable business intelligence software. The analysis showed that it could reduce chemical dosing.

Over the past five (5) years, they have saved between 10 and 20 percent on chemical costs every year while reaching the highest water quality goals in their history.

SEVERN TRENT WATER (STW), UNITED KINGDOM

STW, a water and wastewater treatment provider in the United Kingdom, services 7 million households and business and has nearly 3 million different assets. Determining which assets to invest in, how and when to maximize the return on investment for shareholders and customers is a complex problem requiring advanced analytics. STW employs a decision support tool—SEAMS Enterprise Decision Analytics—to incorporate predictive analytics, modeling, and optimization to their asset management practices.

The benefits include: a change in planning processes and culture equating to a 15+ percent cost efficiency; a consistent attainment of an upper quartile industry ranking; and significantly and consistently outperforming performance commitments to the regulator, resulting in record-breaking rewards of \$65 million.

TARRANT REGIONAL WATER DISTRICT (TRWD), TEXAS

TRWD is leveraging technology, like machine learning, to track real-time energy market conditions and the energy consumption of energy-intensive assets used in daily operations. While still in the early stages, the energy management optimization tool is providing **actionable information to support operational decisions and critical business decisions.** It includes an alert system for energy market conditions, which can **free staff from constant monitoring of energy prices and enable them to focus on more productive tasks.**

Once alerted, engineering and operations can follow predefined standard operating procedures on how to react under price spike conditions. The tool also enables operators to proactively simulate the power consumption impact of operational changes before they are implemented. **This empowers them to make better decisions that can translate into cost savings in months ahead.** It also provides a platform that can be used to integrate other monitoring capabilities related to asset performance levels. These can be turned into **predictive asset maintenance capabilities that can add to overall energy efficiency activities, as well as reduce operational costs and support capital investment decisions.**



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ONE STEP AT A TIME

Successfully embracing digital doesn't happen overnight. However, by viewing these initiatives through the lenses of technology and culture, utilities can develop a thoughtful approach to maximize success:

- Define the business problem (and possible solution) by mining your current data.
- Reframe digital initiatives as catalysts for innovation.
- Understand and communicate the meaning of digital and ensure leadership support.
- Shape your strategy recognizing that the role of technology will increase exponentially.
- Foster a culture of innovation.



WE ACKNOWLEDGE THE FOLLOWING DATA SOURCES:

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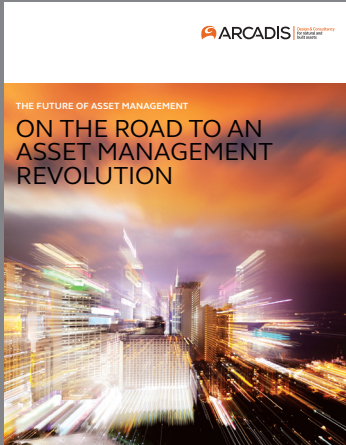


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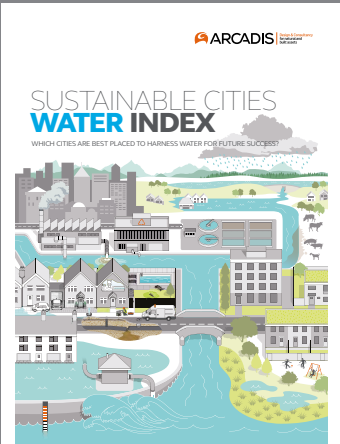
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