

WHITE PAPER / **DATA, DIGITAL TWINS AND THE WATER INDUSTRY**

INFORMING BETTER BUSINESS DECISIONS USING A DIGITAL WATER APPROACH

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After years of data gathering, the water utility industry is beginning to see a shift toward better use of that data. In the past, consultants would simply provide clients with a data dump of information and little direction on how to achieve a sustained return on investment.

Today, data analysis and visualization tools are creating decision support platforms — digital twins — that inform business decisions.



Water utilities already have a great deal of data collected through various pieces of technology. Utilizing that data and transforming it into useable information takes the use of digital twins to better inform business decisions. But making the shift isn't easy.

Historically, any transformation in technology has gone through three distinct phases.

In the beginning, the transformation focuses solely on the technology. Take, for instance, the surge in computing technologies in the late 1980s or digital cameras in early 2000s. The focus at the time was on the computer memory, the disk space, the software development to create new tools, and on the megapixels and storage cards.

In the middle phase of the transformation, the focus shifts to the technology applications. In the personal computing world, this meant focusing on software packages; for cameras, the shift was toward image processing and filters.

Finally, in the last phase, technology transformations focus on the user. Today, when someone downloads an app or uses a phone to take a picture, hardly a thought is given to the disk space, processor speed or development it took to produce it.

These digital transformations not only change the way we live, but they also change the way a utility does business as it moves through each phase. At the start, the water industry's digital transformation focused heavily on the technologies, such as geographic information system (GIS) or hydraulic modeling platforms. Today, mathematical models, sensors, dashboards and other data collection tools work wonders, creating datasets that provide myriad opportunities to improve business operations. But without a focus on the value that data can truly bring to an organization, this digital transformation is ultimately less impactful than it could be. Water utilities need to move to the final phase of digital transformation, to refocus on utilities' return on investment from data collected.

Today's data analysis and visualization tools are being used to create digital twins — or representations of a system — that can help inform business decisions. But finding the value of these tools means first understanding

the issues that need to be solved. When an individual utility identifies a problem and then applies the data it has already collected to solve that specific issue, then the true value of digital twins can be garnered from existing systems.

Using digital twins to inform business decisions and improve processes and operations is the next step in the digital water transformation. Working with a partner that understands the water industry, the problems water utilities

DEFINING THE DIGITAL TRANSFORMATION

The digital transformation can be visualized as a path an organization must move along to meet its goals. An organization can be at any point along this journey, utilizing different tools to make its business run smoother.

DATA — Collect valuable data using a variety of technology tools and sensors.

INFORMATION — Turn that data into information, that is, use hierarchies to organize the data. In this way, data can be tailored to fit an organization's specific needs. Information is organized data that provides the context in addition to the value.

KNOWLEDGE — Information becomes knowledge when it is simplified and presented in a way that can make meaningful impact on the business. Knowledge is actionable information.

DECISION — Use the knowledge to help inform business decisions. Each organization will face different issues; the solution for many of these can be determined through the proper collection and use of data. What is most important is that the data is collected and used to provide real value to the business.

ACTION — Take action on these decisions to positively impact the business.

face and the products available to assist in the effective use of data can lead water utilities to make more informed business decisions that directly impact the bottom line.

THE IMPORTANCE OF DIGITAL TWINS

Today, water utilities typically manage and operate their systems, at least in part, using computers. Digital twins, such as supervisory control and data acquisition (SCADA) data, GIS or hydraulic models, allow many to see their systems through datasets that represent the various parts or processes in the system.

Digital water is a set of decision-making platforms that use digital twins to allow a water utility to operate the system more efficiently. Put simply, digital water provides utilities an opportunity to use existing information and systems to make better business decisions.

MOVING TOWARD DIGITAL WATER

The water industry is already being altered by the digital transformation. However, moving away from a focus on technologies — such as artificial intelligence or augmented reality — and instead thinking about the direct needs of the organization will allow water utilities to make better business decisions, such as picking the most impactful project for the organization.

Traditionally, technology providers have driven the move to digital water through the sale of their products. But from the client side, digital water should be more about value creation and results rather than a collection of technologies. This value is created when an organization has the technology — and the data — that is designed to meet its specific needs.

For water utilities, digital twins provide the informational backing for digital water decision support platforms. When these various representations of a system come together — through GIS, hydraulic models, SCADA, closed-circuit television and the like — they build a decision support platform that can move a utility toward digital water. The success of this move is further increased when the data is simplified and easily understood.

Simplicity of use is important to digital water initiatives. To expect everyone in an organization to understand complex data is unrealistic — data democratization and data literacy can be low, even among some industry veterans. Presenting the data in a way that is easily understood makes it useable across various levels of the organization.

BEGIN WITH THE RETURN ON INVESTMENT

It's important that a development of digital water begins with determining the problems a water utility wants to solve. In this way, a utility can find real value by applying the technologies and data that can make a true impact on the business by improving operations, systems or processes.

Today, organizations are realizing a wide range of benefits from digital water initiatives. These include more efficient operations and maintenance activities; reductions in power consumption; increased levels of service and responsiveness to ratepayers; improved capital project coordination; pump energy use optimization based on real-time weather forecasts; and reductions in unplanned outages.

WHAT ARE DIGITAL TWINS?

Digital twins are sensor data, mathematical models or the combination of the two. These provide a virtual model of a process, product or service, creating a bridge between the physical and digital world.

WHAT IS DIGITAL WATER?

Digital water is a decision support platform — based on digital information organized into digital twins, which translate digital data into knowledge — to enable water utility decision-makers to confidently select optimal actions through value engineering practices.

DIGITAL WATER MYTHS

Many myths surround the term “digital water.” Below are some examples and the truth behind the fiction.

DIGITAL WATER IS NEW

Digital water has been around since computers were first used to make better decisions about utility planning, management and operations.

DIGITAL WATER COMES IN A BOX

Digital water is not a product; it is the integration of digital twins with data analysis tools targeted at answering a utility’s needs. An experienced consultant will understand the industry, allowing each digital water solution to be customized to fit the organization it serves.

DIGITAL WATER IS A DASHBOARD

Digital water cannot be delivered through a single project. Digital twin databases will change over time, meaning that digital water solutions need to be maintained and adapted to fit future organizational needs. Therefore, digital water is a long-term partnership of a utility, data analysis tool providers and the implementors of those tools.

DIGITAL WATER IS DIFFICULT TO OBTAIN

This is only true if an attempt is made to deliver a digital water solution through a single project or product. A good digital water solution, while complex, should be as simple to understand and use as a traffic light.

DIGITAL WATER IS EXPENSIVE

If a digital water solution is not tailored to an organization’s needs, it cannot provide the answers to the issues the organization faces. This can increase costs. But when a digital water solution is properly implemented it becomes a value-add service that delivers a quantifiable return on investment from digital twin systems

Additionally, a digital water approach provides benefits from data and tools that are already in place. These include the integration of multiple systems, such as combining sensor data with hydraulic models to create a forecasting platform to predict system response to current conditions, such as rainfall.

Digital water initiatives allow utilities to plan for system growth without unnecessary investments; optimize system processes; forecast impacts of short-term and long-term changes; provide a training platform for new operators in a changing workforce; and streamline regulatory compliance.

MOVING FORWARD FROM THE CURRENT STATE

Digital transformation is a path — and organizations can be anywhere along that path and be successfully implementing a digital water approach. Beginning by understanding first the need to add value to an organization helps to build a reasoning for collecting data and for the tools needed to do so. The information and knowledge that comes out at the other end of that process must be able to be interpreted to make impactful decisions.

Software, tools, sensors — all of these can be put in place and become part of a digital water approach. But the end goal is not well-defined; there is no end state for digital transformation. It boils down to using information to drive business decisions, being able to make sense of the data and then using that data to act.

Today, there is not a utility in the country that does not utilize a digital component or tool. Digital billing systems help water utilities understand their revenue and more effectively sell their services. Other utilities are implementing large initiatives and technology tools, but is this move really meant to meet a need, solve a problem, inform the business and improve, or is it simply because the organization was sold on the functionality of a product that does more than is required?

Using data to assist in adjusting business practices is the goal for a utility, but this is a big leap from having the technology and the data. Moving forward means a shift in various parts

of the business, including the mindset of leadership. Those at the management level must adjust and shift to learn new ways to use information and approach business challenges. As new employees are added, with more modern ways of thinking, utilities must move away from the traditional ways of operating and let data drive where they are headed.

STOP AND GO

On a traffic light, everyone knows that green means go and red means stop. The simplicity of the system is, in part, a major contributor to the safety and success of our traffic systems. For digital water and digital transformations to work, the interfaces must be easy to understand, despite being informed by complex data. This allows any user to make sense of the system, making complex data readily available and useable across an organization, no matter the level.

THE DIGITAL TRANSFORMATION JOURNEY

Once an organization reaches this point in the digital transformation journey, it can stop focusing on collecting the data and start focusing on using it. This is the time to look at the data collected and at the tools used to collect it. Determine the problems that need to be addressed, and how that data can be put in the hands of someone who can make it most effective.

There's no simple process to do this. Having an experienced partner, with an understanding of the industry and the tools available can help determine not only the issues that need to be solved to improved business operations but also what tools can get the organization moving toward that goal.

BIOGRAPHIES

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