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Business Water:

The Value of Artificial Intelligence in
Achieving Sustainable and Resilient
Corporate Water Strategies

6 MAY 2020 | White Paper

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Introduction

Access to water is one of the greatest challenges to business continuity and growth. A key component of this challenge is the effective operational management of water, which plays a critical role in how much of this resource is utilized. Businesses across a range of sectors such as agriculture, energy, food and beverage, and manufacturing are discovering the value of investing in access to water supplies, water use across their value chain (e.g., supply chain, operations and product use) and improvements in the efficiency and effectiveness of infrastructure and assets to manage water (e.g., treatment systems). Businesses also have a critical role to play in ensuring access to water for their customers, workforce, and communities. Increasingly, consumers, customers, investors, non-governmental organizations (NGOs), and civil society favor “brands with purpose” which includes consideration of how businesses are stewards of water.

One of the many lessons we are learning from the COVID-19 pandemic is that analog solutions to water management are no longer viable to ensure sustainable and resilient operations. Businesses and the public sector must now more efficiently and effectively manage that precious gallon or liter of water. As a result, digital technologies such as AI, IoT and remote sensing have an ever-increasing role to play in addressing water risks to business continuity and growth across their value chains. Figure 1 illustrates the digital water technology value chain and representative digital water technology use cases for each segment of the business value chain.

Digital Water Value Chain

Watershed, operations and supply chain/customers



WATERSHED

- Real time water quantity and quality
- Predictive analytics
- Integrated water, energy and agriculture management



OPERATIONS

- Predictive analytics
- Water quality monitoring
- VR/AR augmented workforce
- Smart hardware
- AI managed assets



SUPPLY CHAIN

- Ag tech, information and analytics
- Accountability and traceability
- Customer and Community engagement

Water Risks – Present and Future.

Water is finite, in increasing demand, poorly governed, undervalued and there is no replacement. The water “crisis” is current and projected to have an increasing negative impact on economic development, business growth, social well-being and ecosystem health. The recently released World Economic Forum Global Risk Report 2020 identified the water crisis as fifth in terms of social impact.

The facts are telling as to why that’s the case.

Currently, approximately four billion people live in water-scarce and water-stressed regions, with nearly one billion people lacking access to safe drinking water and almost one million deaths per year from water-borne diseases. The 2030 Water Resources Group projected^[1] that by 2030, the world faces a 40 percent “gap” between water supply and demand under business as usual practices (e.g., public policy and technology).

Several global cities—from Johannesburg to Rio de Janeiro—are facing risks to their water supplies and as a result are increasing their resilience to changing hydrologic conditions. Research by CDP Water highlights the response of cities to these water risks, noting that 196 cities reported the risks of water stress and scarcity, 132 reported a risk of declining water quality and 103 reported a risk of flooding.^[2]

A 2016 report from the World Bank evaluated and presented the impacts from water scarcity on a regional and national scale.^[1] Among the conclusions are that water scarcity, exacerbated by climate change, could cost some regions as much as six percent of their GDP, spur migration, and spark conflict and that without urgent action, water will become scarce in regions where it is currently abundant—such as Central Africa and East Asia—and water scarcity will worsen where it is already in short supply, such as the Middle East and Africa’s Sahel.

The Role of Businesses in Solving Water Challenges

Businesses, as part of an ecosystem of stakeholder groups, have an important role to play in solving water scarcity and quality challenges. Businesses that address these water challenges not only mitigate their own risks but contribute to solutions in the public sector within the watersheds in which they operate and more broadly for civil society. Businesses also have an opportunity and a responsibility to create value by solving water challenges. Many businesses are developing new products and services to solve water scarcity, water quality and lack of access to sanitation and hygiene.

While many companies understand water related risks, very few have truly quantified the value of water to their business and how it can fuel business growth. In addition to quantifying reputational risks, companies who have a leading-edge water stewardship strategy now need to quantify the brand value from their investments. Quantifying the brand value from water stewardship enables companies to make better long-term investments to support business growth. In order to account for the total impact of water on their growth, businesses need to identify all the resources needed to manage water and include the associated costs and risks. This will enable them to quantify the opportunity and communicate it to all the stakeholders.

^[1] 2030 Water Resources Group, 2009.

^[2] CDP, 2017.

Water, like all resources, has value that varies depending on its use or non-use. Businesses face three types of water related risks: physical, regulatory and reputational.

- Physical risks arise from quantity and quality issues. These issues are: too little water (scarcity), too much water (flooding) or poor-quality water. The causes of these risks are not straightforward and are a combination of problems such as over-allocation, droughts or natural disasters. Physical risks impacts businesses across their value chain — upstream supply chain, operations and in some cases product use. For many businesses, poor water quality can also represent a risk to industries such as semiconductor manufacturing because of their need for ultra-pure water.
- Regulatory risks are the ability and costs to a business for complying with current and projected water regulations. For example, the amount of water a business has to use may be curtailed due to short- or long-term scarcity and water quality discharge requirements driven by local or national regulations.
- Reputational risks are those posed by stakeholder perception as to how businesses manage water. These stakeholders do not need to be customers, consumers or the workforce of the business. They can be local, national or global non-governmental organizations or anyone with a social media account who decides to criticize how a company is managing water use across their value chain, within a watershed, etc.

These risks have tangible and intangible financial impacts to business. Tangible impacts are from not having enough water to operate or higher costs for input water and treatment resulting in short- or long term revenue loss (e.g., business disruption) to a significant financial loss from a stranded asset (e.g., capital investment that can't be operationalized). There are also impacts to a company's brand from stakeholder activism. Reputational risks and impact to brand value can have a significant impact to business as they may lose their social license to operate with an immediate financial consequence.

Digital Solutions at the Forefront of Solving Water

Digital technologies are at the forefront of solving water quantity and quality challenges. They're also helping to vastly improve monitoring of water supplies (surface and groundwater) and how infrastructure assets are managed, as well as communication with customers and consumers ([2019 Year Analog Water Solutions Died](#)). In order to drive business value, digital solutions have become part of the day-to-day work on the frontline. By fundamentally changing how work gets done, businesses can take a big leap forward in terms of solving the challenges related to water management within their operations. The adoption of digital water technologies is now accelerating in response to increasing water scarcity and poor-quality issues, and the COVID-19 pandemic is only accelerating this ([Doubling Down on Digital Water](#)).

The digital transformation of water is captured in the [World Economic Forum Harnessing the Fourth Industrial Revolution](#) for Water report.

It is just one more aspect of society that has transformed as a result of digital technologies. These technologies are everywhere: in transportation through services such as mobility on demand and micro-mobility, in healthcare in the form of digital record keeping and robotics, in education where digital readers, tablets and gamification are used to teach, and in the power sector in the form of smart devices and advanced analytics for optimizing network flows.

Several recent reports highlight the ongoing digital transformation of water this year. In particular, the International Water Association and Xylem publication [Digital Water: Industry Leaders Chart the Digital Transformation](#), as well as the report [Accelerating the Digital Water Utility \(PDF\)](#), focused on the water and wastewater utility sector and geographically focused digital water technology solutions. Another reference is [Digital Water Technology Solutions for the Colorado River Basin](#), which Water Foundry published along with the Environmental Law Institute.

The Value of Digital Transformation and AI

The value of digital transformation to businesses is increasingly clear. According to the MIT Sloan Management Review, companies that embrace digital transformation are 26 percent more profitable than their average industry competitors and see 12 percent higher market valuation.

A recent survey by Plutoshift, "[Breaking Ground on Implementing AI](#)" provides detailed insights on the adoption and value of AI to businesses. The report uncovered that while companies are making progress with their AI initiatives, many planning and implementation struggles remain. Data collection at its simplest form continues to be a challenge for businesses. While many are collecting data, they struggle to make use out of it or extract value. Eighty-four percent of respondents said they are not yet able to automatically and continuously act on their data intelligence.

Another AI challenge businesses face is defining realistic outcomes and goals. The key to success is setting clear and narrow key performance indicators (KPIs), so that measurement is possible. Maturity to manage budget scope also surfaced as a key finding in the survey results. Fifty-three percent of respondents said their company has not kept its AI project(s) in scope and focused on clear deliverables. Sixty-two percent of respondents said their company took more time than anticipated to acquire internal buy-in and commitment in implementing AI. While companies are looking to solve key business problems, including cost savings, automating tasks, increasing productivity in their workforce and improving efficiencies, only 17 percent of respondents said their company was in full implementation stages of their AI projects.

The last major challenge when it comes to AI is the "Last Mile". This relates to how information gets delivered to the frontline operators. In order to ensure that AI is delivering value, the information on the screen has to be converted to actions taken in the real world. If this delivery mechanism is sub-optimal, businesses won't be able to see the required ROI. Right information delivered to the right person at the right time can make all the difference. Businesses need to master this "Last Mile" challenge in order to realize the full potential of AI.

Closing Thoughts

Digital technologies and transformation in the water utility and industrial sectors alone will not solve 21st-century water challenges. Public and private sector enterprises need to adopt a culture of innovation and learning to scale digital technology solutions. While challenging, organizations must transform into agile learning organizations to successfully scale digital solutions. Digital water technologies will become an essential component of their water stewardship strategies to ensure business continuity and growth.