NEW FINDINGS ON GLOBAL WATER UTILITY TRENDS

By Amir Cahn

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SWAN, The Smart Water Networks Forum, brings together key voices in the water industry to promote the global development and adoption of smart water technologies, making water networks more efficient and sustainable. By aligning industry leaders and participants, SWAN has the unique ability to share its members’ diverse experiences, develop research, and shape industry language and thinking. As a rapidly growing forum, SWAN welcomes new members across the water industry. Recently, SWAN, The Smart Water Networks Forum, conducted a Global Utility Survey to obtain a current snapshot of water utility networks, including their challenges, opportunities and areas of focus. The survey provides great insight into global trends in water utility network management due to the diversity of survey respondents: 33 utilities from 15 countries completed the survey, with participants from Europe, South America, the Middle East, Asia, Australia, the U.S. and South Africa. Survey respondents ranged in size from a utility with 1,279 connections to one with 2,400,000 connections, and network length ranged from 150 km to 47,000 km (See Figure 1 and 2). This article highlights a few of the key survey findings and discusses the way forward through a smart water journey.

In the SWAN Survey, each water utility was asked to identify its top-three challenges as well as opportunities for improvement. Leakage was identified by over half of the surveyed utilities (55%) as a key challenge followed by OPEX effectiveness (52%) and energy (39%). See Figure 3. Other significant concerns shared by respondents included aging infrastructure, water quality, apparent losses, and data management.

The top-three opportunities for network improvement were aligned with the utility challenge areas. Leakage detection was cited 70% of the time as an area for network improvement followed by repair and maintenance (61%) and energy costs (48%). See Figure 4. Demand consumption planning, water quality and asset life were also identified as significant opportunities for improvement.

The Water-Energy Nexus
The findings of the SWAN survey support the existence of a strong nexus between water and energy for water utilities, which isn’t surprising as energy is required in all stages of water production and distribution, from pumping and treatment to transportation. The SWAN Survey found that energy costs are a top-of-mind concern for utilities, regardless of geography, size and level of network efficiency. It was also cited as the third largest opportunity for network improvement. When utilities in the survey were categorized as either low NRW (<20%) or high NRW (>20%) to determine any differences in network challenges, the one topic that utilities agreed upon equally was the fact that energy is a significant challenge. In addition, when asked to provide a breakdown of their water distribution operating expenses, utilities selected energy costs as their third highest expenditure (The full survey provides a detailed breakdown of average utility costs per area).

50 is the New 75
While the expected life of pipes is often estimated at over 75 years, 10 utilities cited “aging infrastructure” as a top-three challenge despite having a median network age of 50 years old. This suggests that a utility’s effective network lifespan is actually below 75 years. The age of network infrastructure among utilities surveyed ranged from 16 years to 100 years old. The majority of utilities had a network age between 40-60 years old - see Figure 5.
Special Feature

These findings suggest that utility asset repair and replacement strategies may shift earlier than previously expected, as utilities begin addressing aging infrastructure earlier and more proactively.

To see more of the SWAN Survey findings, including findings on utilities’ expectations on water scarcity and current NRW rates, visit the SWAN Forum’s website.

Taking the Smart Water Journey
With the growing water crisis and concerns related to aging infrastructure, water utilities are constantly seeking to make their networks more efficient. Experts estimate that up to $12.5 billion can be saved through the implementation of smart water grid technology. Thus, a growing number are adopting a “smart” approach to managing and controlling their networks.

A “smart water network” can be defined as a fully integrated set of data-driven components and solutions that allow water utilities to optimize all aspects of their water distribution systems. Smart water solutions improve the efficiency, longevity, and reliability of a utility’s underlying physical assets by better measuring, collecting, analyzing, and acting upon a wide range of network events. This can impact different dimensions of the utility work, such as day-to-day operations, maintenance, and network planning. By generating knowledge through data-driven technologies, a utility can accurately set goals, plan investments, and address some of its largest challenges such as leakage, energy efficiency, regulatory compliance, or water quality.

When describing smart water networks, it is useful to separate the technology components into layers. The “Five SWAN Layers,” a model developed by the SWAN Forum, provides a useful guide to this discussion (See Figure 6). In general, Smart Water Networks are layered, beginning with the sensing and control layer through data collection, data management, and up to the data fusion layer. A utility’s overall network can become more intelligent by adopting the right components from each layer.

The initial, “Physical” layer includes pipes, pumps, valves, reservoirs, and other delivery endpoint components, which are typically not considered “smart” since they are data-less. The second, “Sensing and Control” layer contains equipment and meter components that measure water delivery and distribution parameters, as well as remote controlled devices like AMR/AMI. Next, the, “Collection and Communication” layer is responsible for discrete data point collection, transmission, and storage including fixed cable networks, cellular, and Wi-Fi. The fourth, “Data Management and Display” layer aggregates data from the lower SWAN layers and creates an interface with human operators such as through a SCADA (Supervisory Control and Data Acquisition) system. Lastly, the “Data Fusion and Analysis” layer takes data from multiple samples, sources, and types to provide automated control and Decision Support Systems for human operators featuring automated network monitoring, advanced pressure management, pumping and energy optimization systems, and more.

Utilities that begin adopting smart water technologies are able to monitor real-time data, integrate current IT systems, improve O&M procedures, reduce water and energy costs, and improve customer satisfaction.

Enhancing the Smart Water Journey
The findings of the SWAN Utility Survey serve as a backdrop for two upcoming SWAN initiatives designed to help water utilities in their smart water journeys: the SWAN SMART SCORE and the SWAN Interactive Architecture Tool.

The SWAN SMART SCORE, which will be available to water utilities free of charge on the SWAN website, is a 12-question survey, which will allow utilities to gauge the relative ‘intelligence’ of their networks and better understand the extent to which they are taking advantage of existing technologies. The SWAN Interactive Architecture Tool, another SWAN tool that reflects the power of cross-industry collaboration, will allow utilities to identify the best solutions for their specific challenges and business drivers, taking into account the many-to-many relationships inherent in smart water networks.

The Tool will provide a comprehensive picture of existing technologies, case studies, architectural maps and benefit analyses.

The Time is Now
Smart water technologies are a critical solution to the looming water crisis - by adopting smart water technologies, utilities may dramatically reduce water loss, as well as energy costs and operational expenses. Utilities around the world have already begun adopting such technologies, with great success. Many utilities have been able to share their experiences in adopting smart water technologies - and learn from the experiences of other water utilities around the world - through the SWAN Forum. We hope to have many more water utilities embark on this exciting journey, bringing the power of technology to the world of water networks to help protect our most valuable resource: water.

About the Author
Amir Cahn is currently working as Market Research Manager at SWAN.

SWAN, The Smart Water Networks Forum, is a worldwide industry forum promoting the use of data technologies in water networks, making them smarter, more efficient and more sustainable. SWAN brings industry leaders together to create and accelerate awareness and effective use of smart data systems for water networks. The forum is open to technology and solution vendors, consultants, researchers, utilities and wholesalers, network operators, investors and any other valuable contributors to the future of water networks. SWAN welcomes members who share this vision of Smart Water Networks, and wish to take part in shaping the future of efficient water distribution.

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