

4 Priority analysis

4.1 Data transforming the water sector

4.1.1 Overview

The priority focusses on better data collection and doing smarter things with the large datasets already collected by our industry and other useful sources, as well as the rapid growth in the technologies supporting services in the sector, and capturing that data.

IoT has become a buzzword but there are limited real examples of analytics being used to support better asset management and service provision in the sector. Where examples exist, they are typically delivered by an organisation in isolation.

There is a relatively strong industry appetite to build on existing **qldwater** benchmarking efforts. **qldwater** has delivered an annual benchmarking report for 8 years but the chosen indicators are WSP-wide and it is challenging to move towards more efficient practice without “clustering” of like communities, and reporting at a scheme level.

4.1.2 Industry trends

Increases in processing power, telemetry, and communication technologies already impact the industry and will accelerate in coming decades because of affordability and community acceptance. Even small service providers have begun migrating towards cloud-based services, mobile computing and increased use of SCADA and telemetry for monitoring and remote operations.

Regulatory responses to these trends have largely been limited to a recognition of cyber-security risks at both the state and federal level. Federally, water utilities with 100,000 or more connections are required under the Security of Critical Infrastructure Act 2018 to contribute to the national register of Critical Infrastructure Assets (which has a focus on foreign ownership).

At a state level, a Queensland Audit Office report ultimately saw amendments made to DNRME's Drinking Water Quality Management Plan Guideline to incorporate an evaluation of cyber-security risks into the plans, and a number of new Key Performance Indicators (required to be reported annually) were introduced, to be reported from 2019/20 for all Queensland Service Providers.

Transparent reporting of performance linked with regulatory incentives and penalties is common in many jurisdictions aiming to prevent over-charging or long-term under-investment, ensure transparency for customers and encouraging competition by comparison to improve efficiency (see e.g. Walter et al., 2009; Rouse, 2009; Haider et al., 2014a; Vilanova et al., 2015). This approach is generally underpinned by benchmarking of selected performance indicators and is common internationally.

4.1.3 Consultation results

This priority was explored in discussions at the Hervey Bay mini-conference in July 2019, in which automated metering was used as an example of why collaborative technology trials can be a challenge:

- Most trial activities have proceeded independently. Needs differ (e.g. different technologies can support different scale solutions, topography, whether meters are installed in pits or above ground etc all have an impact) however the technologies and difference business needs aren't the main impediments.
- Arguably, programs like automated metering end up involving multiple departments within a utility including billing departments which complicates communication and collaboration.

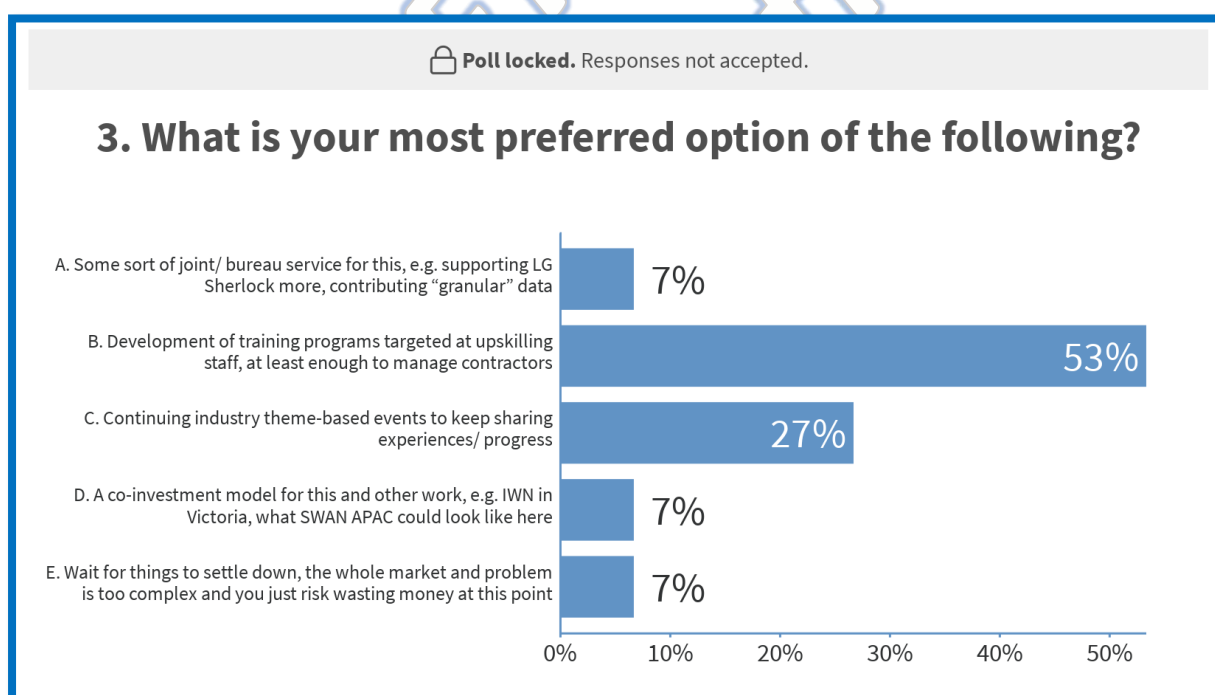
- Much R&D is driven out of large SEQ utilities. Automated metering is an example of one which isn't due to a range of factors, but underpinning all is the way the SEQ utilities are structured and pricing. SEQ utilities have a strong interest in leak detection driven by the high price of treated bulk water, but have in general favoured other technologies.

At the same forum, interest expressed in R&D information exchange, and potential joint chemical dosing trials.

The priority was also implicit in some of the discussions at the TRG Asset Management workshop in June 2019:

- The ISO 55000 readiness project for Whitsunday/ Isaac/ Mackay provided a great vehicle for data sharing
- Offers were made to include data from other service providers into Unitywater's network criticality/ condition assessment modelling tool and Power BI visualisation Logan Council's condition assessment data.
- **qldwater** assisted in reconvening the SEQ Research and Innovation group in 2019, proposed activities will be confirmed at a later date.

One poll of relevance to this theme was administered (at Hervey Bay):



The question was directly targeted at determining delegate preferences for addressing the lack of analytical capacity in member organisations, i.e. we know there is a wealth of data available through a growing number of monitoring tools, but the value of that data remains largely unrealised.

This is possibly a good illustration of what viable "first steps" are; a conservative industry is going to struggle to justify investment in something as speculative as a Victorian Intelligent Water Networks-type model, but with some investment towards more upskilling and more industry events to compare experiences, a more sophisticated option may emerge.



A workshop session was devoted to the topic at the 2019 Annual Forum, with the expansion of the Smart Water Networks Forum Asia-Pacific Alliance pitched as such an option. This more detailed explanation and Q&A session ultimately resulted in very strong support for this type of collaborative model, however there were many provisos (which may be addressed as the relatively new Alliance model matures).

Other most favoured ideas included collaboration on development of digital strategies and data schema, skills development for data analytics/ data literacy, and other collaborative/ data sharing opportunities including common data warehousing for research purposes, and a way for members to understand the value proposition for the growing number of subscription based/ membership services promoting collaboration but competing for limited discretionary budgets.

qldwater has actively proposed the expansion of industry benchmarking efforts since the 2018 Annual Forum and with a new staff member on board from July 2019, we intend to expand this work in 2020. Microsoft PowerBI trials had commenced at the time of writing.

Vox Pop consultation results

"We look very carefully at SWIM data both for our Council and for other Councils and we look at those parameters and then as a result of that information we gather we are now looking at whether we can improve ourselves in relation to those parameters."

"... from a skill set point of view the technological advances from a data collection and data analysis perspective [have] dramatically increased globally and from a water sector perspective, especially in Australia, we are very much behind the 8 ball from a global perspective in gathering data, in compiling it, interpreting it and analysing it to the benefit of the customer."

"We collect lots of data, regulatory and operational data, but we don't utilise it at all, so it sits in these databases and as a manager within the business, what I would really like to see is even at my level some simple dashboard type reporting of some key information we can use."

"... we invest in a lot of technology like our smart metering system... but we don't make that information available to those that are investing in the system, so the customers who could better utilise that through their modern technology today, don't have the option to be able to do that."

"I'd really like to see customers benefit from the data that they invested in Taggle so they should see the benefit in my view. And even from talking about water restrictions and things like that, it will help with being able to communicate that message through smart water use"

4.1.4 Case studies

Suggested case studies:

Mackay and Mareeba for smart meter installations

Automated CCTV analysis of sewers and machine learning (WIMWA???)



Unitywater network asset failure modelling and renewal prioritisation

4.1.5 Key issues

Improved benchmarking is the one topic within this priority which has come up repeatedly through many years of consultation.

Benchmarking is a structured and continuous process that allows service providers to assess performance and identify and adapt fit-for-purpose practices at operational, tactical and strategic scales. Transparent reporting of performance linked with regulatory incentives and penalties is common in many jurisdictions and is essential for competition by comparison amongst water utilities.

Queensland has been criticised in industry reviews (e.g. Draft Productivity Commission report, 2017) for a lack of mature competition by comparison. However, performance reporting processes are well established across the State through SWIM and the State's mandatory Key Performance Indicator (KPI) framework.

Existing reporting needs to be reinforced through a focussed, industry-led approach to establish an appropriate benchmarking framework.

DRAFT for consultation

Roadmap Directions table for priority area "Data transforming the water sector"

Where are we now: The "Old way"	Where we want to be The "New way"	What is required/ What may help	Agents of change	The next steps
<p>Data is collected for a range of purposes including internal benchmarking. All service providers collect high level data to meet annual statutory reporting obligations. Little is done with the data beyond collection.</p> <p><i>Most utilities are resourced only to meet compliance obligations, not extract value out of the wealth of data they collect.</i></p>	<p>Data is better analysed for the purposes of better benchmarking leading to service improvement and/ or reduced costs to serve.</p> <p>More rigour, developed through voluntary industry programs, would prepare the sector for future regulatory changes (e.g. economic/ pricing) or provide a defence against the imposition of onerous regulation.</p> <p><i>A culture of monitoring and analytics supports better decision making.</i></p>	<p>Analytics trials based on existing data, new more "granular" data collected to support scheme-level comparisons.</p> <ul style="list-style-type: none"> Themed shared research activities including ageing infrastructure. 	<p>Bold utilities prepared to trial</p> <p>qldwater</p>	<p>qldwater</p> <ul style="list-style-type: none"> Expansion of annual benchmarking report using swimlocal data, new voluntary scheme level indicators. Power BI dashboard and app trials to demonstrate the value of simple benchmarking tools to members/ clustering/ trials with interested members/ limited/ gradual release. Basic benchmarking could be free/ part of qldwater work plan, fee for service for significant/ customised benchmarking. Collaboration with DNRME on expansion of KPI framework, comparative report tool. <p>Collaborative Opportunities</p> <ul style="list-style-type: none"> Vendor trials with integration tools, e.g. Lutra, Elafent with a committed qldwater member. Establishment of a data sharing/ modelling community of practice, building on themes explored at the 2019 Asset Management Workshop.

				<ul style="list-style-type: none"> Through the Water Skills Partnership, investigate options for building useful training programs to upskill member staff in analytics. <p>Policy recommendations</p> <p>DNRME – commit to real continuous improvement of the KPI framework, support the proposal for “voluntary” indicators as a way of improving participation.</p>
<p>Water Service Providers that can afford R&D undertake projects in isolation, typically share information when projects are finished.</p> <p><i>Collaborating is perceived as more challenging than doing it yourself.</i></p>	<p>Active collaborative research trials, shared knowledge, reduced duplication, saving \$ for customers.</p> <p><i>The whole is greater than the sum of its parts.</i></p>	<ul style="list-style-type: none"> Better promotion of existing collaborative networks including SEQ R&I network. Other research collaborations including SWAN, Water RA, CRCs, WSAA networks. 	<p>SEQ utilities</p> <p>Larger regional utilities</p> <p>Research collaborations and alliances</p>	<p>qldwater</p> <ul style="list-style-type: none"> explore chemical dosing trials WBBROC, link unis etc, undergrads, postgrads, data sharing laboratories network use forums to develop theme-based communities of practice <p>Collaborative opportunities</p> <ul style="list-style-type: none"> event underpinned by Seqwater research project to seed potential collaboration Specific focus on digital utilities – using SWAN as an IWN-like vehicle (“peer-to-peer” utility-driven network) Consider “smart city” applications



				<ul style="list-style-type: none"> Fit for purpose treatment and other technology trials <p>Policy recommendations</p> <ul style="list-style-type: none"> Establishment of a research/ innovation seed fund specifically devoted to water and sewerage with collaboration, linkages to regional/ remote as fundamental criteria. e.g. CRC-P model. Acknowledging challenges of ageing infrastructure and need to be smarter about investment, particularly focussing on TOTEX.
<p>Service Providers are reactive to challenges of changing technologies instead of planning for data futures. Our industry is diverse but many of the same fundamental needs drive business.</p> <p>There is little consistency in approaches – e.g. Data architecture, data management. SCADA and asset management systems often quoted.</p>	<p>Service Providers collectively plan and share information for common challenges around changing technologies, particularly data management.</p>	<ul style="list-style-type: none"> Collaboration on digital strategies – common research platform, individualised strategies Learn from other industries including utilities Joint modelling Standardised approaches – schema, other mechanisms to ensure data quality including approaches to auditing Data hosting arrangements which are 	<p>Pilot utilities</p> <p>Alliances e.g. SWAN</p> <p>qldwater</p>	<p>qldwater</p> <ul style="list-style-type: none"> Continue to build SWIM as an integrative tool – for regulator data, laboratory results, and other sources, with appropriate licensing – encouraging creative commons/ open source as far as possible within security constraints Consider case for expanding SWIM as a hosted service/ storage vehicle for research <p>Collaborative Opportunities</p> <ul style="list-style-type: none"> A place to record all of the available research and other collaborations, including their value propositions



		<p>cognisant of trends in cyber-security</p> <ul style="list-style-type: none">• Improved data transfer/ shareability		<ul style="list-style-type: none">• Joint modelling initiatives• Collaborative approaches to development of digital strategies (customized for each utility but core shared knowledge)• Platform for sharing results of utility research/ active programs• Skilling options – analytics, cyber security and other fundamentals – link to skilling priority <p>Policy recommendations</p> <ul style="list-style-type: none">• Non-capital funding to support innovation and collaboration• Use ICT to understand peak demand and optimise network design/peak flow and target efficiency (e.g. energy used to pump).
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