NOVEMBER 2024 - SCIENCE BRIEF
The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

DIGITAL UTILITY MATURITY ASSESSMENTS OF SOUTH AFRICA'S WATER BOARDS IN SUPPORT OF THE 4TH INDUSTRIAL REVOLUTION

Background

One of the great challenges of digital development is tailoring the abundant varieties of digital technology to the unique demands of individual utilities. It is important to identify the digital maturity of an organisation to provide appropriate solutions. By 'ground-truthing' in this way, each organisation can pursue a digital strategy that suits its readiness to adopt new technologies, as well as its long- and short-term objectives. Doing this enables utilities to use data, consolidate and open new possibilities that benefit both the utility as well as other organisations more effectively.

Over the years, South Africa's water utilities have adopted various solutions and tools to support their operations, including Supervisory Control and Data Acquisition (SCADA) systems, and others such as Laboratory Information Management System (LIMS), Geographic information system (GIS), etc. They are aware that the data currently being collected is not all being analysed and used to its full benefit. Enabling them to make full use of the digital tools they have already acquired and accurately identifying the most impactful additions just ten organisations can make will improve service delivery to >22,000,000 water consumers.

A recently completed WRC-funded study intended to determine the digital maturity of a small number of water utilities to provide a context-specific assessment framework., This was followed by a collation and analysis of the full dataset to provide not only private results to each supplier, but a national view of the state of water utilities.

To calculate the digital maturity, the Digital Utility Maturity Assessment (DUMA) process involved participants responding to the DUMA survey involving 80 questions on 8 business function areas of a water utility, followed by a validation workshop with the utility to understand the scores and opportunities for improvement. The 8 business function areas assessed were Asset Management, Operations & Maintenance, Customer Service, Corporate Services, Safety, Health, Environment and Quality (SHEQ), Strategy & Stakeholders, Capital Planning & Delivery and Business Continuity and Planning. Water utilities could score as many as 10 points toward digital maturity in each of the functional areas.

The project methodology selected water utilities, whereby the project objectives, milestones, timeframes, and advice on ways to complete the DUMA survey was rendered. Subsequently, water utilities completed the DUMA survey pursuant to understanding their "current" state and desired "target" state and through this process, digital maturity gaps were identified. The project performed a detailed analysis on draft survey responses to verify and identify potential incorrect survey inconsistencies. Through a rigorous consultative process, the project worked through the survey and utility validation report to agree on the survey scores and on priority utility improvement activities to close gaps to current state and future state to demonstrate the need

for investment in the digital maturity transition. Thereafter, water utilities submitted their revised and final version of survey. The project has developed the definitive version of the benchmarking outputs (key charts, maturity and gaps identified), which are combined with the previously identified utility improvement initiatives and identified best practices to form concise individual utility reports.

Digital Utility Maturity Assessment of South Africa's Bulk Water Utilities

The DUMA assessed water utilities over 8 functional areas for several South African bulk water utilities, including Amatola Water, Johannesburg Water, Midvaal Water, Rand Water and Umngeni-Uthukela Water.

The level of digital maturity for South Africa's bulk water utilities has been charted across all 8 functional areas as shown in Figure 1. Both the current and target values are calculated as the average of the responses from the online DUMA survey. The chart also incorporates an 'industry average' based on results from a peer group of twelve (12) water utilities from South Africa, Australia, United Kingdom, and the United States of America. The 'South Africa average' is based on results from Amatola Water, Johannesburg Water, Midvaal Water, Rand Water and Umngeni-Uthukela Water.

Key results of the assessment are as follows:

- The **overall maturity current score** is **4.8** with a **target score** of **8.0**.
- The **Strategy & Stakeholders (score of 5.2)** and **Capital Planning & Delivery (score of 5.1)** functional areas were ranked as having the highest digital maturity; and
- The **Customer Service (score of 4.2)** functional area was ranked as having the lowest current digital maturity across all the functional areas, followed by **SHEQ** (with a **score of 4.6**) and **Asset Management, Operations and Maintenance, Business Continuity and Planning** (with a **score of 4.7**).

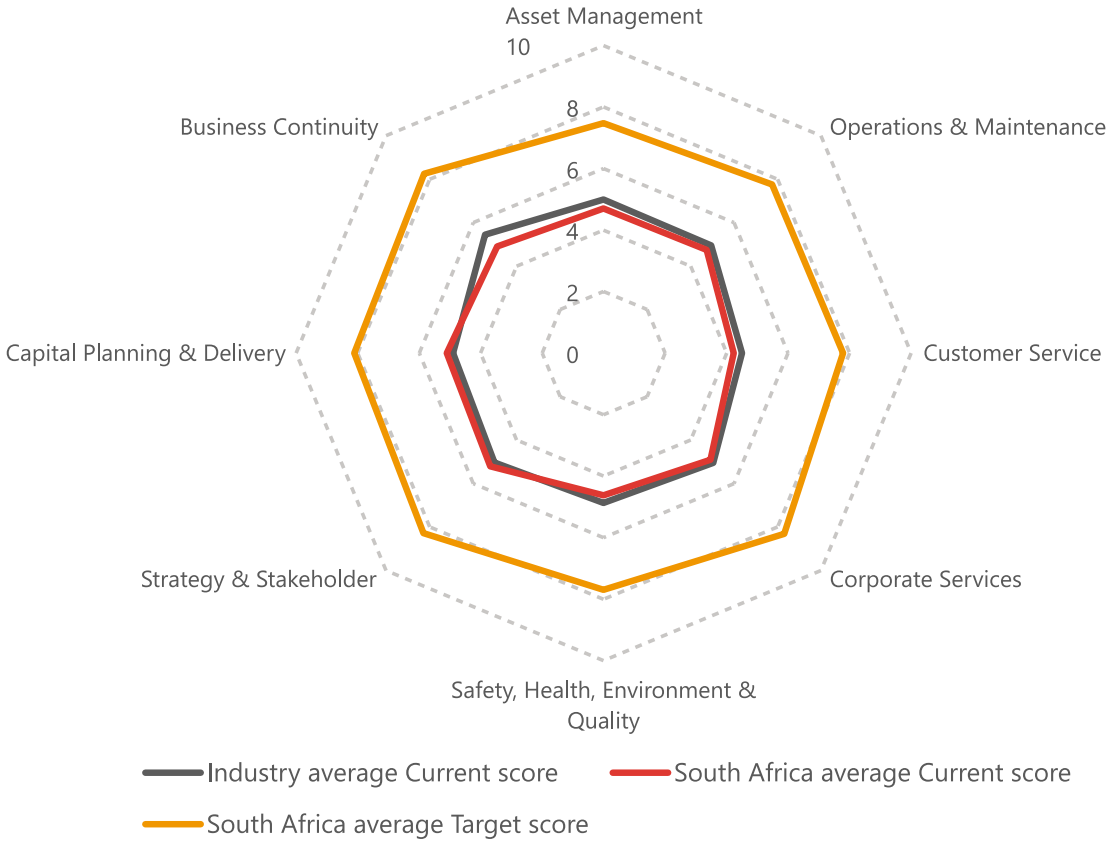

Figure 1: South Africa's Bulk Water Utilities Digital Maturity Overview

Recommendations

The three main recommendations not only focus on building maturity, but they also will lay the foundations to cater for growth and/or integration if needed in the future.

The three main recommendations are as follows.

- Building data analytics capability to drive better decision making through the asset lifecycle.
- Digitising field mobility and work order management system to drive efficiencies & uplift Asset Management and Operations & Maintenance capabilities.
- Explore building a better understanding of customer segments and water use with digital metering.

Several other considerations relating to execution of the above recommendations are as follows:

- Several obstacles or barriers stand in the way of digital transformation. A lack of strategy and competing priorities leads the list. It becomes extremely important to identify and understand the barriers to digital transformation and develop strategies to overcome these barriers.
- Digitally maturing companies behave differently than their less mature peers do. The difference has less to do with technology and more to do with business fundamentals. Digitally maturing organisations are committed to transformative strategies supported by collaborative cultures that are open to taking risk.
- Equally important, leaders and employees at digitally maturing organisations have access to the resources they need to develop digital skills and competencies.
- Due to the complex nature of infrastructure utility organisations and their lock-in to existing infrastructure, digital transformation will require careful strategic and operational planning and commitment and may take longer than in other sectors. It is imperative to develop a digital transformation strategy which will outline the utilities digital transformation journey. The digital strategy needs to form part of the corporate strategy.
- Many utilities will have to change their cultural mindsets to increase collaboration and encourage risk taking. Executive management should also address whether different digital technologies or approaches can help bring about that change. They must also understand what aspects of the current culture could spur greater digital transformation progress.
- Pursue innovation and pilot projects to effectively de-risk digital innovation adoption. Piloting and testing projects offer a means to explore new technologies and have a more holistic understanding of their physical and financial effects on operations before committing to large-scale implementation; and develop a clear framework on how to systematically adopt digital solutions.

To support the successful implementation of the three main recommendations, the project team has considered the national and local contexts and recommends the following approach:

- Each recommendation be implemented adopting a trial and learn approach before scaling.
- Three water utilities are selected to trial the three recommendations, with each water utility testing one of the recommendations. This will ensure efficient and effective allocation of resources and effort to get the learnings that can be shared with the broader sector in South Africa; and
- There is an overarching governing body such as the WRC, supported by an expert agency that oversees the implementation of the trials. The key role of this body should be to:
  - Establish an overarching governance framework for management and delivery of trials.
  - Set the objectives and key performance indicators of all trials.
  - Ensure the allocation of required resources (skills, capabilities, and budgets) to trials.
  - Monitor the progress of the trials and report on the outcome to the sector and relevant policy makers.
  - Remove all barriers to trial management and delivery.

For more information, refer to WRC report, ***Digital utility maturity assessments of South Africa's water boards in support of the 4th Industrial Revolution*** (**WRC report no. 3096/1/23**).