Digital Water Horizons: Leading the Next Wave of Innovation

2 NOVEMBER 2023
AGENDA

- Welcome & icebreaker
  
  Erin Jordan, IWA

- Introduction to the IWA DWP
  
  Oliver Grieveson, AtkinsRéalis

- The Development of a Smart Water Utility: The Rand Water Experience
  
  Mogan Padayachee, Rand Water

- Utility Digital Collaboratives- Expanding affordable digitalization to small and low resource water utilities
  
  Deepa Karthykeyan, Athena Infonomics

- Q&A Panel Discussion
  
  Oliver Grieveson, AtkinsRéalis

- 2023 IWA Digital Water Summit Presentation & Close
  
  Oliver Grieveson, AtkinsRéalis & Erin Jordan, IWA
ICEBREAKER

Browse to join.groupmap.com and enter invite code

972-FBB-B9C

https://join.groupmap.com/972-FBB-B9C
ABOUT THE DIGITAL WATER PROGRAMME

• The Digital Water Programme aims to act as a catalyst for innovation, knowledge, and best practices around digitalisation for the water industry, provide a platform to share experiences and promote leadership in transitioning to digital water solutions, and consolidate lessons to guide the natural evolution from the ‘business as usual’ to achieving a digital water utility.

• The Programme is driven by end users (e.g., utilities, regulators) as well as solution providers (e.g., technology companies, software companies, researchers, academia) at the forefront of emerging technologies to solve urgent and costly operational problems to deliver water services.

• The overall goal of the Programme is to facilitate utility’s access to knowledge that enhances the rate of success of their digital initiatives and prowess. The objectives of the Programme ensure this goal can be achieved.
The DWP Steering Committee

The Steering Committee guides the Programme, ensuring the goal and objectives are consistently achieved.

The 2023 – 2025 Steering Committee was recently announced, with 55% being female, and 50% representing low- and middle-income countries.

The Steering Committee is led by Oliver Grievson.
The DWP Goal

**Goal**

To facilitate embedding digital at the core of the water profession to address challenges and create value

**Objectives**

- Collate body of knowledge and insights from members
- To empower members with a unified terminology and standards
- Enabling sharing between members
- Creating a focal point in IWA for Digital Water

**Suggested Tools**

- Webinars
- Blogs & podcasts
- Videos
- Zoom interviews
- White papers
- Case studies
- Surveys
- Book series
- Elevator pitch
- Good practice guides
- Workshops
- Library of case studies
- Annual Meeting (DWS)
- Subgroups working on different topics
The DWP Outputs

- **4** Subgroups
- **11** Publications
- **13** Webinars & Events
- **40+** Online media
THE DEVELOPMENT OF A SMART WATER UTILITY: THE RAND WATER EXPERIENCE

MOGAN PADAYACHEE

RAND WATER INNOVATION & NEW TECHNOLOGIES DIVISION

2 NOVEMBER 2023
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1. RAND WATER CONTEXT
2. DIGITAL TRANSFORMATION OVERVIEW
3. VALUE PROPOSITION
4. DIGITAL WATER PROGRAMS
5. PARTNERSHIPS & COLLABORATION
**OUR STRATEGY**

**VISION**
Be a provider of sustainable, universally competitive water and sanitation for Africa.

**MISSION**
To consistently meet the expectations of Rand Water customers, partners, and the government by strengthening the capacity to:
- Attract, develop and retain leading edge skills in the water services
- Sustain a robust financial performance
- Develop and sustain globally competitive capabilities in core areas
- Enter into and sustain productive partnerships
- Develop, test and deploy cost-effective technologies

**STRATEGIC OBJECTIVES**
- Achieve Operational Integrity and Use Best Fit Technology
- Achieve a High-Performance Culture
- Positively Engage Stakeholder Base
- Achieve Growth
- Maintain Financial Health & Sustainability

**OUR SUPPLY**

**Capacity to Supply**
- Largest water utility in Africa existing for 120 years
- Bulk Water supplier mainly to municipalities
- Distribution network over 3 056km of large diameter pipeline
- Feeding 60 strategically located service reservoirs
- Supplied an average of 4 520 Mℓ/d and peak day demand of 5 199 Mℓ/d

**Supply to Main Customers**
- 37 Municipalities
- 27 Mines
- 2 Railways
- 652 industries and direct consumers

**OUR OUTPUTS**

Un-interrupted Supply
Rand Water remains a prominent example of a state-owned entity that consistently delivered water every day of the year.

<table>
<thead>
<tr>
<th>Total Sales Volumes</th>
<th>1 721 658 Mℓ/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Daily Demand</td>
<td>5 199 Mℓ/d</td>
</tr>
<tr>
<td>Lowest Daily Volumes Sold</td>
<td>4 443 Mℓ/d</td>
</tr>
<tr>
<td>Highest Daily Volumes Sold</td>
<td>4 604 Mℓ/d</td>
</tr>
</tbody>
</table>

**KEY BUSINESS PROCESSES AND ACTIVITIES**

- Abstraction
- Treatment
- Pumping
- Distribution

**Strategic Risks 2022/23**

- Abstraction
- Treatment
- Pumping
- Distribution

- Cost effective, and timeous procurement of quality goods and services for the sustainability of Rand Water
- Climate change and its impact on future sustainability of the company
- Viability and sustainability of RW growth and expansion initiatives
- Alignment and compliance to regulatory frameworks and governance protocols
- Protection of critical RW Assets (NKP issues, Pipelines)

**RAND WATER’S 6 CAPITALS**

- Finance Capital
- Manufactured Capital
- Natural Capital
- Human Capital
- Intellectual Capital
- Social & Relationships Capital
ANALYSIS & EVALUATION OF APPROPRIATE FRAMEWORKS
1. What is the overall current state of the digital transformation of the utility?

2. Is the utility actively pursuing new skills and capabilities in the analytics (or “big data”) space?

3. What is the utilities approach to piloting and testing new digital technologies and solutions?
8 business functions, 80 questions on people, process and technology

- How do our staff in different functional areas view their ‘current’ and ‘future’ state from a digital perspective?
- Do these views vary significantly both within and across our different functions?
- How do our functional and overall results compare to others within or external to our industry?
- What industry best practices exist with respect to people, process and technology that I could apply to my own business?
CURRENT VS ASPIRATION

Data from various disparate sensors and instruments throughout the Rand Water operations (i.e. water flow, water pressure, water quality, energy consumption, corrosion sensors, alarms, etc.)

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**Data Sources**
- Acoustic loggers
- Customer meters
- Transient loggers
- Water quality sensors
- Flow meters

**Sensors**
- Background leakage
- Demand / usage
- Surge / water hammer
- Detects water quality issues
- Inflow & outflow

**Network**

**Analytics Platform**

**Business function**
- Maintenance
  - Leak detection
  - Proactive workforce management
- Asset management
  - Condition monitoring
  - Preventative maintenance
  - Renewal, planning & forecasting
  - Investment planning
  - Prioritisation
  - Network management strategy
- Network operations
  - Alarms monitoring
  - Performance monitoring
  - Water supply management
  - Water quality monitoring
  - Burst detection
  - Water hammer / surge pressure monitoring
  - Cathodic protection

**Other enterprise data**
- EPANet
- BI
- SCADA
- GIS
- MES
- Maximo
- MDMS
- SAP

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FINANCE OF THE FUTURE: DIGITAL TRANSFORMATION

The RPA Benefits

WHAT DOES THIS MEAN FOR YOU?

- Truly assess how human error
- Lower costs of processing
- Increased efficiency
- Decreased cost of errors
- Improved scalability
- Increased security
- Immediate tools available now
- Increased customer satisfaction
- Emotional reporting on variables
- Technical reports in milliseconds
- Technical reports on automation impact by business analyst
- Automated resources with ambition scripts by business analyst
- Increased customer feedback between team and customer

ACTIVITY

- Define IT processes
- Document IT organisation structure
- Define data migration strategy & plan
- Define data management framework
- Investigate Excel for SAP CRM
- Investigate RPA technologies to realise efficiencies
- Implemented an integrated GRC Solution
- BPC Configured Service Desk Operations over Digital platforms
- Digitalisation of templates
- Vendor Recon Automation
- Enabling Billing & Service Desk requirements
- Define short-term (1-2 years) activities
- Medium-term (3-4 years) activities
- Long-term (5+ years) activities

Activities are not chronological. Look within the relevant zones for timing.
INNOVATION & PILOTING TO FULL SCALE IMPLEMENTATION

Use Of Satellite Technology to Detect Leaks on Drinking Water Pipelines

Monitoring of Cyanobacteria Blooms in The Vaal Dam Using Satellite Remote Sensing

Robotics Process Automation

Alternative Water Sources - Ground water Groundwater Exploration Using Digitally Enhanced Technologies

Advanced 3D Mapping of Sub-Surface Pipes Up To 20M Depth

Digital twins in the water sector

Predictive Catchment Water Quality Model

3D Scanning, Virtual Reality and Digital Twins
INNOVATION & PILOTING TO FULL SCALE IMPLEMENTATION

PREDECITIVE ANALYSIS

ONLINE DETECTION

ONLINE BACTERIAL DETECTION
METHODOLOGY: PROCESS FLOW OF DATE COLLECTION

Drinking Water Network Monitoring

Multiple pipe:scans are the ideal solution to monitor drinking water at any point in the network.

Real-time Monitoring of Network Hydraulic and Water Quality

Figure 2: Process flow of data collection
GENERATIVE AI: UNLOCKING THE POWER OF CHAT GPT: REVOLUTIONIZE YOUR UTILITY DATA MANAGEMENT REVOLUTIONISE

Turn historical and on-going operations info into a Knowledge Powerhouse

- Equipment Calibration Recommendations
- Clutch Slack and Common Trends
- Value Operations guidance
- Scenario B recovery based on criteria
- Residents commonly affected in case of a customer complaint
- Recommended Flushing guidance
- New Staff Induction
BRING IT ALL TOGETHER - SMART WATER UTILITY

- Achieve growth
- Achieve operational integrity & use best fit technology
- Positively engage stakeholder base
- Achieve a high performance culture
- Maintain financial health & sustainability
- Converge digital (IT/OT) infrastructure
- Deliver solutions, systems, data analytics of value
- Implement automation technologies
PARTNERSHIPS & COLLABORATION


2. 2X Presentations at WISA Conference

3. UK KTN Delegation to South Africa (Rand Water)

4. Rand Water delegation to UK


6. Ground Water discussion with Danish Water Embassy

7. Paper presentation at IWA World Water Congress (Copenhagen, Denmark).
Thank you!
Utility Digital Collaboratives -
Expanding affordable digitalization to small and low resource water utilities
There is wide disparity in system maturity & digital readiness across utilities

More mature systems are better buyers and managers of digital products and services and digitalization processes
How to bridge the digitalization divide and accelerate digitalization for water utilities, particularly those operating in low resource contexts?
Known Knowns

Awareness on gaps and capacity to review different technologies (costs, relevance and benefits) is limited

Solutions may not be relevant or affordable

Weak staffing norms and capacity to procure, implement, manage and oversee digitalization efforts

Transaction costs of engaging with smaller utilities is high but with lower returns – Quality of service may suffer
A utility digital collaborative could be a way to deliver affordable digitalization for small utilities.
Digital Collaboratives - A ‘network driven’ approach to address technology, talent and system gaps to accelerate digitalization of small /low resource water utilities

Tech Reviews and Guidance
Maturity assessment models

Investing in Technology and Tools
Digital Public goods

Attract and channel talent
A data science fellows' program

Investing in Process and Systems –
Contracting standards and SLAs

Mobilize resources
Members fee, Govt budgets, grants etc
Thank you
Q&A Discussion

MODERATOR: OLIVER GRIEVSON
The IWA Digital Water Summit

A snapshot of the first IWA Digital Water Summit:

- 300+ digital water professionals joined and contributed to the numerous discussions
- 20 exhibitors showcasing innovative & futuristic technologies
- Multi-faceted programme challenged attendees on What is digital water? What is the difference between digital water and digitalisation? How can we make the water industry more digitally aware?
- Featuring keynote presentations, technical sessions, ‘Innohub’ pitches, and out-the-box interactive sessions.
IWA Digital Water Summit

BILBAO SPAIN

14 - 16 Nov 2023

www.digitalwatersummit.org
IWA Digital Water Summit

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www.digitalwatersummit.org

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https://digitalwatersummit.org/
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