the international water association

Digital Water Horizons: Leading the Next Wave of Innovation

2 NOVEMBER 2023

inspiring change

AGENDA

- Welcome & icebreaker
  Erin Jordan, IWA
- Introduction to the IWA DWP
  Oliver Grievson, 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 Grievson, AtkinsRéalis
- 2023 IWA Digital Water Summit Presentation & Close
  Oliver Grievson, AtkinsRéalis & Erin Jordan, IWA

ICEBREAKER

the international water association

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.

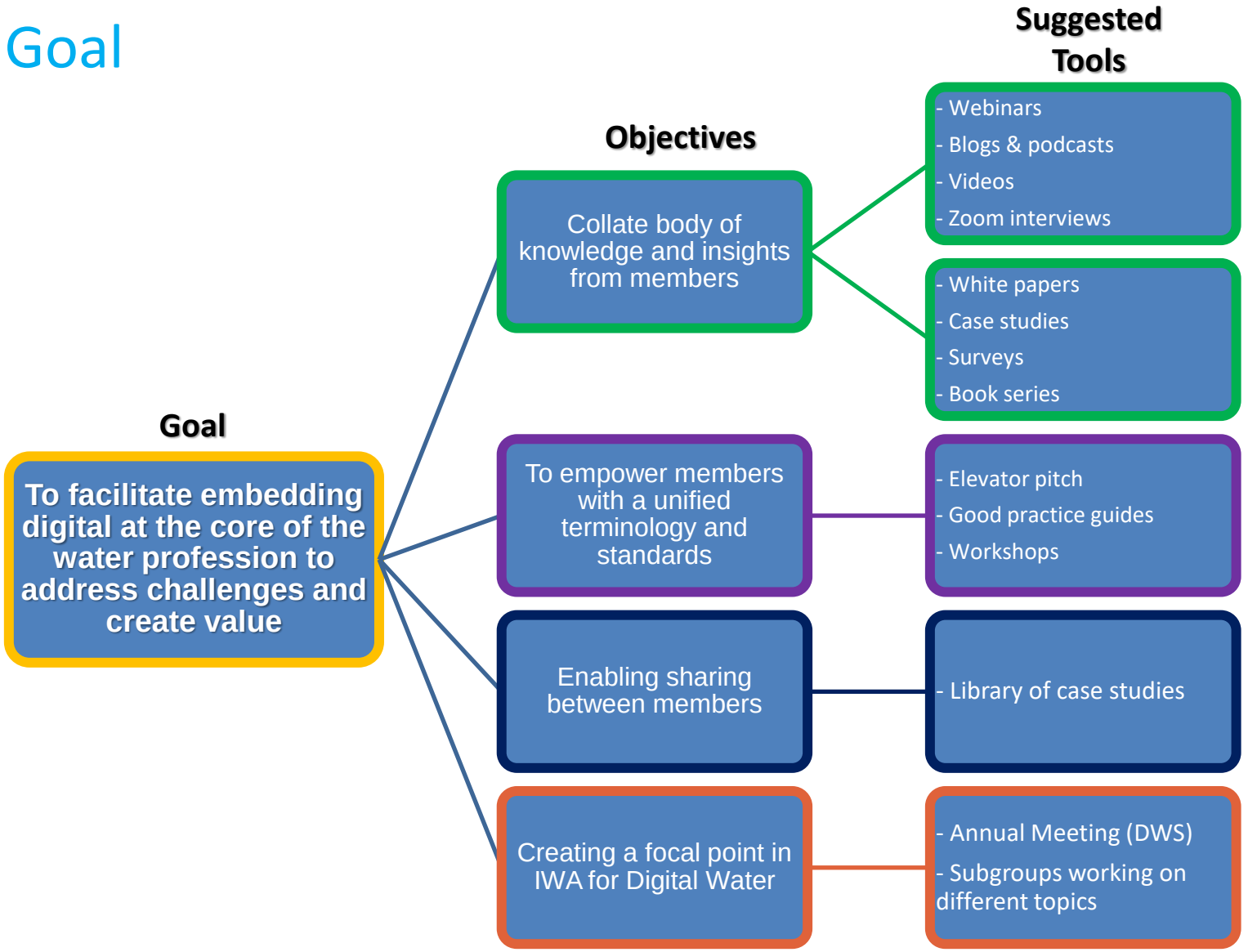
The DWP Steering Committee

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

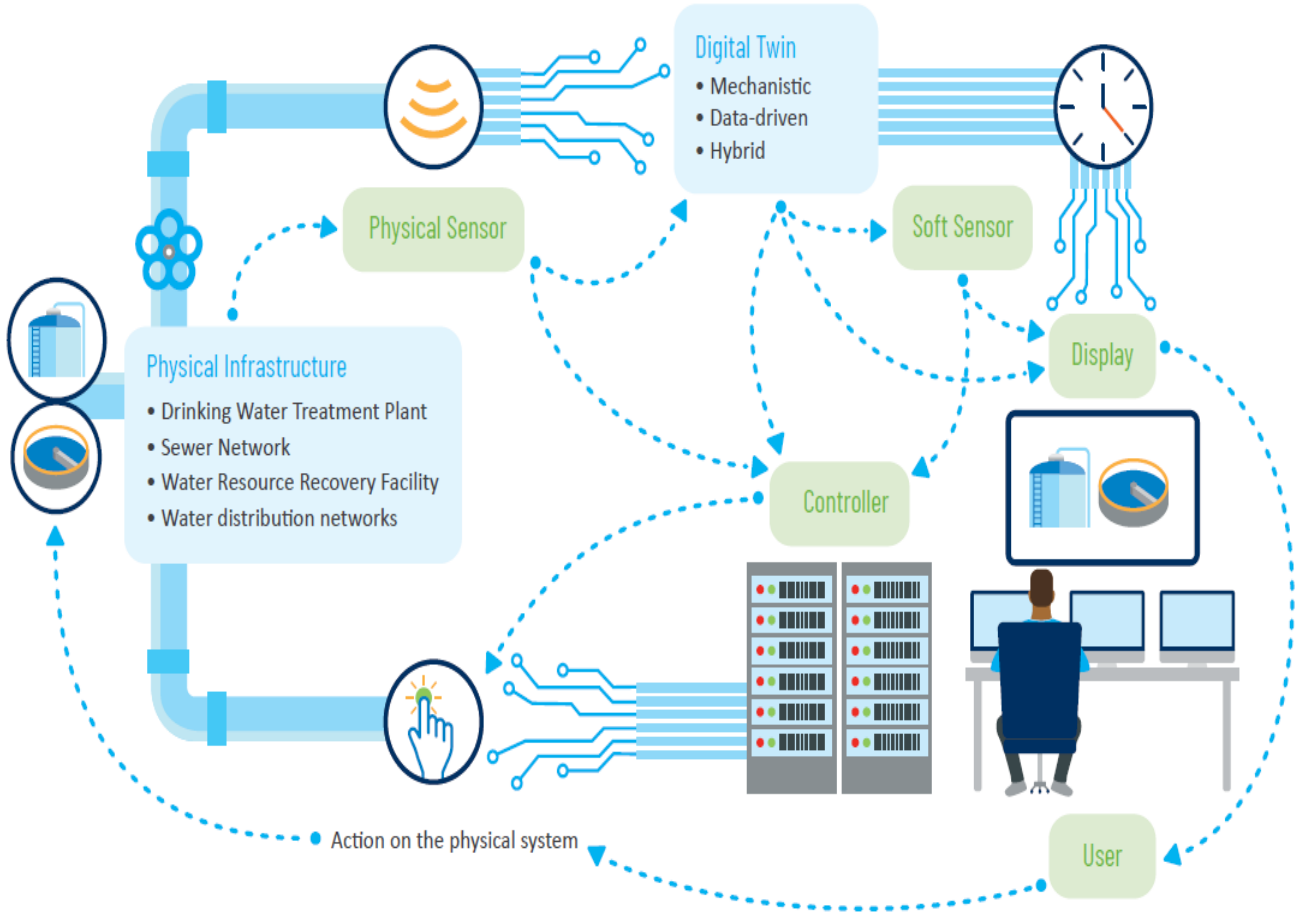
MOGAN PADAYACHEE

RAND WATER INNOVATION & NEW TECHNOLOGIES DIVISION

THE DEVELOPMENT OF A SMART WATER UTILITY: THE RAND WATER EXPERIENCE

2 NOVEMBER 2023

CONTENTS



RAND WATER 120 YEARS OF FINDING NEW WAYS

OUR VALUE CREATION MODEL

INPUTS

Finance Capital serves as a strategic asset and facilitator for Rand Water's process of generating value across various dimensions: Natural Capital, Manufacturing Capital, Human Capital, Intellectual Capital, as well as Stakeholder and Relationship Capital.

RAND WATER'S 6 CAPITALS

- Finance Capital
- Manufactured Capital
- Natural Capital
- Human Capital
- Intellectual Capital
- Social & Relationships Capital

Business Model

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

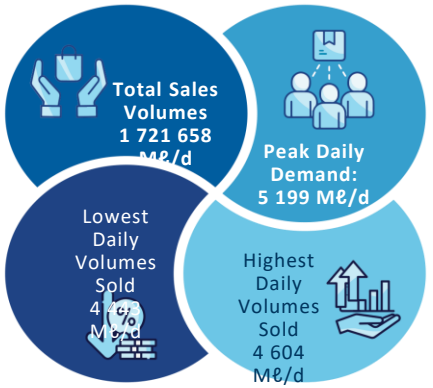
- Largest water utility in Africa existing for 120 years
- Bulk Water supplier mainly to municipalities
- Distribution network over 3 056km of large diameter pipeline
- Feeding 60 strategically located service reservoirs
- Supplied an average of 4 520 Mℓ/d and peak day demand of 5 199 Mℓ/d

Supply to Main Customers

- 17 Municipalities
- 27 Mines
- 2 Railways
- 952 Industries and direct consumers

OUR OUTPUTS

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



KEY BUSINESS PROCESSES AND ACTIVITIES

Abstraction → Treatment → Pumping → Distribution

Strategic Risks 2022/23

- Availabillity, reliability and quality of electrical supply
- Infrastructure project implementation, completion and integrity of new installation
- Encroachment over pipeline, servitudes and properties
- Credit & Debt Management
- Sustainablilty of the supply of portable water
- 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 complaince to regulatory frameworks and governance protocols
- Protection of critical RW Assets (NKP issues, Pipelines)

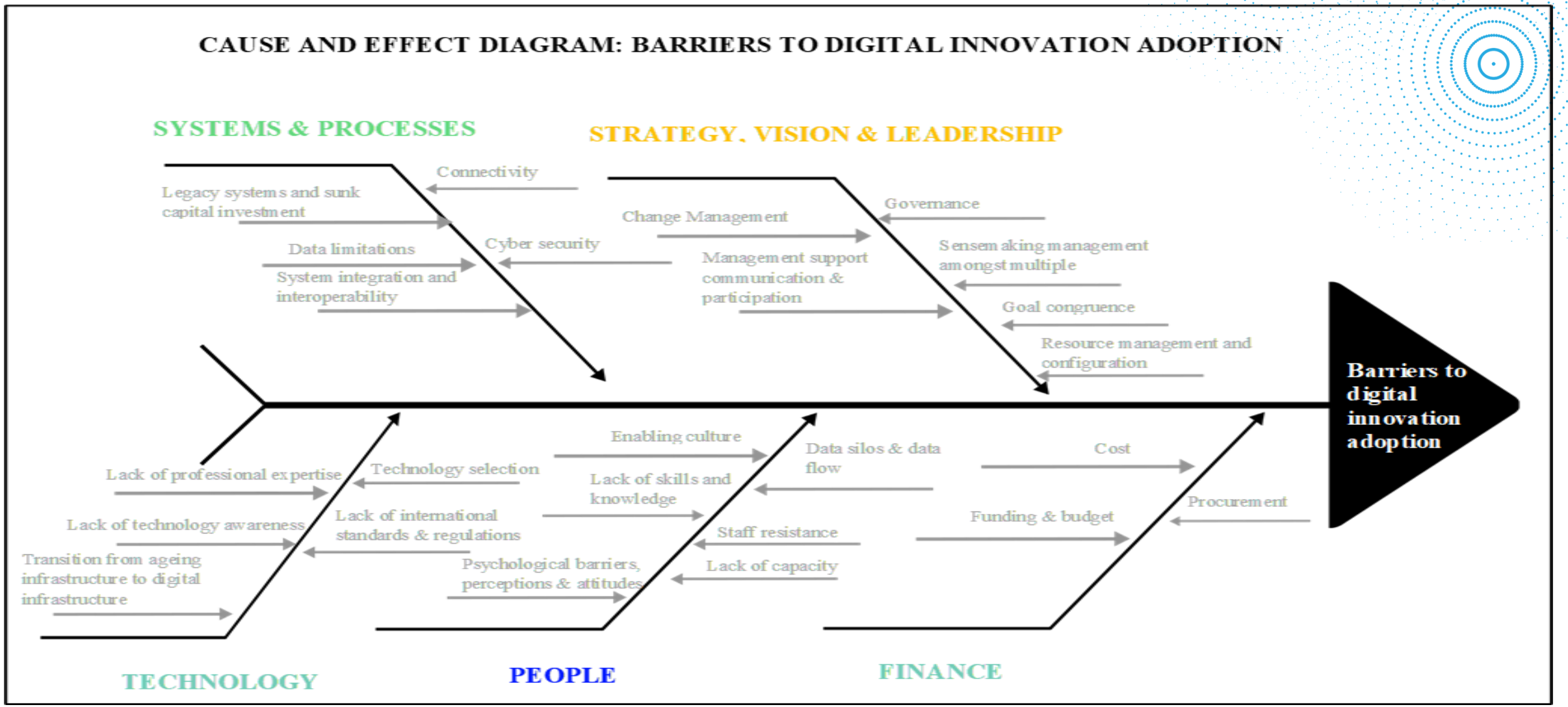
OUTCOMES

Value was created within Each of Rand Water's 6 Capitals: Finance Capital, Manufactured Capital, Natural Capital, Human Capital, Intellectual Capital, Social & Relationships Capital

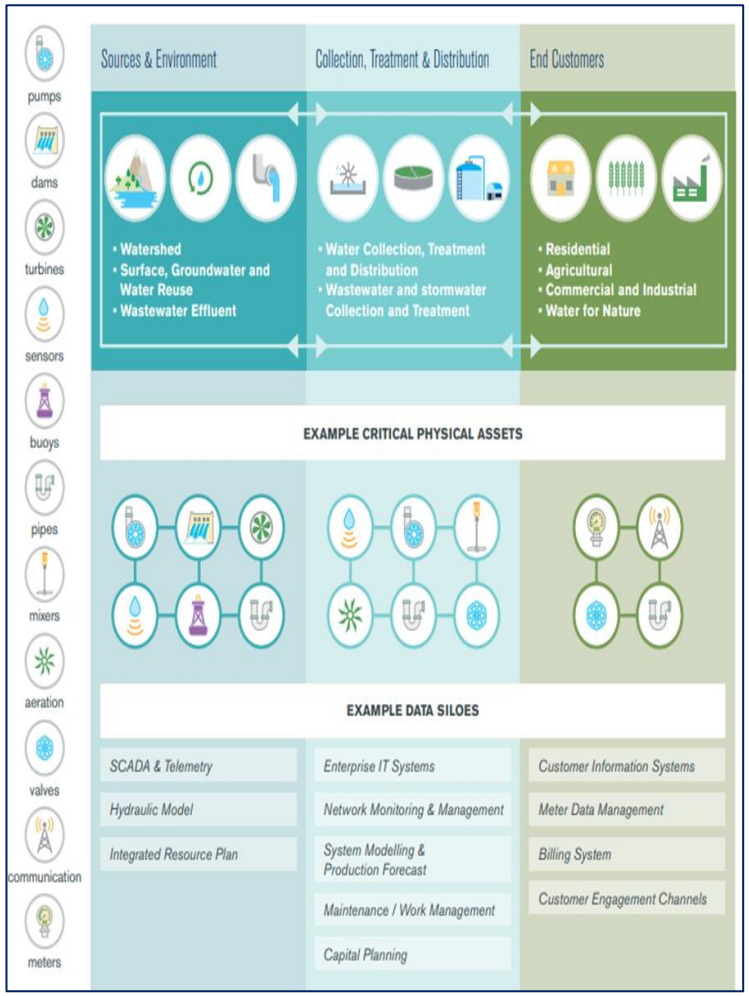
- Finance Capital
- Manufactured Capital
- Natural Capital
- Human Capital
- Intellectual Capital
- Social & Relationships Capital

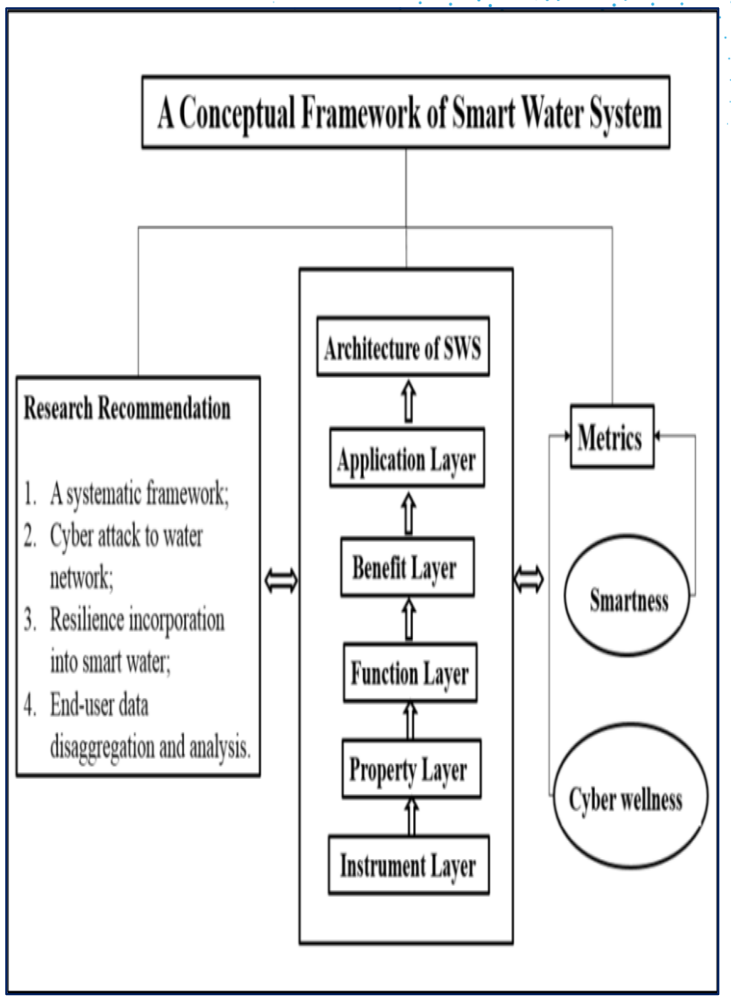
OUR VALUE CREATION MODEL

KEY RISKS, BARRIERS AND CHALLENGES TO DIGITAL TRANSFORMATION

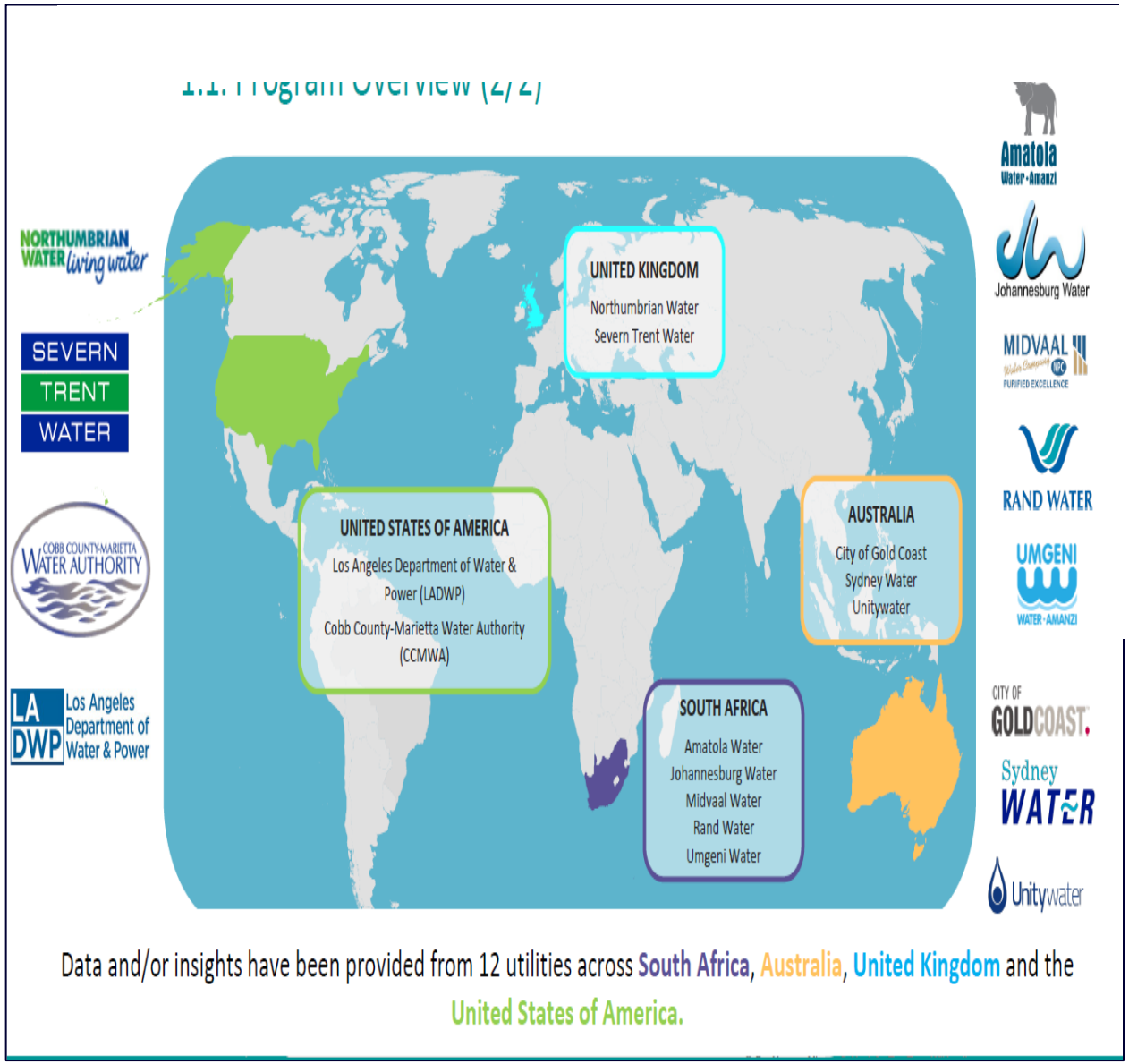


ANALYSIS & EVALUATION OF APPROPRIATE FRAMEWORKS





DIGITAL UTILITY MATURITY ASSESSMENT



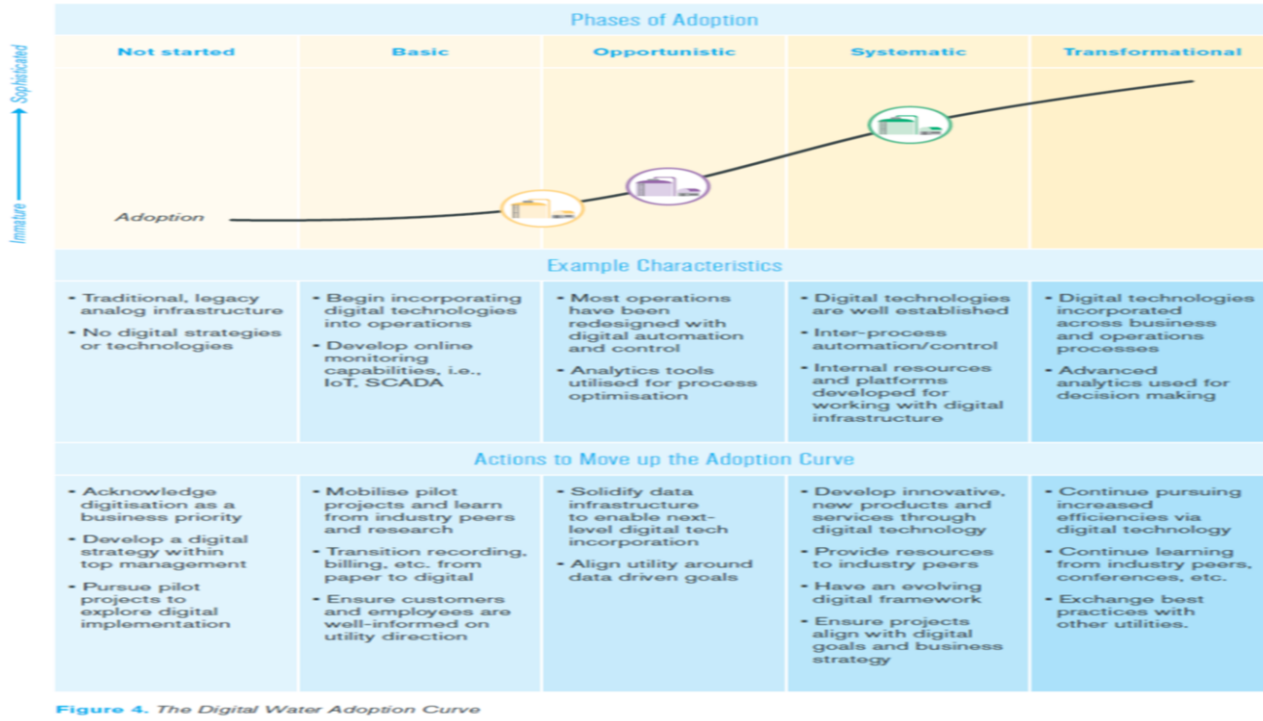


Figure 4. *The Digital Water Adoption Curve*

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?

RAND WATER 120 YEARS OF FINDING NEW WAYS

DIGITAL UTILITY MATURITY ASSESSMENT

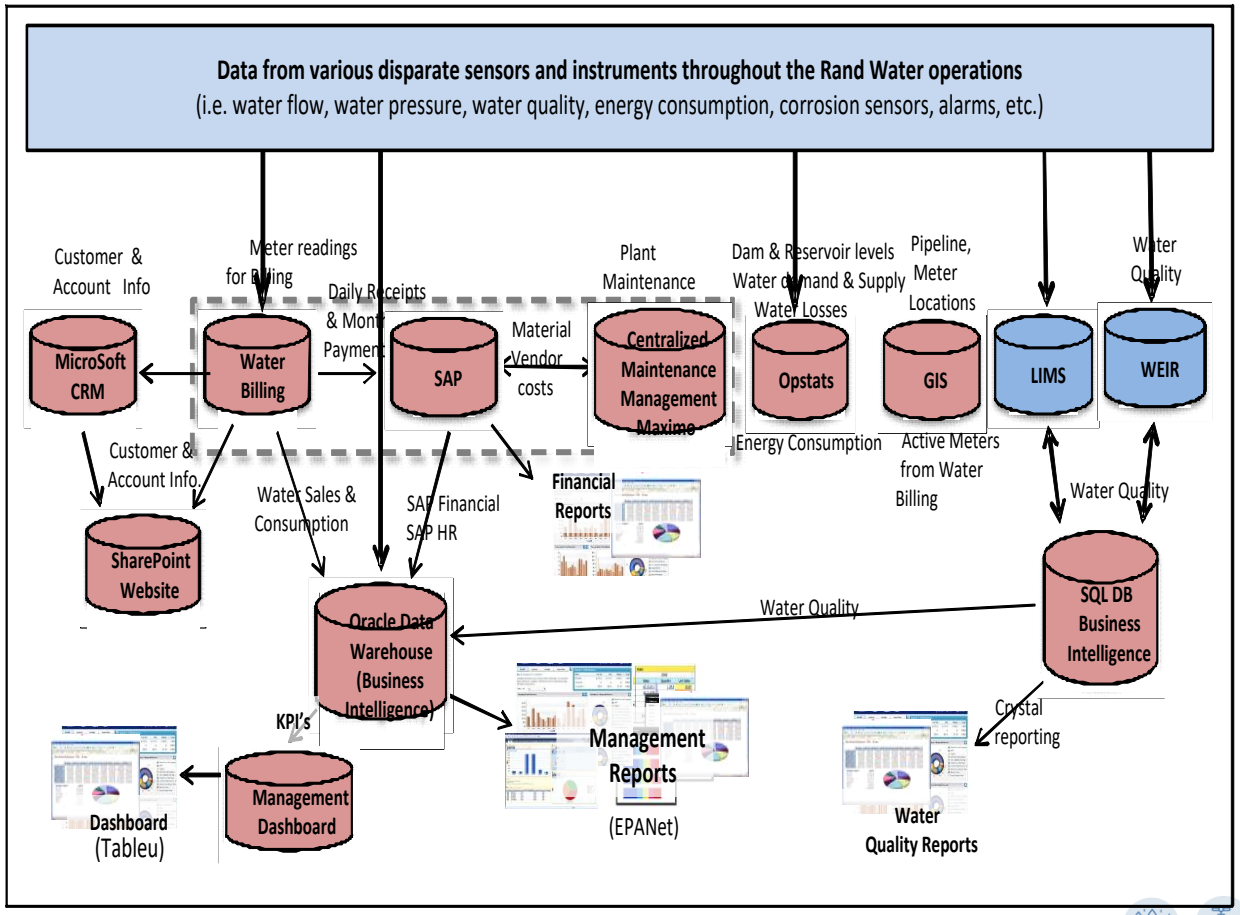
8 business functions, 80 questions on people, process and technology

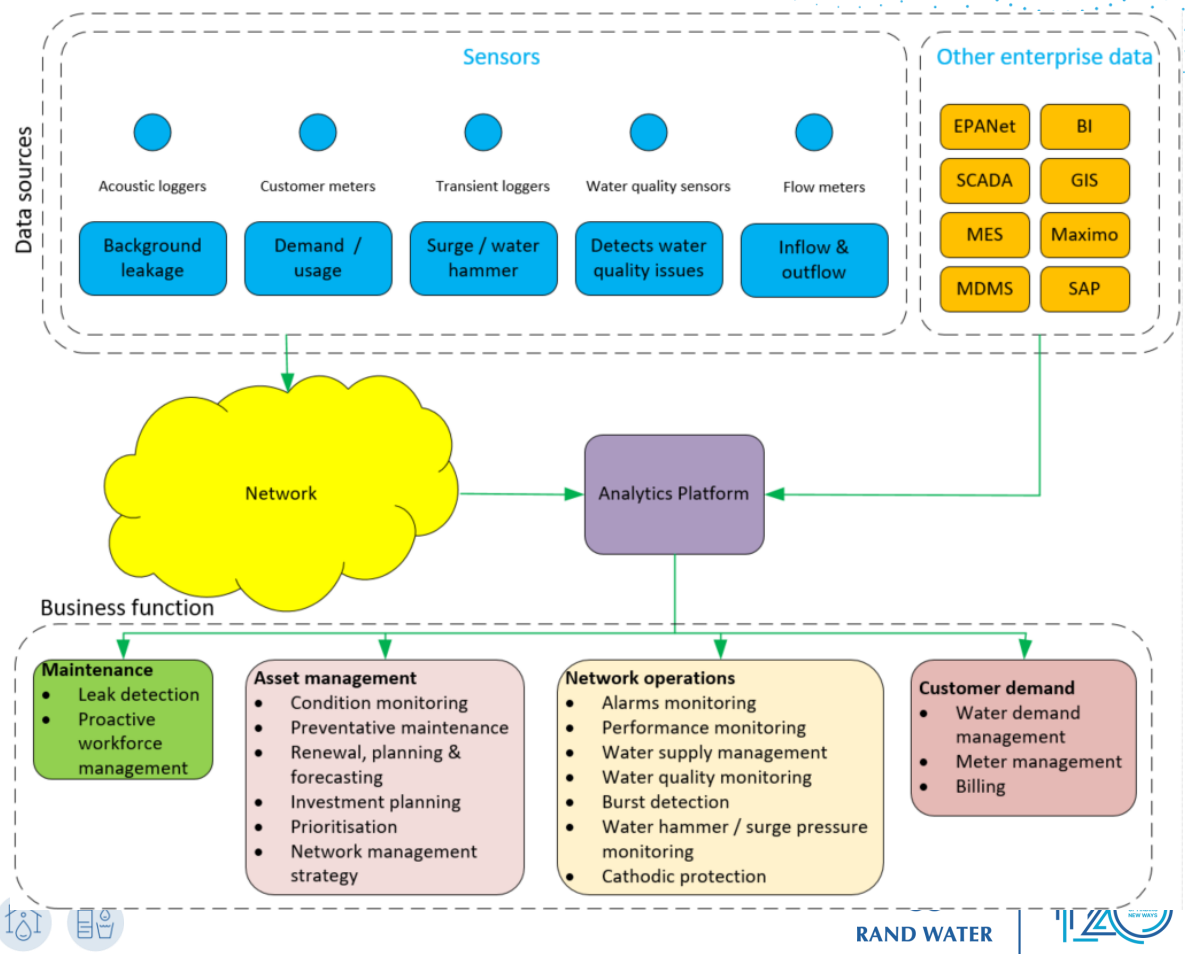
- How do our staff in different functional areas view their ‘current’ and ‘future’ state from a digital perspective?
- Do these views vary significantly both within and across our different functions?

- 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?

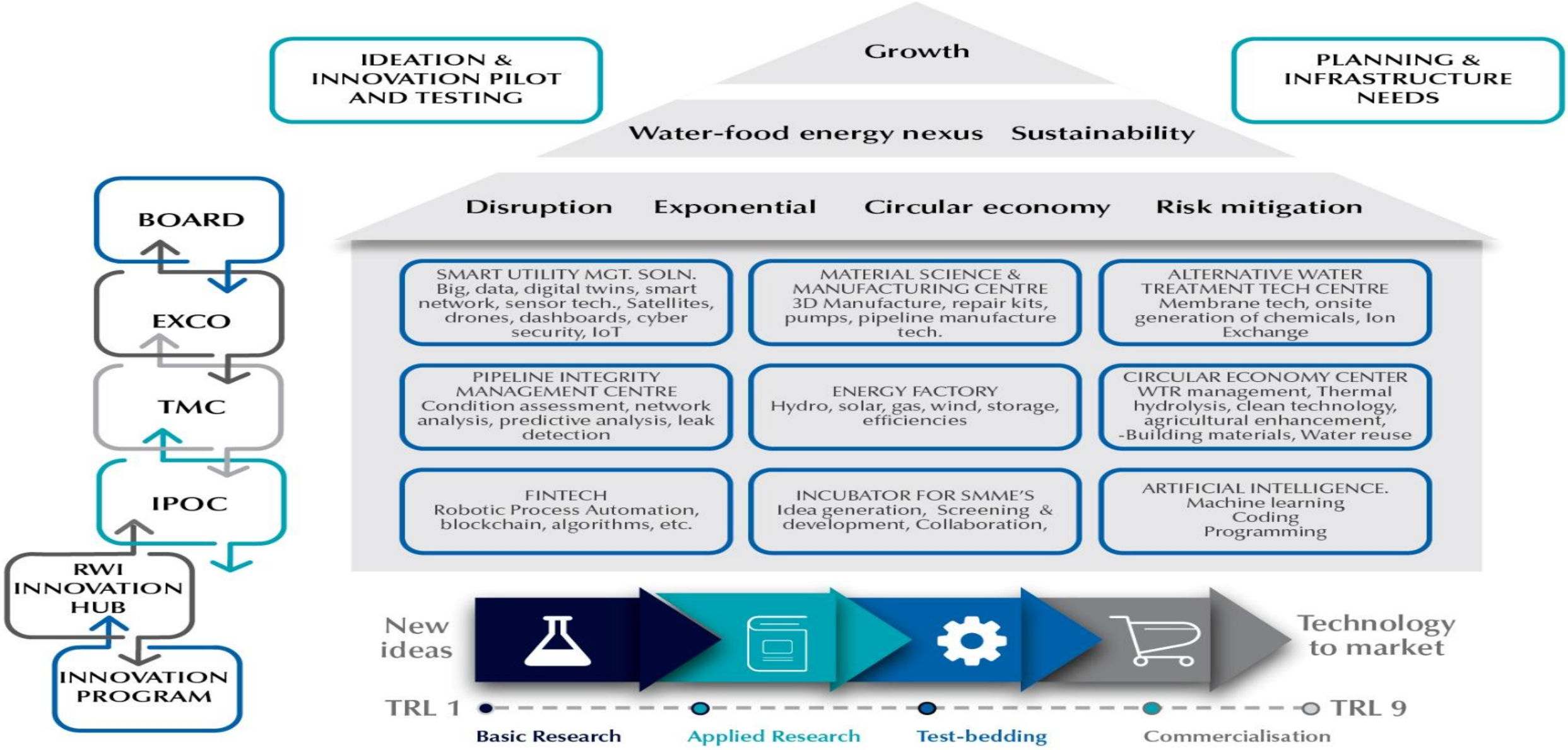
RAND WATER

CURRENT VS ASPIRATION





INNOVATION GOVERNANCE AT RAND WATER

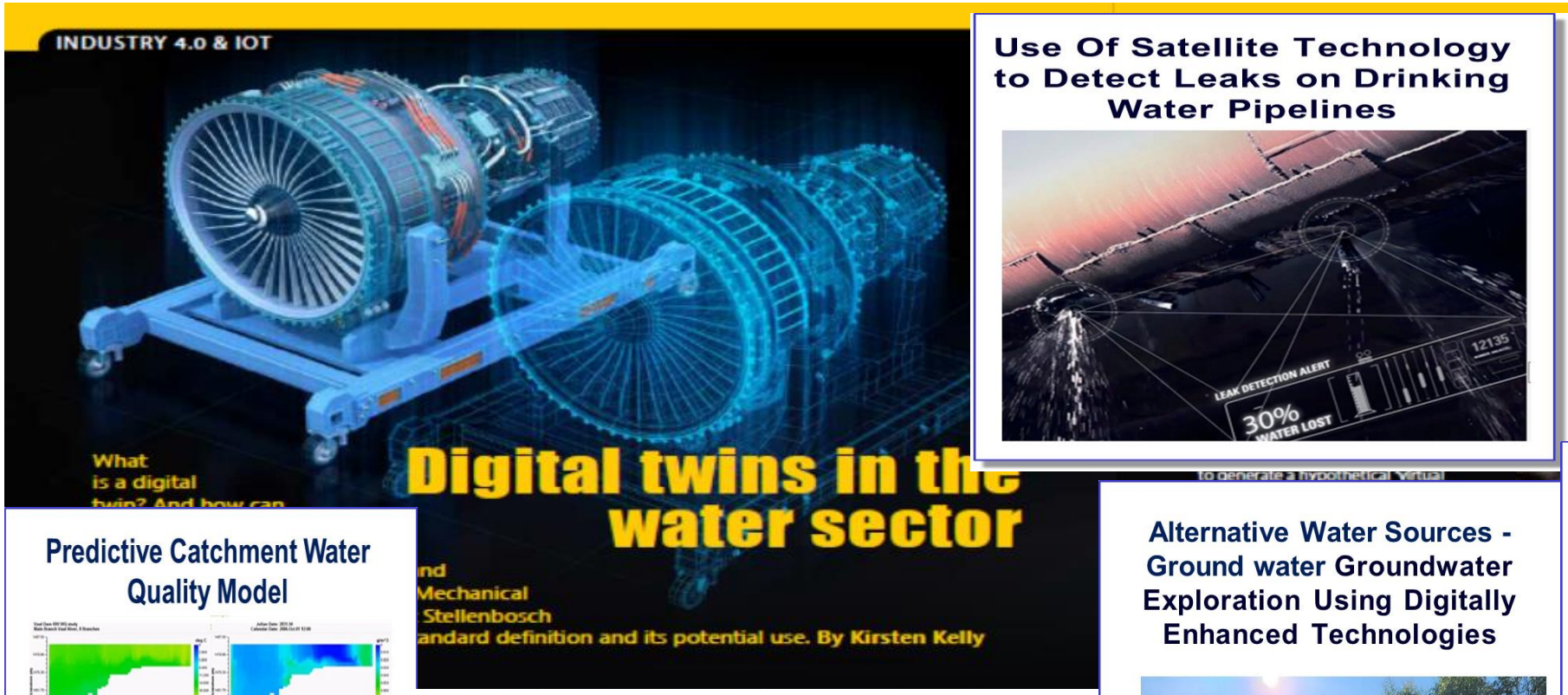


FINANCE OF THE FUTURE: DIGITAL TRANSFORMATION

Complete
In Progress
On the Horizon
Dependency

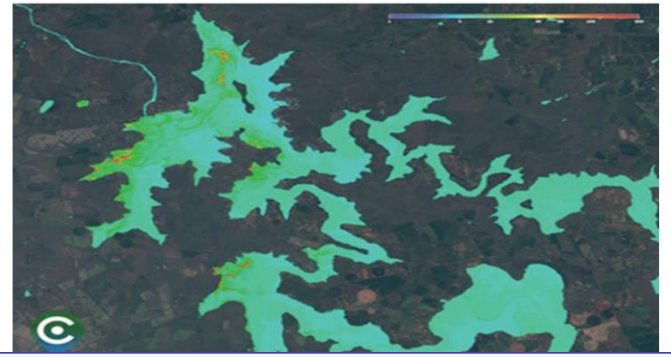
Activities are not chronological. Look within the relevant zones for timing.

INNOVATION & PILOTING TO FULL SCALE IMPLEMENTATION

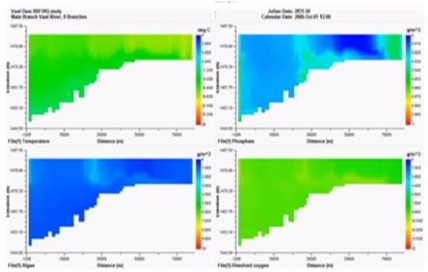


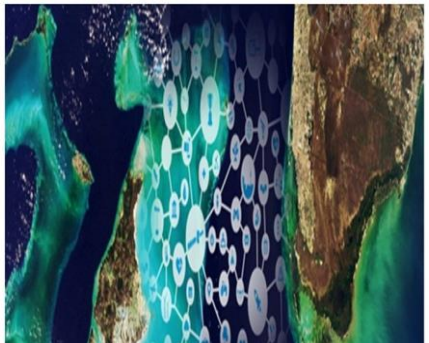
Use Of Satellite Technology to Detect Leaks on Drinking Water Pipelines

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



Predictive Catchment Water Quality Model



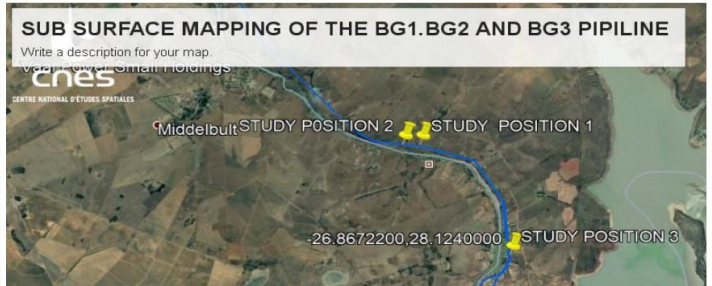


3D Scanning, Virtual Reality and DigitalTwins

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

Robotics Process Automation

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



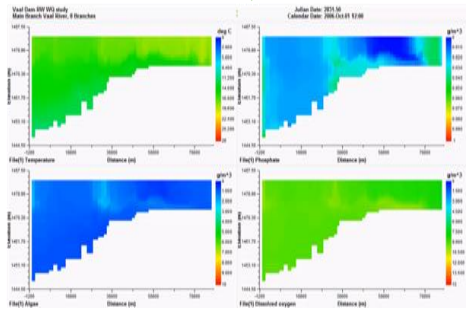
INNOVATION & PILOTING TO FULL SCALE IMPLEMENTATION

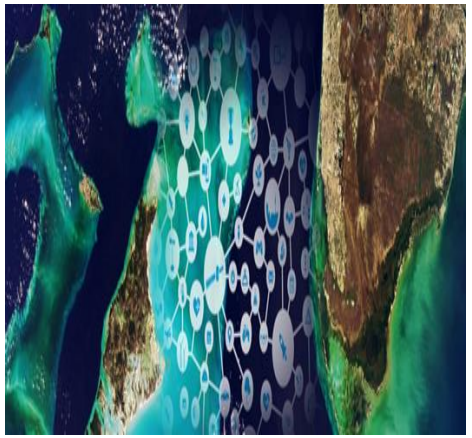
PREDECITIVE ANALYSIS

DEVELOPMENT OF A PREDICTIVE CATCHMENT WATER QUALITY MODEL

Visualisation of the following over simulation period:

- Water temperature
- Total Dissolved Solids (TDS)
- Nitrate_Nitrite (NO_3-N)
- Phosphate (PO_4-P)
- Ammonia (NH_4-N)





ONLINE DETECTION

ONLINE BACTERIAL DETECTION METHODOLOGY: PROCESS FLOW OF DATE COLLECTION

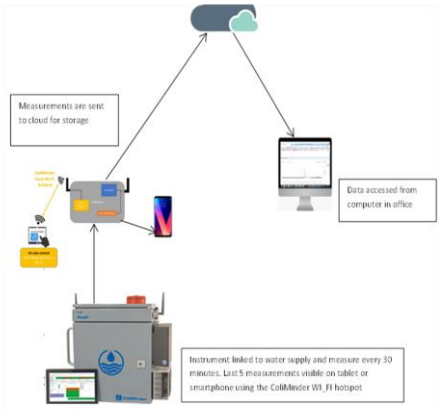
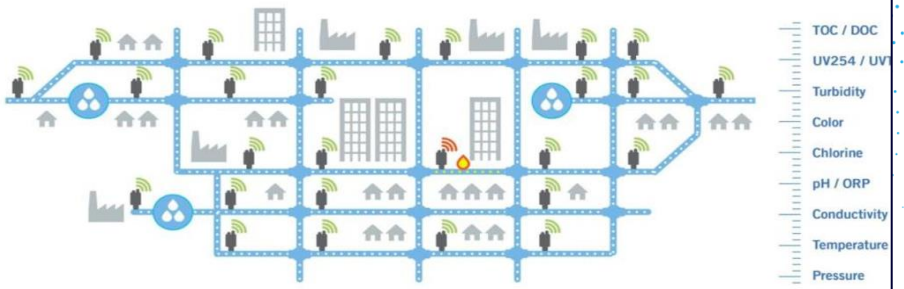


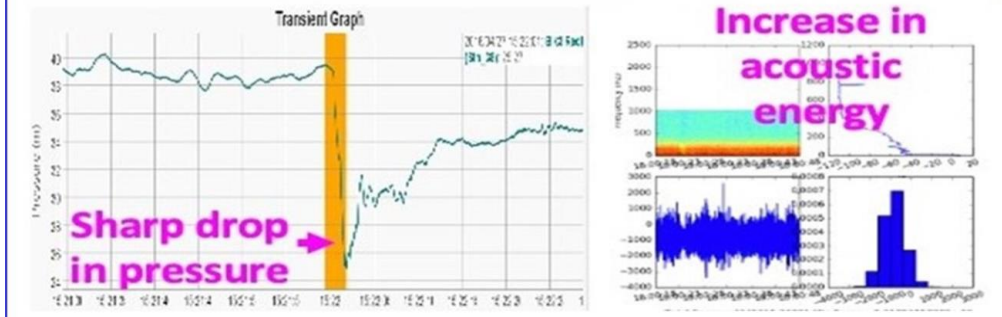
Figure 2: Process flow of data collection

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



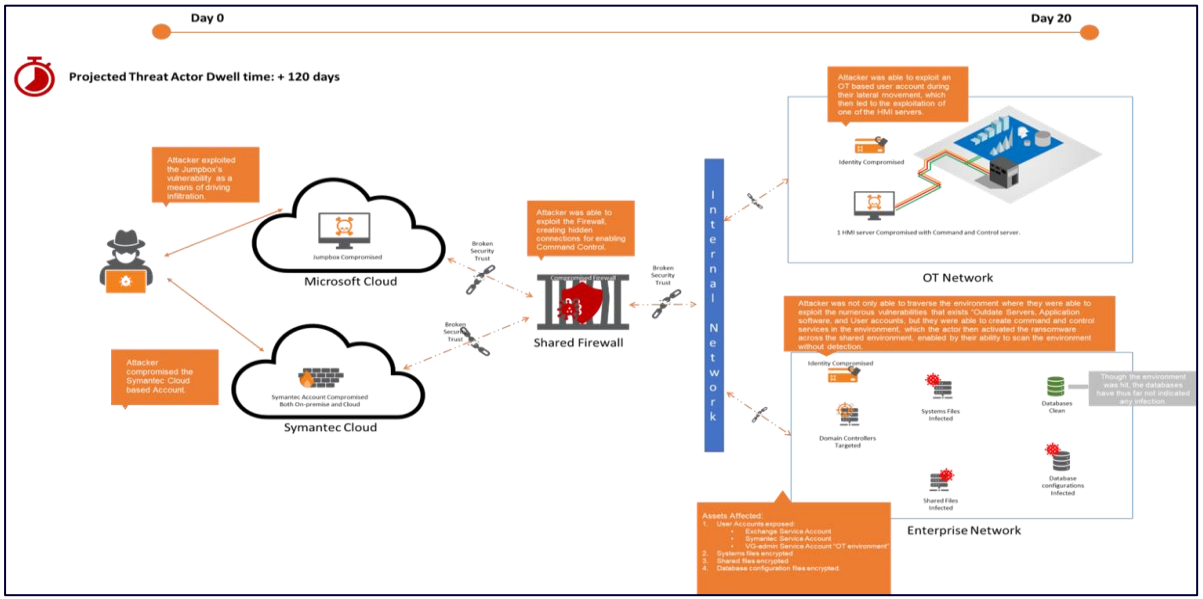
RAND WATER

GENERATIVE AI: UNLOCKING THE POWER OF CHAT GPT: REVOLUTIONIZE YOUR UTILITY DATA MANAGEMENT REVOLUTIONISE

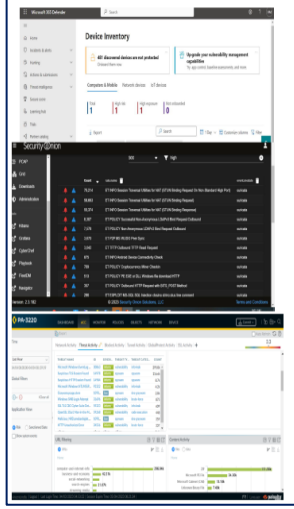
OpenAI

ChatGPT

CYBERSECURITY



Cybersecurity Monitored – Five-Dimensional Visibility



Servers and Workstations

Every Traffic Traversing our Network

Internal Firewall Traffic

Email Traffic

Scanned devices

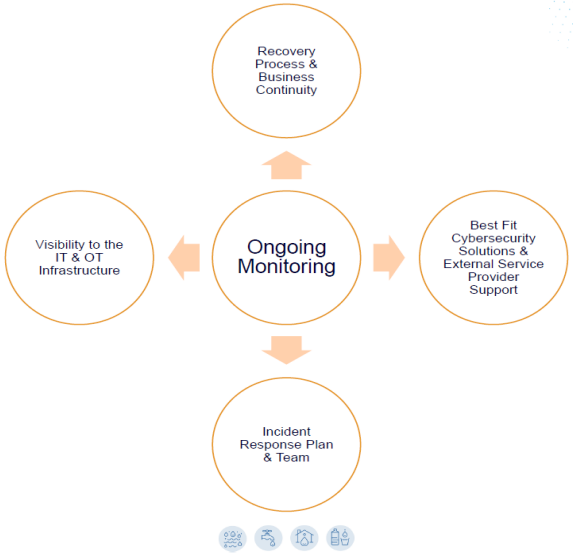
Traffics - Datasets

RAND WATER 120

Cybersecurity Monitoring

- Microsoft Defender for Office 365 — DEFENDER DASHBOARD
- Security Onion — ONION REPORT
- elastic — KIBANA REPORT – ONION MODULE (TRAFFIC DATASETS)
- paloalto NETWORKS — PALO ALTO
- FORTINET FORTIGATE — FORTIGATE - EXTERNAL FIREWALL

Lessons Learned



RAND WATER 120

BRING IT ALL TOGETHER - SMART WATER UTILITY

RAND WATER 120 YEARS OF FINDING NEW WAYS

PARTNERSHIPS & COLLABORATION

1. **German Business Delegation to South Africa: Technological Solutions for Resilience in Water and Sanitation.**

2. **2X Presentations at WISA Conference**

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

4. **Rand Water delegation to UK**

5. **Innovation presentation at Spanish Chamber of Commerce - Water Security & Sustainable Renewable Energy Conference 2022**

6. **Ground Water discussion with Danish Water Embassy**

7. **Paper presentation at IWA World Water Congress (Copenhagen, Denmark).**

RAND WATER

Thank you!

Head Office: Physical: 522 Impala Road,
Glenvista 2058, South Africa
Tel: +27 (0)11 682 0911
customerservice@randwater.co.za

RAND WATER

120 YEARS OF FINDING NEW WAYS

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

ATHENA INFONOMICS

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

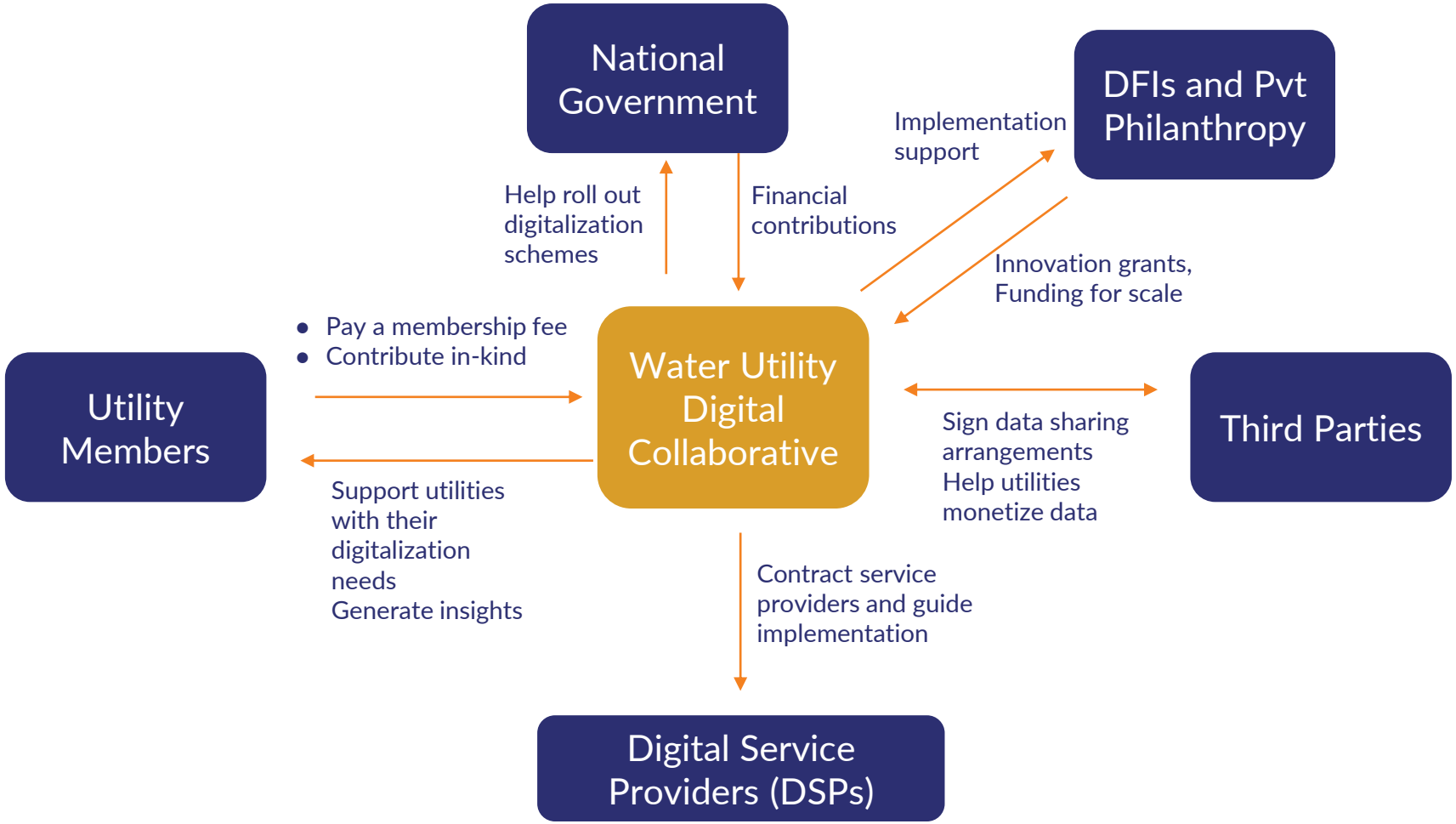
Solutions may not be relevant or affordable

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

ATHENA INFONOMICS

A utility digital collaborative could be a way to deliver affordable digitalization for small utilities



ATHENA INFONOMICS

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

ATHENA
INFONOMICS

Thank you

www.athenainfonomics.com

the international water association

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.


the international
water association
IWA Digital Water Summit
BILBAO SPAIN
14 - 16 Nov 2023
www.digitalwatersummit.org

Find out more at:

https://digitalwatersummit.org/

UPCOMING IWA WEBINARS & EVENTS

Find out more at:

https://waterdevelopmentcongress.org/

JOIN OUR NETWORK OF WATER PROFESSIONALS!

the international water association

IWA brings professionals from many disciplines together to accelerate the science, innovation and practice that can make a difference in addressing water challenges.

Use code WEB23RECRUIT

for a **20% discount off**
new membership.

Join before 31 December 2023 at:

www.iwa-connect.org

inspiring change

the international water association

Learn more at

http://www.iwa-network.org/iwa-learn/