



Smart Infrastructure Management Information - Smart Asset Management Enabler

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Infrastructure decisions- Only as good as information behind them



UNIVERSITY
OF
JOHANNESBURG

IM is hidden cause of project failure

- Information is often not cited as a factor project performance compared to:
 - Communication failures rank highest—(56% of failed projects).
 - Risk management failures
 - Information management issues are only recognised, in terms of cost impact (10–30% added waste), but are less commonly presented as a quantified cause of outright project failure.



Spending too much looking for information



40%

40% of Engineering time is spent on locating and validating information

4%

Owner-operators spend the equivalent of 2-4% of CapEx on correcting and keying in project information to operation and maintenance systems.

SIEMENS



How engineering organisations create, manage, and harness information, impacts productivity and project delivery



Consequences of poor Information management are dire



There's a measurable cost

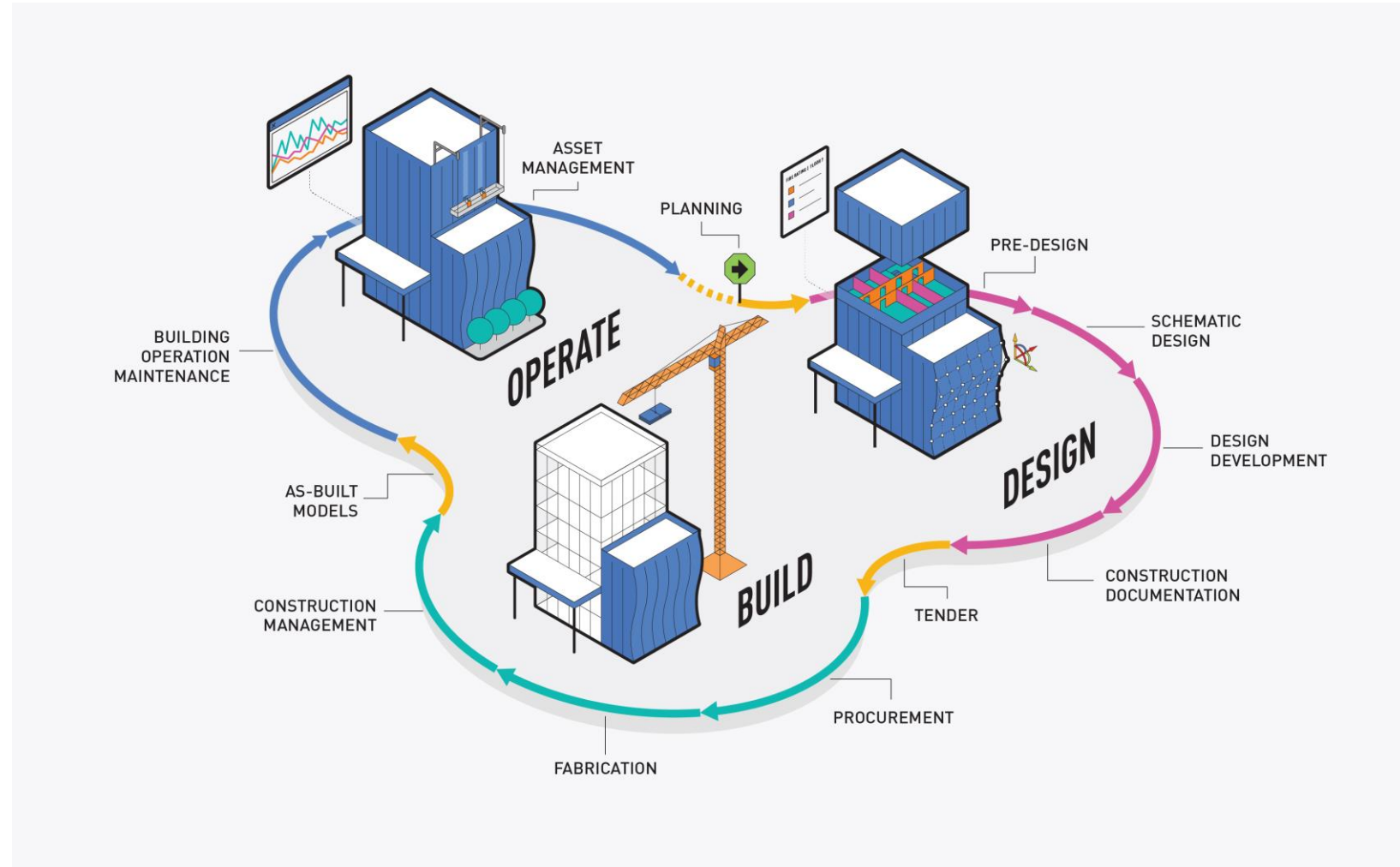
- Inaccurate, incomplete, or ambiguous information, cost construction projects an additional 10% of project cost
- Waste due to poor information was valued at 25–30% of project cost by 1994.

Avanti- UK



We build infrastructure we later know too little about

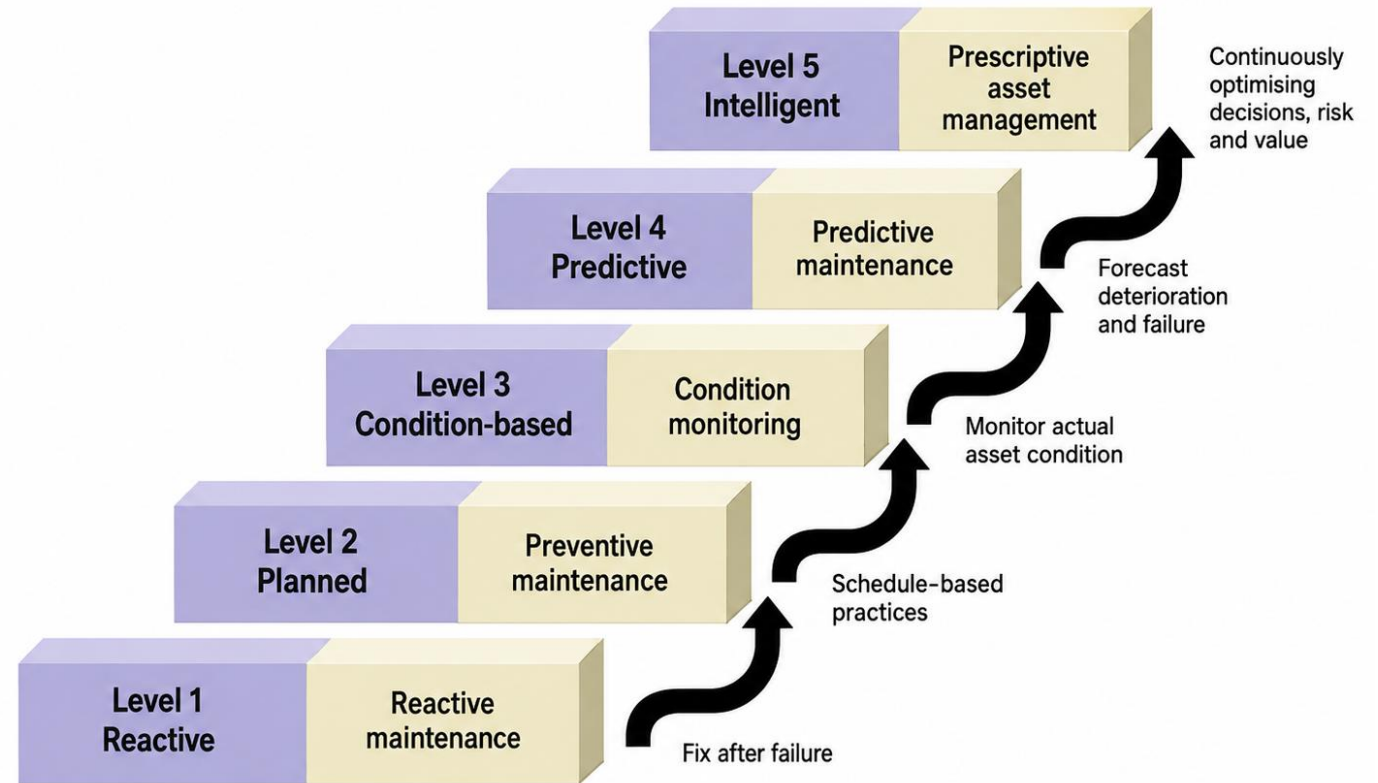
We invest in infrastructure. But do we invest enough in knowing the infrastructure?



Technology is not equal to asset management maturity

- Design
 - build
 - operate
 - Inspect
 - repair
- The irony is, organisations are investing in sensors & software while still operating organizationally they are at levels 1 & 2

Smart Infrastructure Management Maturity Levels

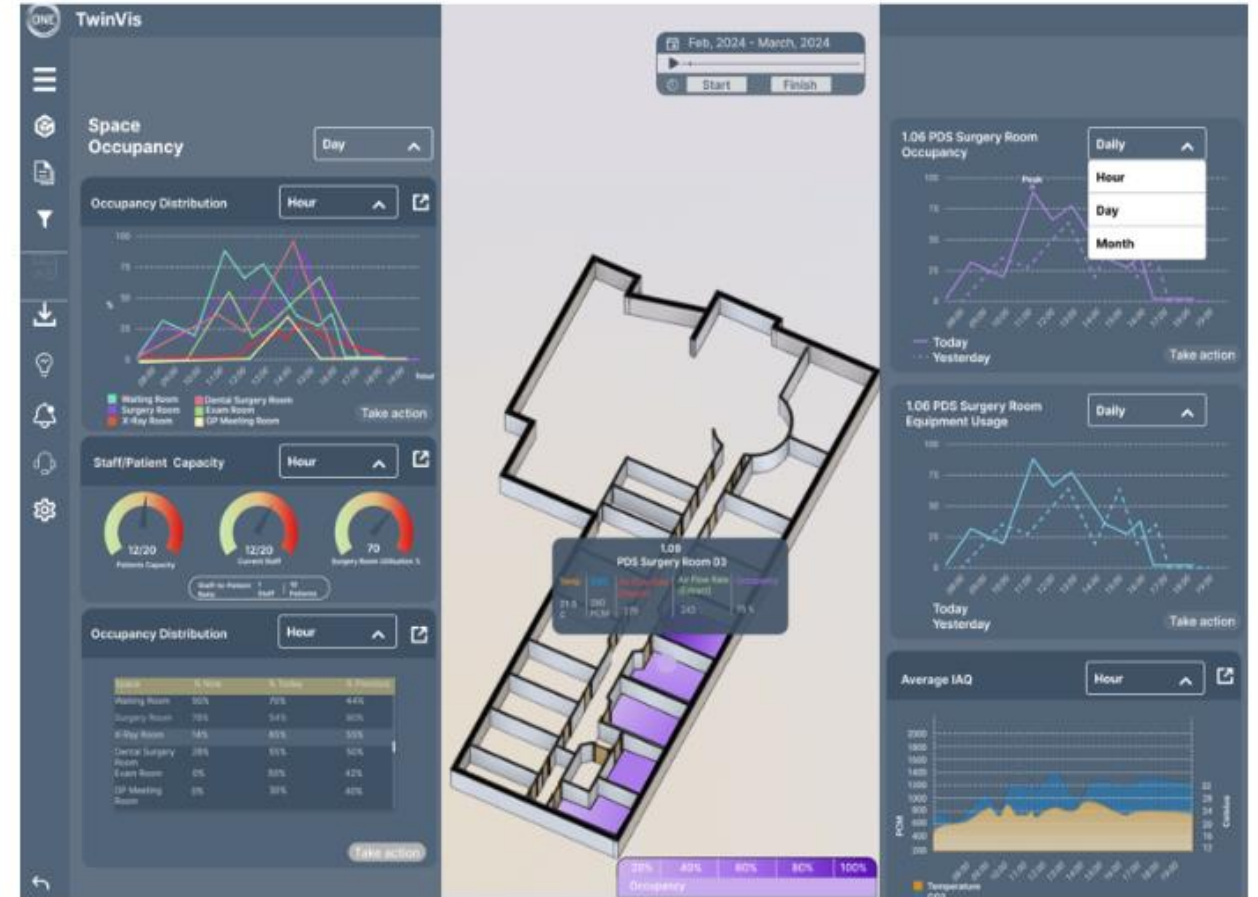


From reactive intervention to data-driven, predictive and value-focused infrastructure management.



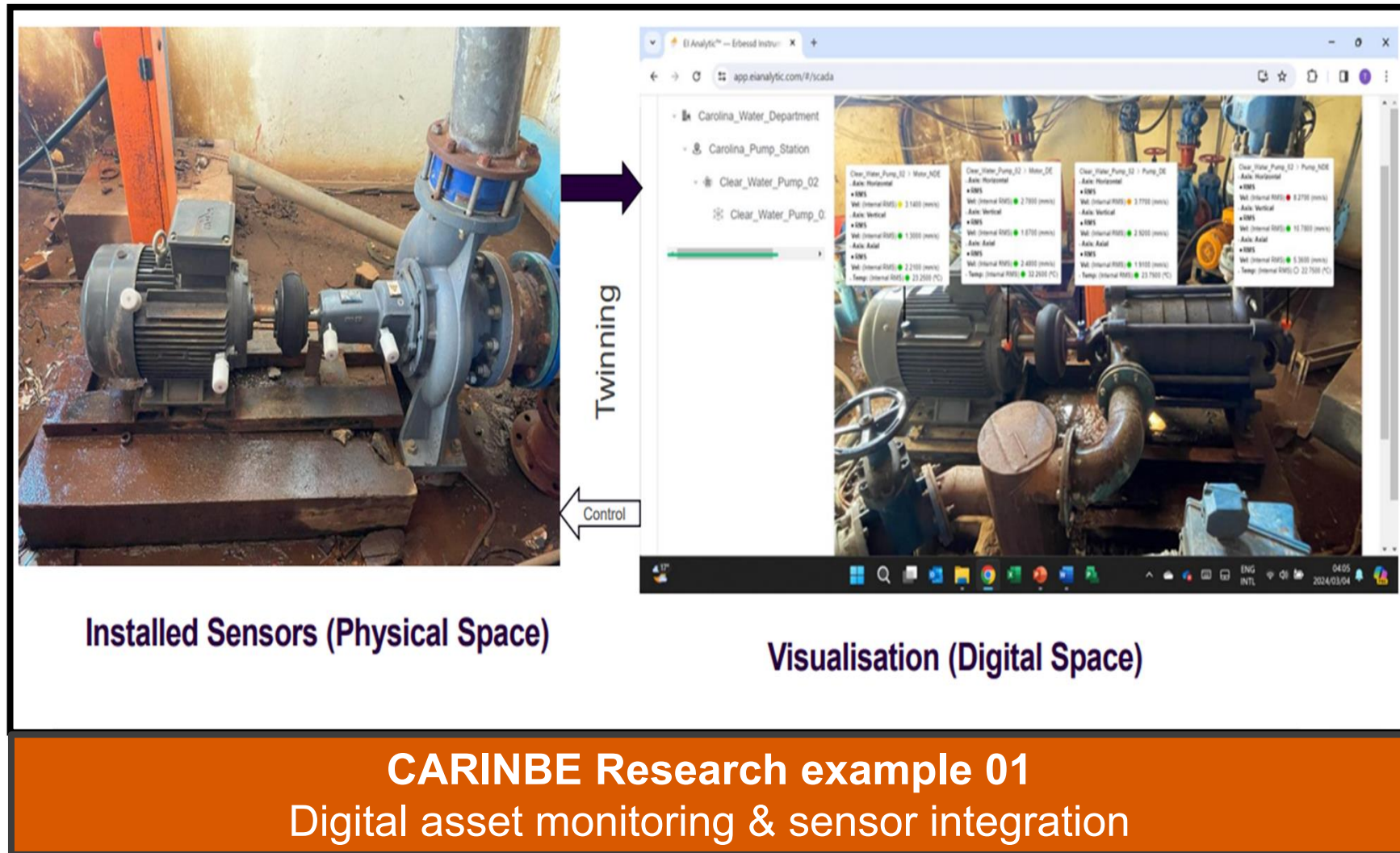
Start with Assets, not Technology

The objective is to optimise value, performance, risk & lifecycle cost.



Know & Sense

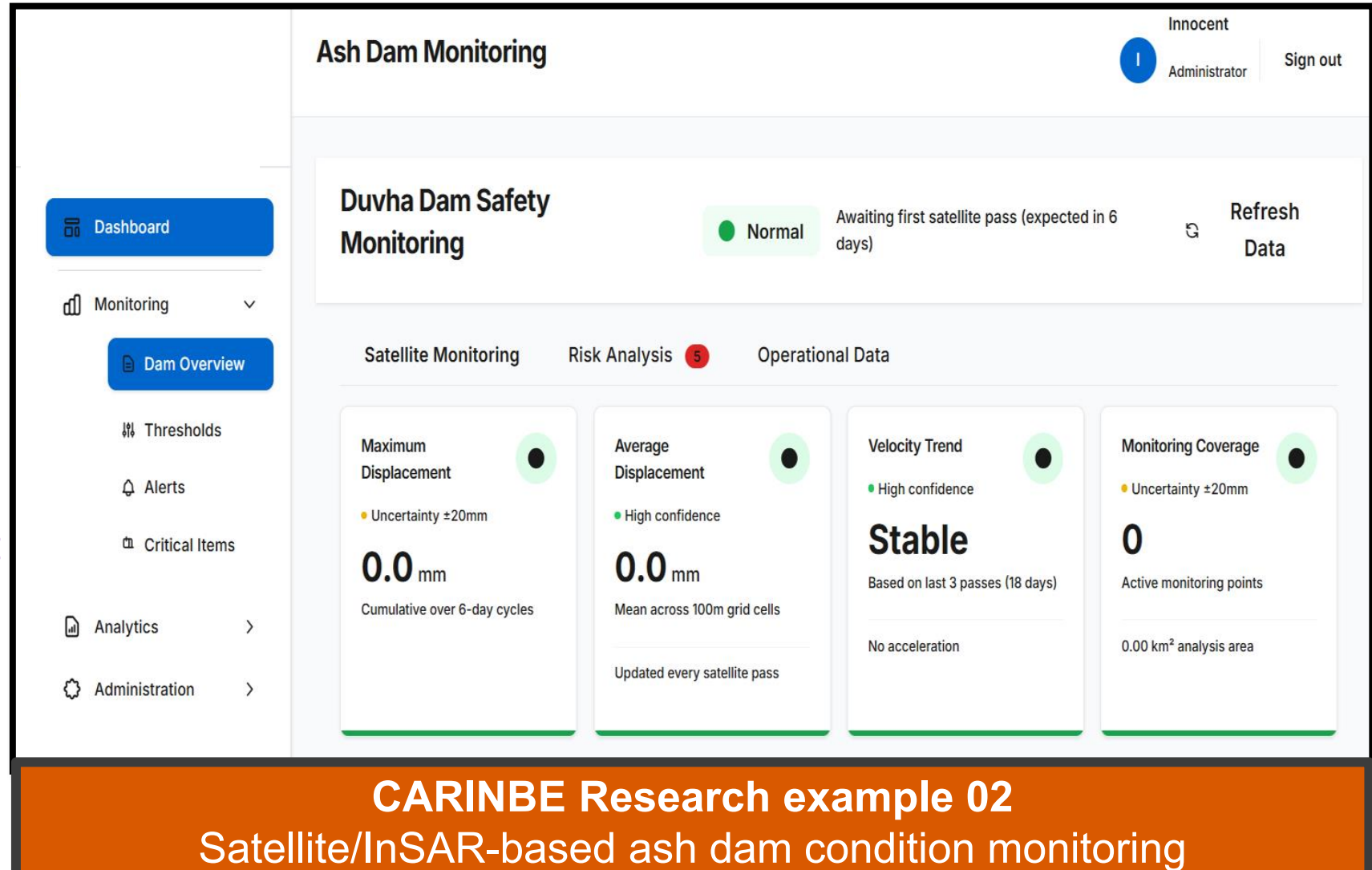
- Create a digital infrastructure asset
- Physical to digital asset ecosystem
- Digital representation
- Observation / monitoring layer
- Intelligence layer
- Decision layer



Monitor – Satellite/InSAR

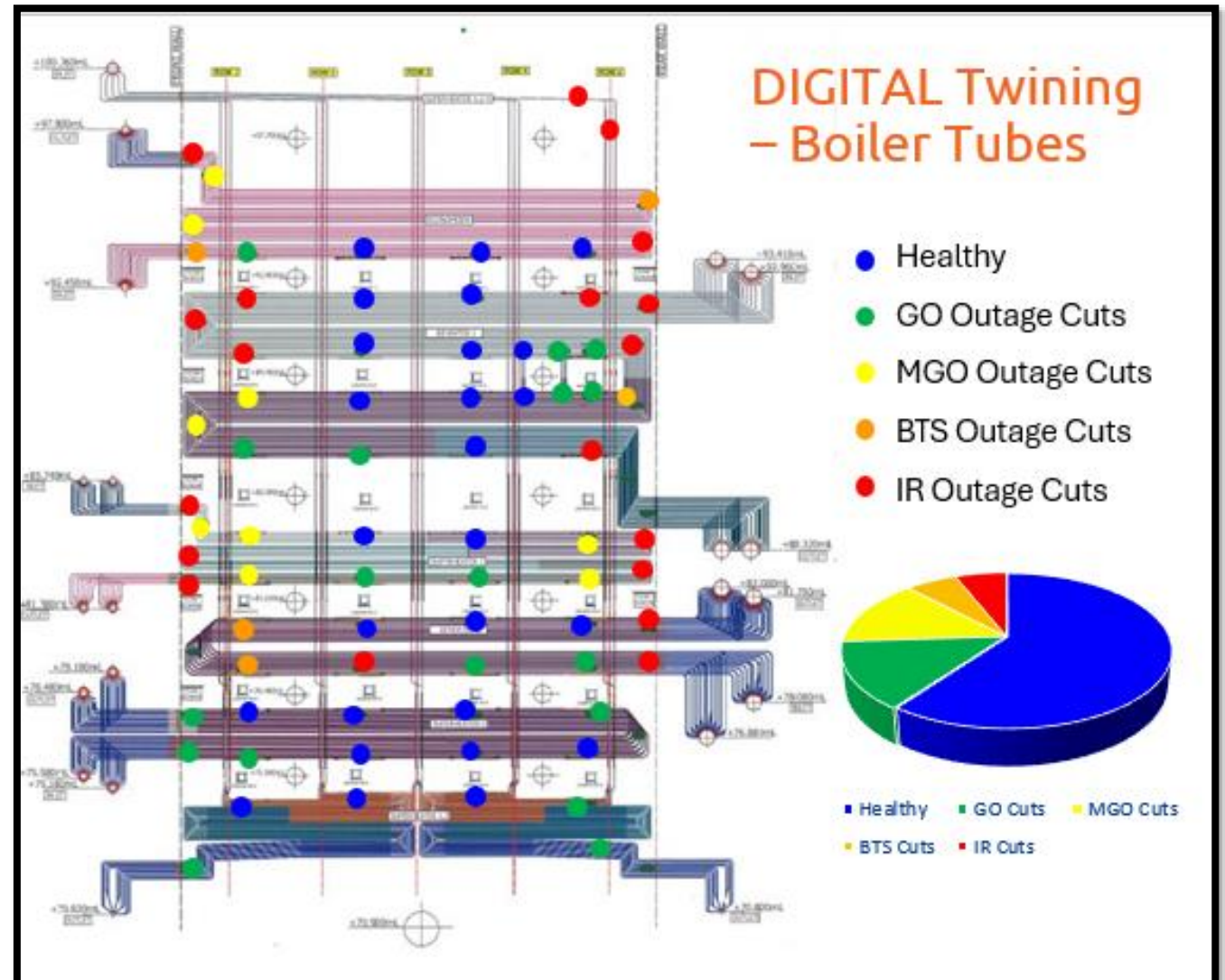
What is happening now

Smart infrastructure management increasingly allows us to monitor assets without physically instrumenting every point on the asset



Digital Twin:

- Know
- Sense
- Understand
- Predict
- Decide
- Intervene



CARINBE Research example 03
Digital-Twin supported boiler asset management



BIM enables shift from predictive maintenance to predictive investment

Prediction of changes in asset condition
decisions

- Know the asset
- Sense the asset
- Understand the asset
- Predict the asset
- Decide
- intervene
- **It's about better asset information**
 - Better condition knowledge
 - Better prediction
 - Better intervention decisions
 - Better capital allocation



Pedestrian bridge collapse in Johannesburg, 2023



Take away

- BIM enables Smart infrastructure management
- BIM enable Digital Twins, Predictive maintenance and predictive investment.
- Africa cannot manage infrastructure in a reactive manner



Building Information Modelling & Digital Twin @ UJ – SLP/CPD



Rationale for offering this short learning programme:

Given the implications of industry 4.0 and the need for future digital skills in the construction industry, there is an urgent need to train and prepare professionals as well as current students in digital skills critical for infrastructure delivery. More and more industry stakeholders are demanding that graduates should possess skills in building information modelling. It is therefore imperative that all built environment professionals should acquire an in-depth knowledge in BIM and various digital Applications that have been driven by industry 4.0 within the Built Environment.

The SLP will appeal to students studying toward a course in civil engineering and or Building/construction related qualifications, BIM and Digital Managers, construction project managers, executive, Workers operating in the built environment, Professionals; i.e.: project Managers, Constructions Managers, Architects, engineers, Quantity surveyors in both private and public sector.



PROGRAMME DETAILS

Duration: Semester 1 and 2
Time: Evening lectures
Venue: UJ DFC/Online
Fee: R 16 780.00 per Student

METHODS OF ASSESSMENT

An online written assessment and a group case study compilation

ENQUIRIES

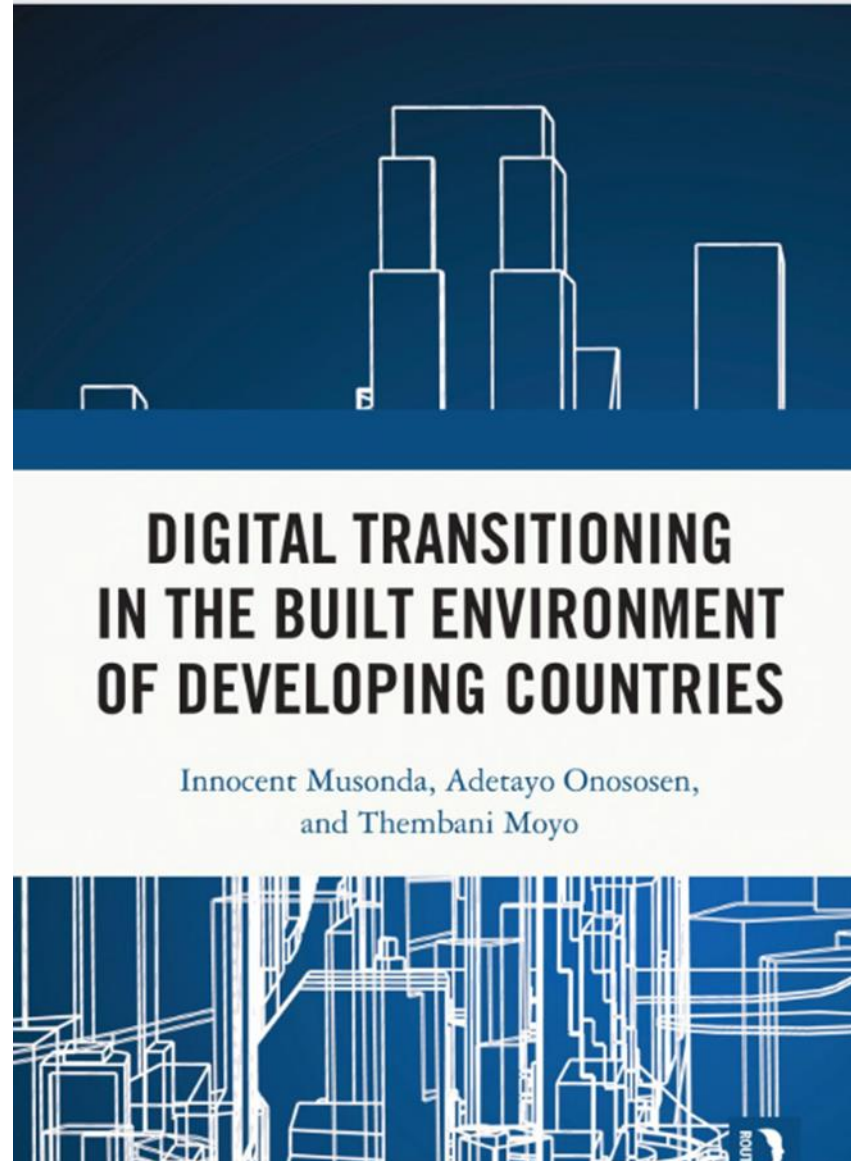
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FOR APPLICATIONS:

Please use this link to complete the form: <https://form.jotform.com/210601483784051>



UJ-CARINBE research outputs on IM



THANK YOU

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