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DIGITAL TWIN

Digital Twin Initiatives in Australia

Tony Wheeler

Geospatial Council of Australia

Advocating for change

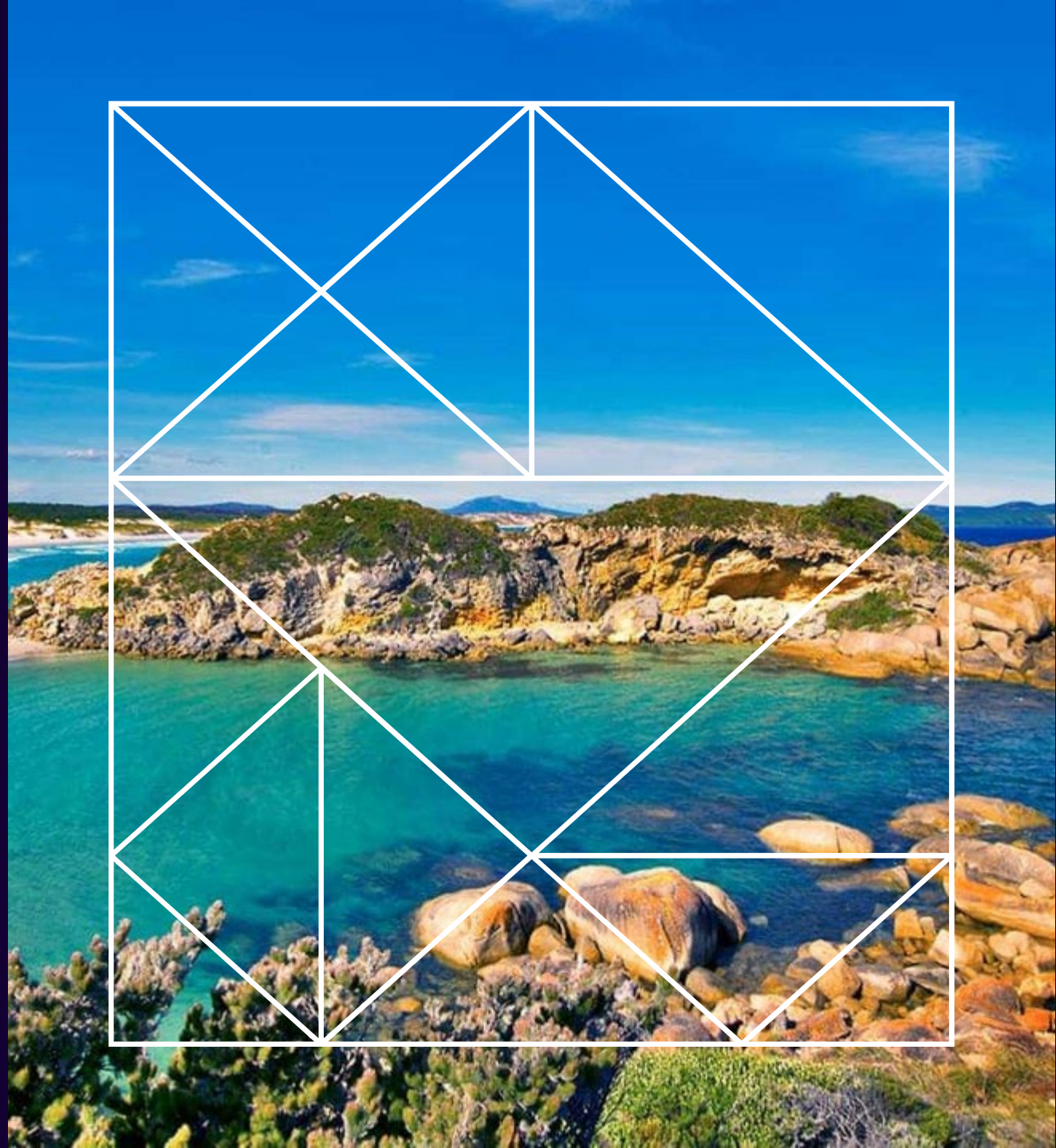
Policy & Advocacy agenda -

- **Workforce**
- **Economic benefits**
- **Industry recognition**

- Opportunity to spearhead change
- Australia needs a relevant and skilled, digitally enabled, space and spatial industry workforce to support our national economy

Value of geospatial information to Australia

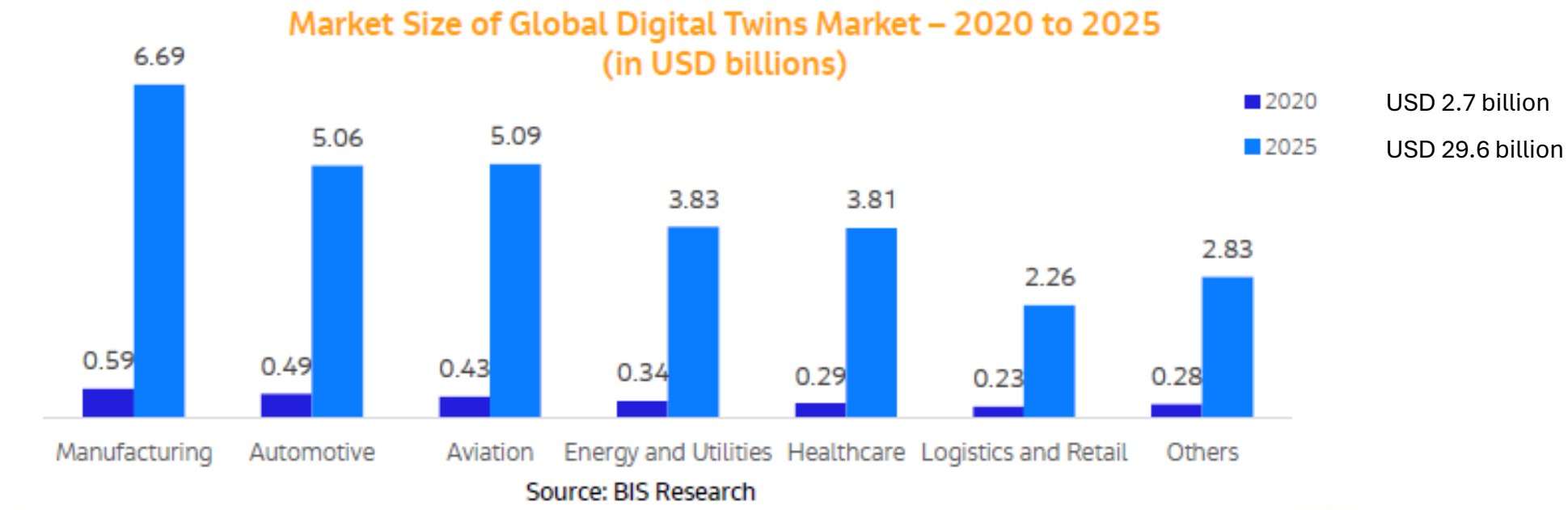
ACIL ALLEN



Coverage of impacts

Size of Digital Twins Market

Global Digital Twins Market



Source: BIS Research

USD 2.7 billion

USD 29.6 billion

Growth of Digital Twins Market

Global Growth of Digital Twin

$73.5 Billion

MARKETSANDMARKETS

The Global Digital Twin market size is projected to reach USD 73.5 billion by 2027 at a CAGR of 60.6 percent during 2022-2027.

31 Percent

Gartner

As a result of COVID-19, 31 percent of respondents use Digital Twins to improve employee or customer safety, such as the use of remote asset monitoring to reduce the frequency of in-person monitoring.

40 Percent

Gartner

By 2027, over 40 percent of large companies worldwide will use Digital Twin in their projects to increase revenue.

89 Percent

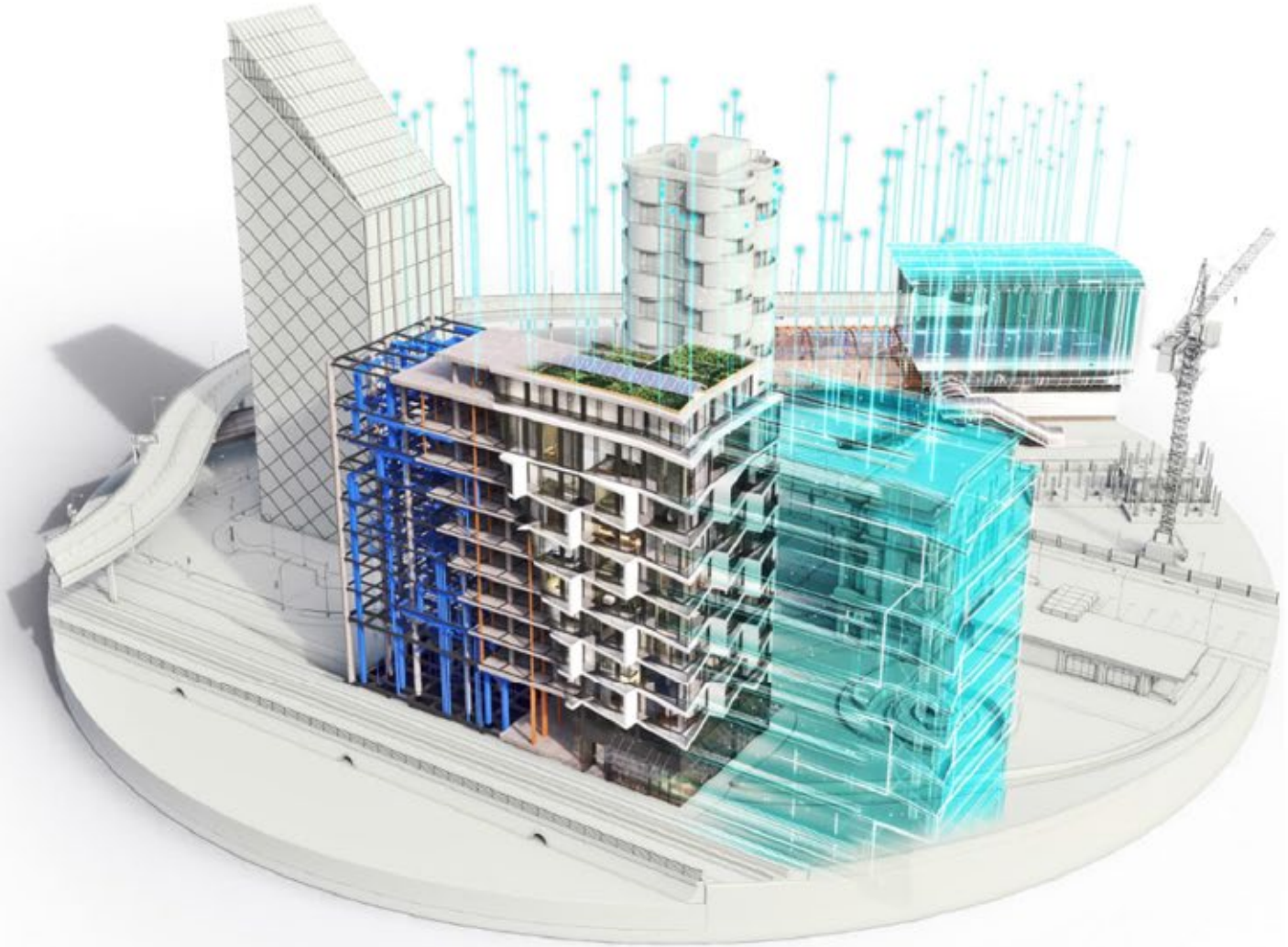
RESEARCH AND MARKETS

Up to 89 percent of all IoT Platforms will contain some form of Digital Twinning capability by 2025.

Underutilized Design and Construction Data

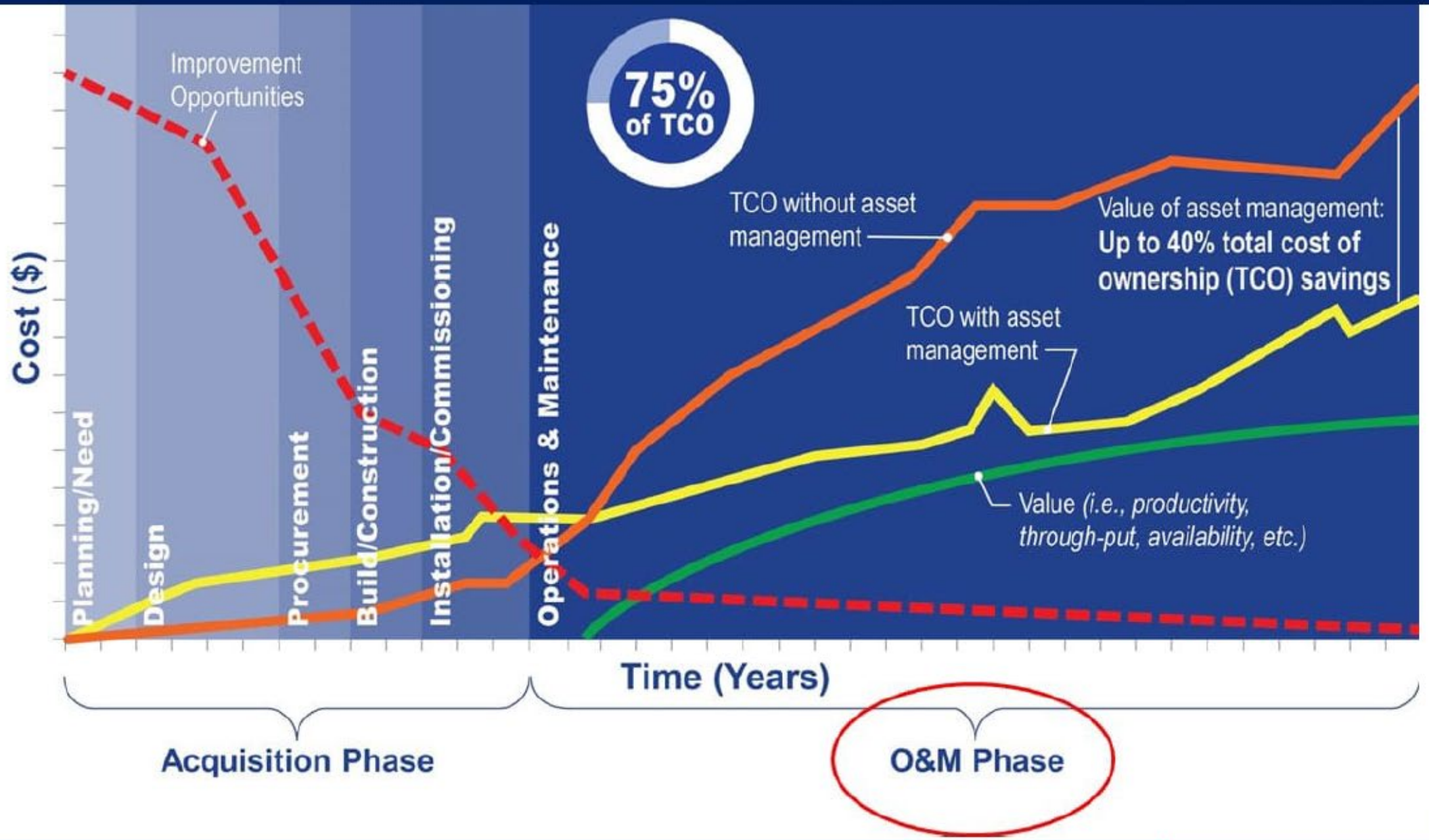
95.5%

of all **data goes unused** in engineering & construction[1]



[1] *Source: Big Data = Big Questions for the Engineering and Construction Industry, FMI Report*

Increasing Total Cost of Ownership (TCO)



High failure rate at attempts to utilize the data
Lack of Digital Transformation process and journey understanding

70%

of all Digital Transformation efforts

FAIL!

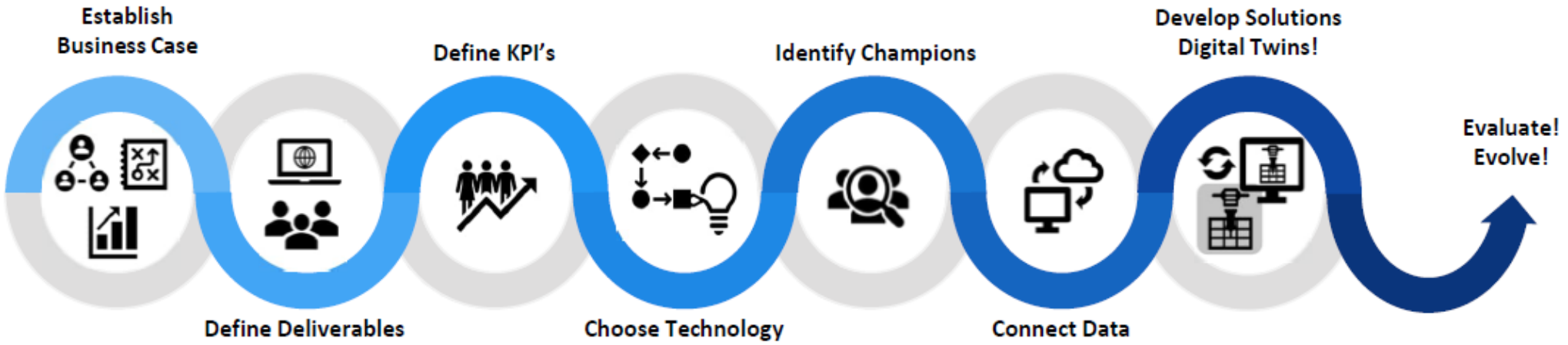
Primary causes of Failure:

Lack of Stakeholder Support

Too Much, Too Fast!

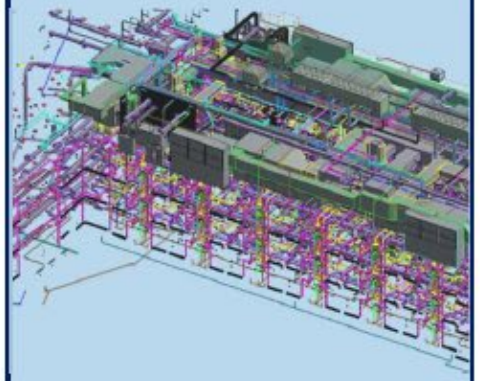
Focus on Technology First

Digital Transformation Journey



Digital Twins connect multiple data sources to provided maximum facility insights

3D BIM



Accurate As-Built Geometric Models

+

AEC DATA

Static Design & Construction Data

+

O&M CMMS

Current Operations & Maintenance Data

+

BAS & IoT

Real-time Performance Sensor Data

Single Federated Platform with numerous cross-applications

Numerous use cases from single platform!

SIMULATION

Accurate Digital Representation of the Physical World

DIGITAL ACCESS

Intuitive & Mobile Access to (As)Built Environment Data

O&M

Work Order & Proactive Maintenance

PERFORMANCE

Building Performance Data Analytics & Optimization

SENSORS

Monitoring real-time performance via IoT Sensor Integration

END-USER

Streamline various types of End-User applications

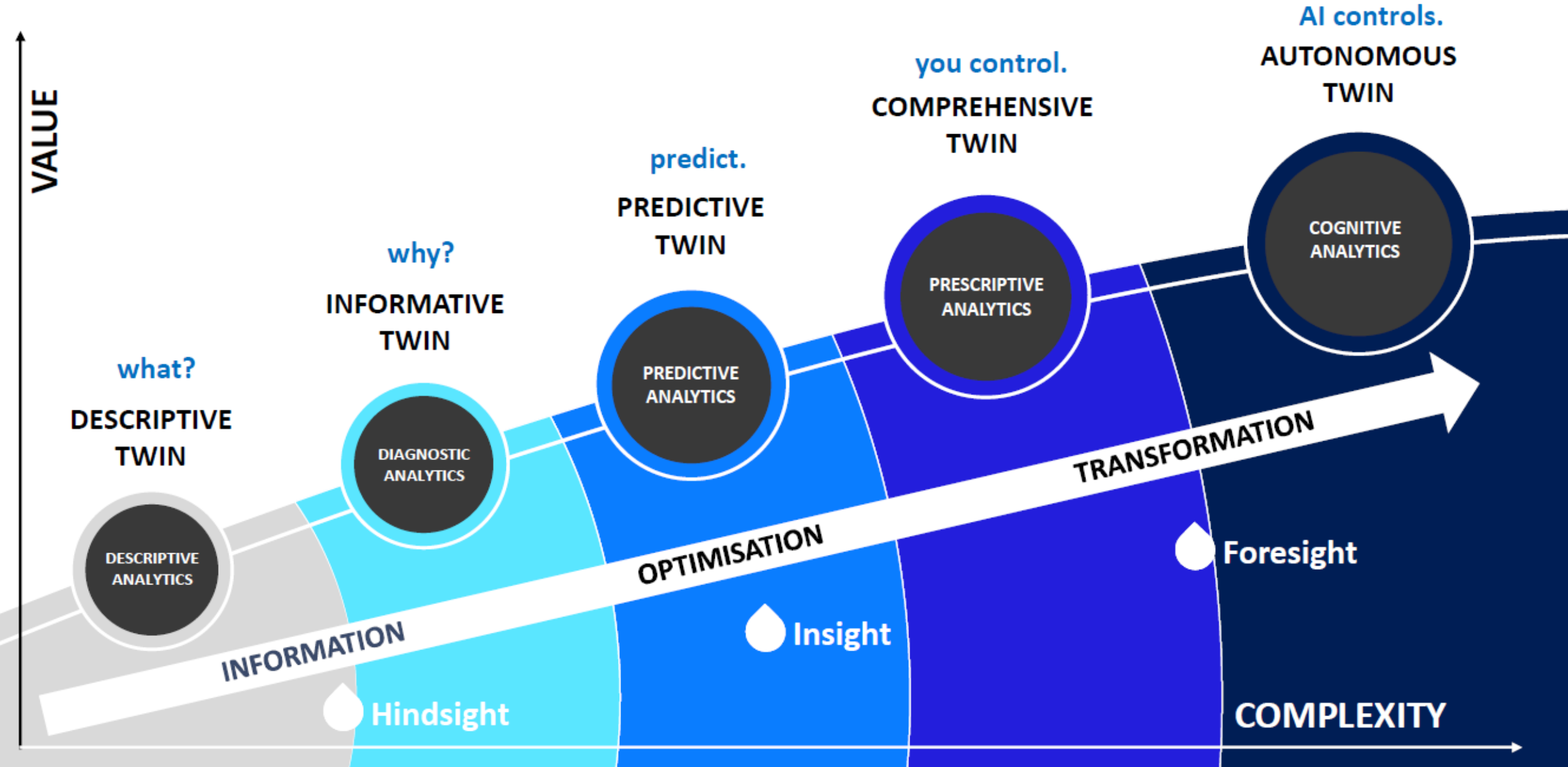
WAYFINDING

Asset Tracking, Mobile Wayfinding & Situational Awareness

AUGMENT

Enable numerous Augment Reality (AR) Applications

Digital Twin Maturity Level



Significant DTw Initiatives in Australia and New Zealand

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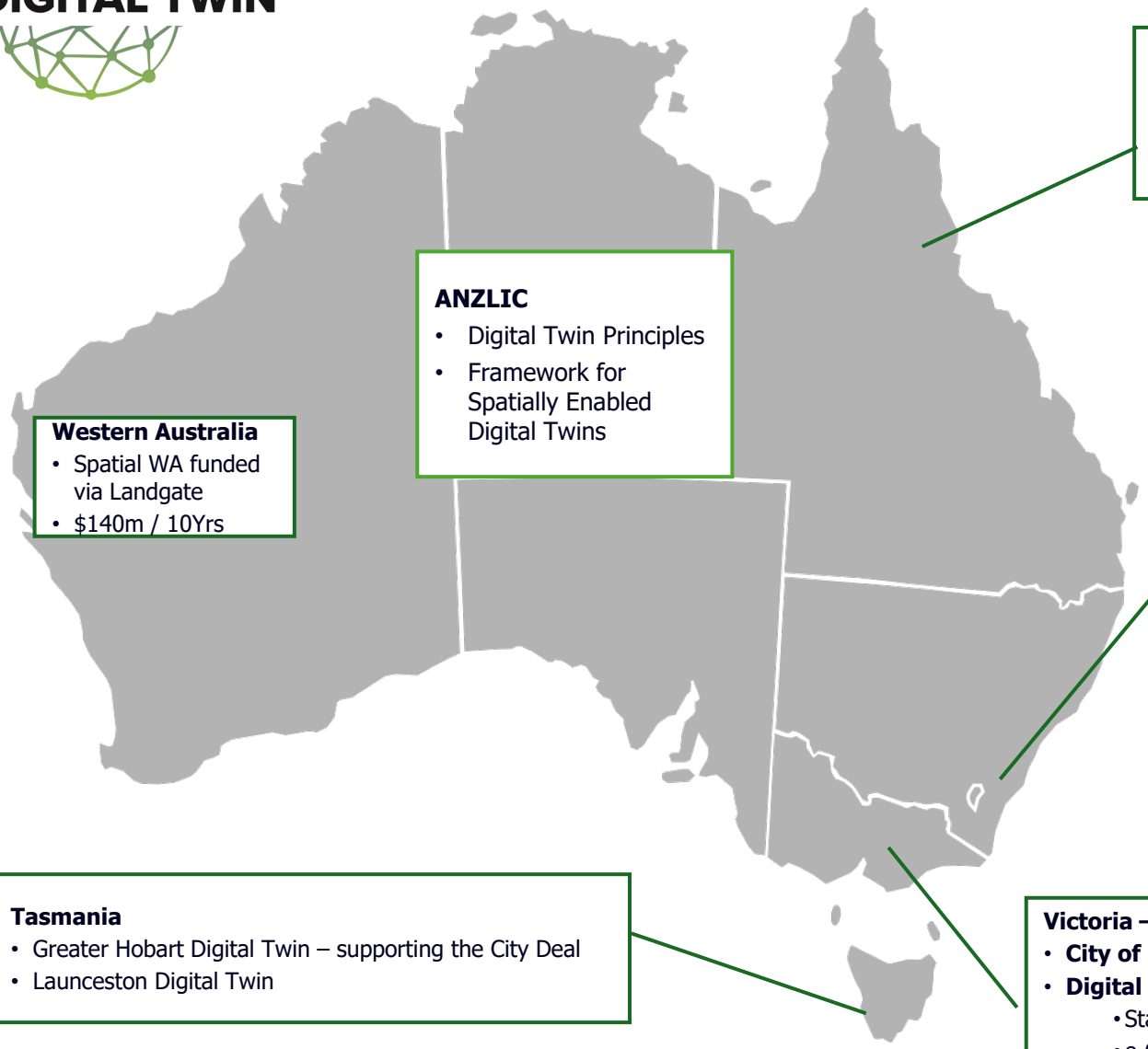


Queensland –
- Queensland Digital Twin – Statewide, and supporting the SEQ City Deal and Brisbane Olympics
- Brisbane Digital Twin
- Cross River Rail

ANZLIC
- Digital Twin Principles
- Framework for Spatially Enabled Digital Twins

Western Australia
- Spatial WA funded via Landgate
- $140m / 10Yrs

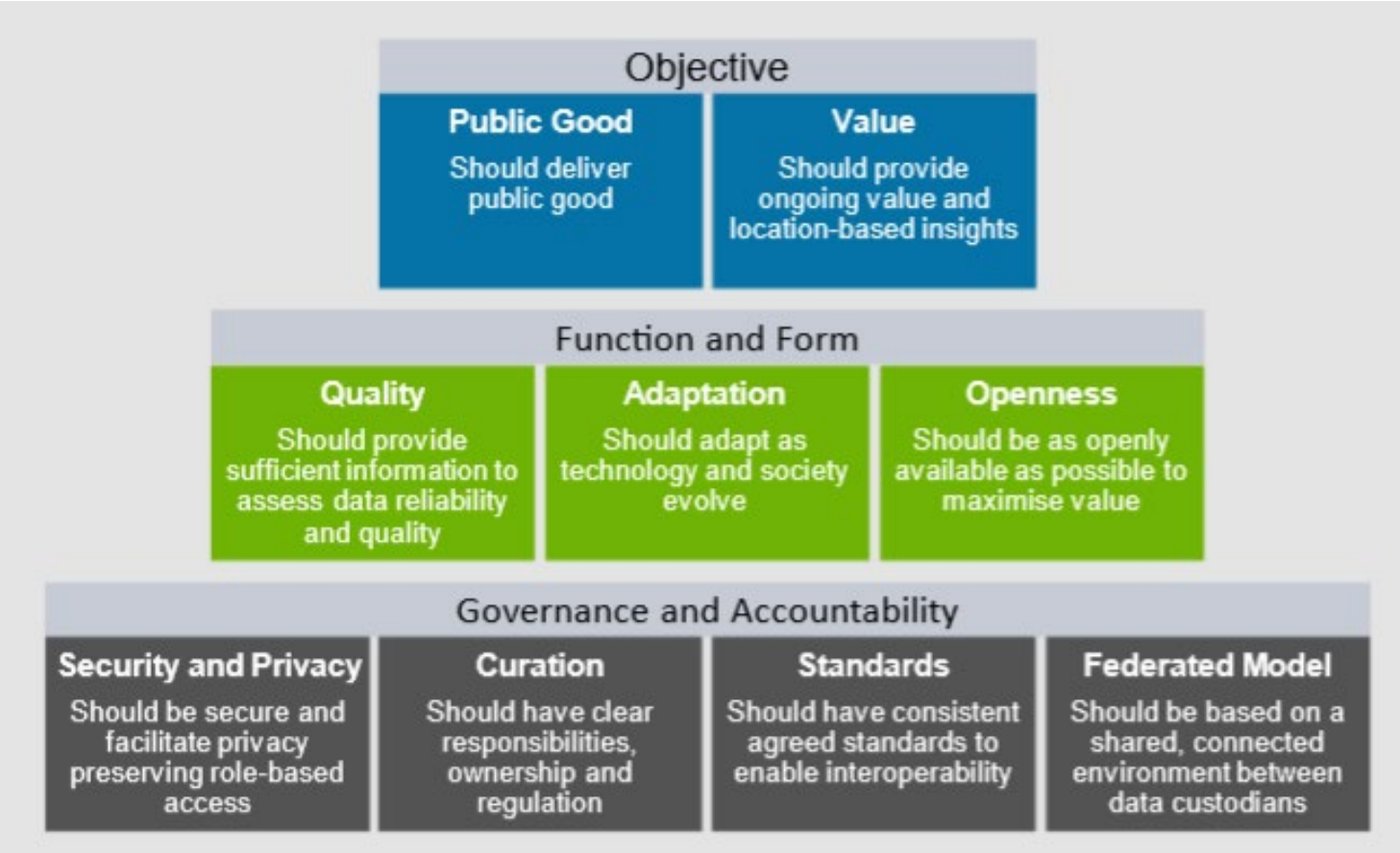
New South Wales –
- **Spatial Digital Twin: Live.NSW**
- LandIQ
- Morriset (Lake Macquarie Council) Digital Twin
- Sydney Water – Digital Twin Program
- Sydney Metro
- Transport for NSW
- Liveable Cities Digital Twin Research Project – UNSW, Liverpool City Council, DCS, AURIN...
- $40m+

New Zealand –
- Digital Twin identified as priority in National Infrastructure Strategy
- Flooding Digital Twin Research Project
- Wellington Digital Twin

Tasmania
- Greater Hobart Digital Twin – supporting the City Deal
- Launceston Digital Twin

Victoria –
- **City of Melbourne Digital Twin**
- **Digital Twin Victoria**, including
  - Statewide Digital Twin
  - e-Comply
  - $40m / 4 years

Digital Twin Principles



Reference: Principles for Spatially Enabled Digital Twins of the Built and Natural Environment in Australia, ANZLIC, December 2019.

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Future of Digital Twins

Standardize Protocols: With Digital Twin technology adoption and implementation accelerating at a significant pace, there is a need for technology providers to develop standardized protocols to ensure compatibility and interoperability across all systems. There is a need for technology providers to work together to create common protocols for Digital Twin adoption and implementation.

Digital Twin Standards: For the future advanced implementation of Digital Twin, technology companies need to collaborate and invest in developing infrastructure Digital Twin standards. Technology providers should work collaboratively with AEC firms, owners, and operators to define and optimize the benefits of deploying Digital Twin standards.

Data Focus: Digital Twins are nothing without data, and therefore, Digital Twin technology providers should work together to ensure the launch of a seamless, integrated platform wherein no data translation is required, smooth fluidity of data between applications is maintained, and data is used as a currency of exchange and performance.

Collaborative Working: Since Digital Twins are built within the context of CAD/BIM and GIS, Digital Twin technology providers should revolutionize collaborative working through CAD/BIM and GIS synchronization and bidirectional viewing. Collaborative working could elevate seamless digital delivery strategy and data, analytics, and computation to increase industry efficiency.

Shared Learnings

Data

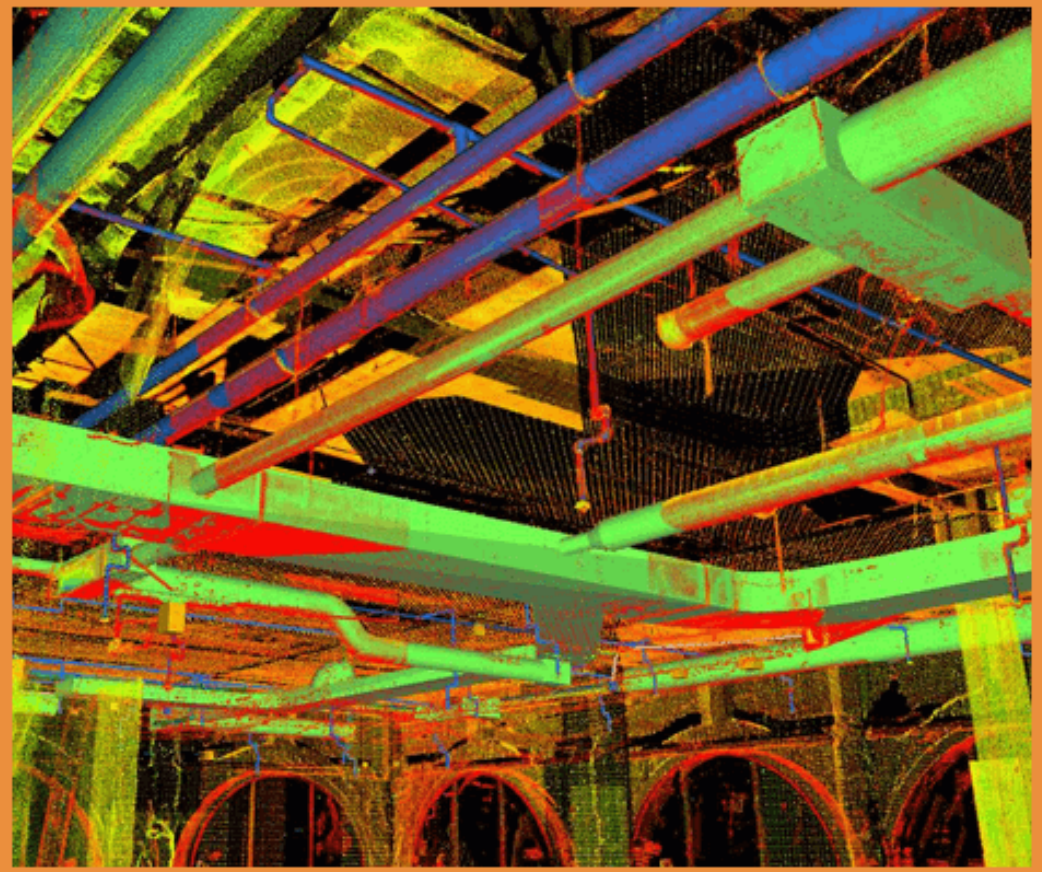
- Digital Twins are a way to unlock data from silos, but at this point – the silos exist – and data collation, aggregation and transformation takes time
- Investment in data is still needed
- **Standards are needed as a priority**

Technology

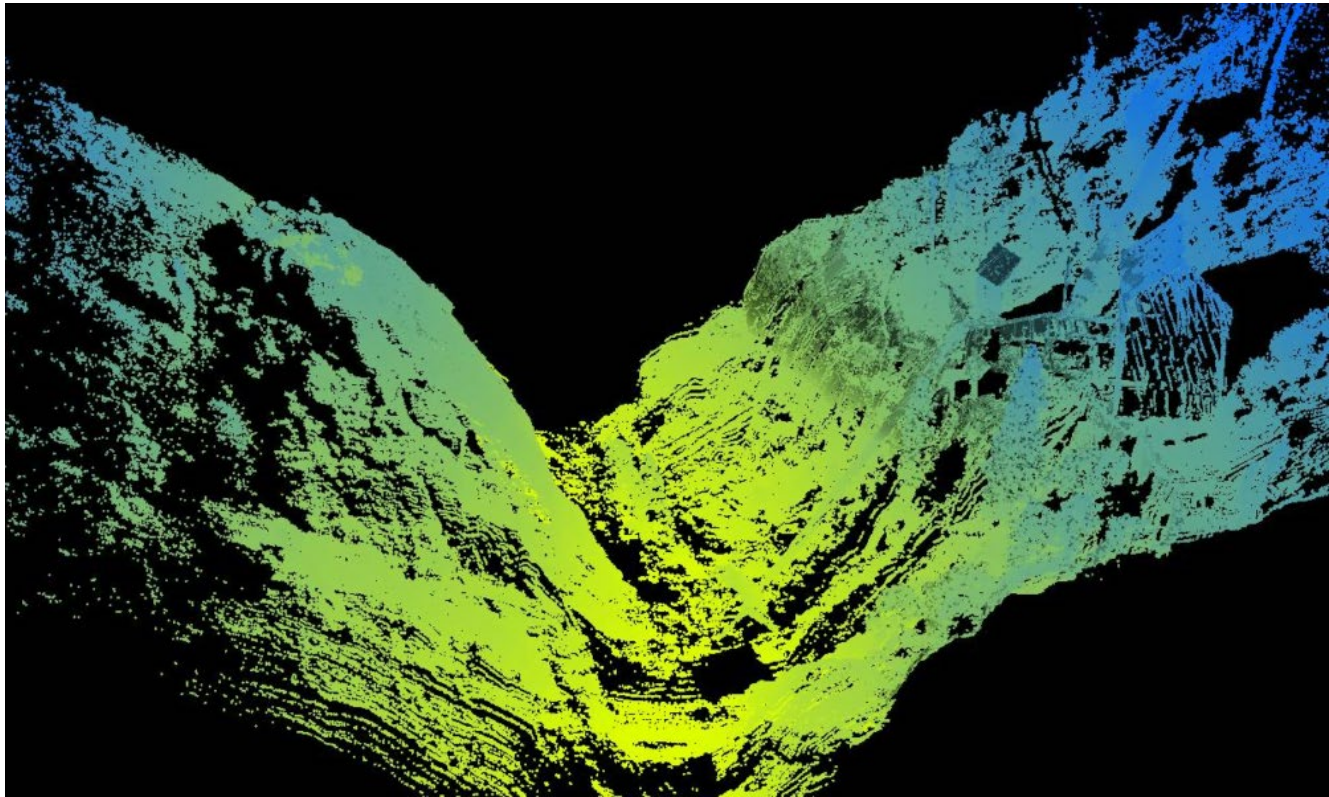
- Governance & federation models are still in development
- A lot of time is spent on technology selection and architecture
- Sharing of solutions and code will be important – but how?
- Research projects will quickly build on government DT initiatives, when they are available

Multi-disciplinary

- The value of digital twin is apparent across domains, it is not just for cities
- Expectations of the use of Digital Twins is growing
- Multi-disciplinary teams are the only way to create (and govern) Digital Twins



Increasingly engineering projects are designed and delivered in a 3D environment



Perth METRONET Project

72 kilometres of new passenger rail and 23 new stations

- Aims to improve 8,000 hectares of residential land into desirable places to live, work and play
- PTA and the contractors do not yet have an aligned geospatial/digital engineering strategy
- Project spans multiple local government areas with little consistency between them
- Design and construction teams of the contractors all working in continuous 3D environment
- Data is collected in 3D and delivered, processed, analysed and shared in 3D.
- All disciplines depend on this data
- Currently PTA cannot injest and use the majority of the as constructed 3D data that the contractor depends on, therefore post project this data is at risk of being lost
- Spatial WA provides a way forward to ensure this data forms part of a living, growing digital twin
- Mandated data sharing provides a practical and cost effective way