DIGITAL CONSTRUCTION SUMMER SCHOOL

Harnessing BIM to Realize Digital Twins

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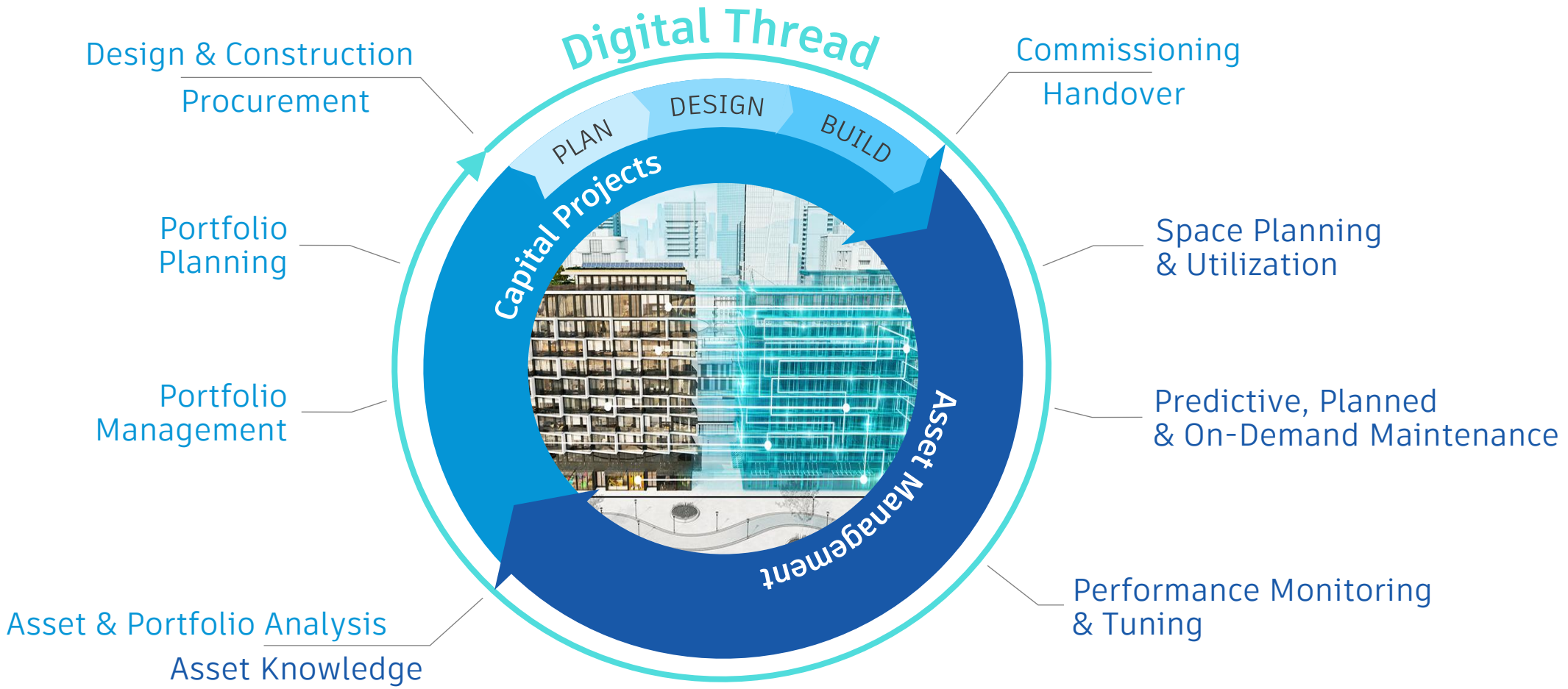
Digital Twin

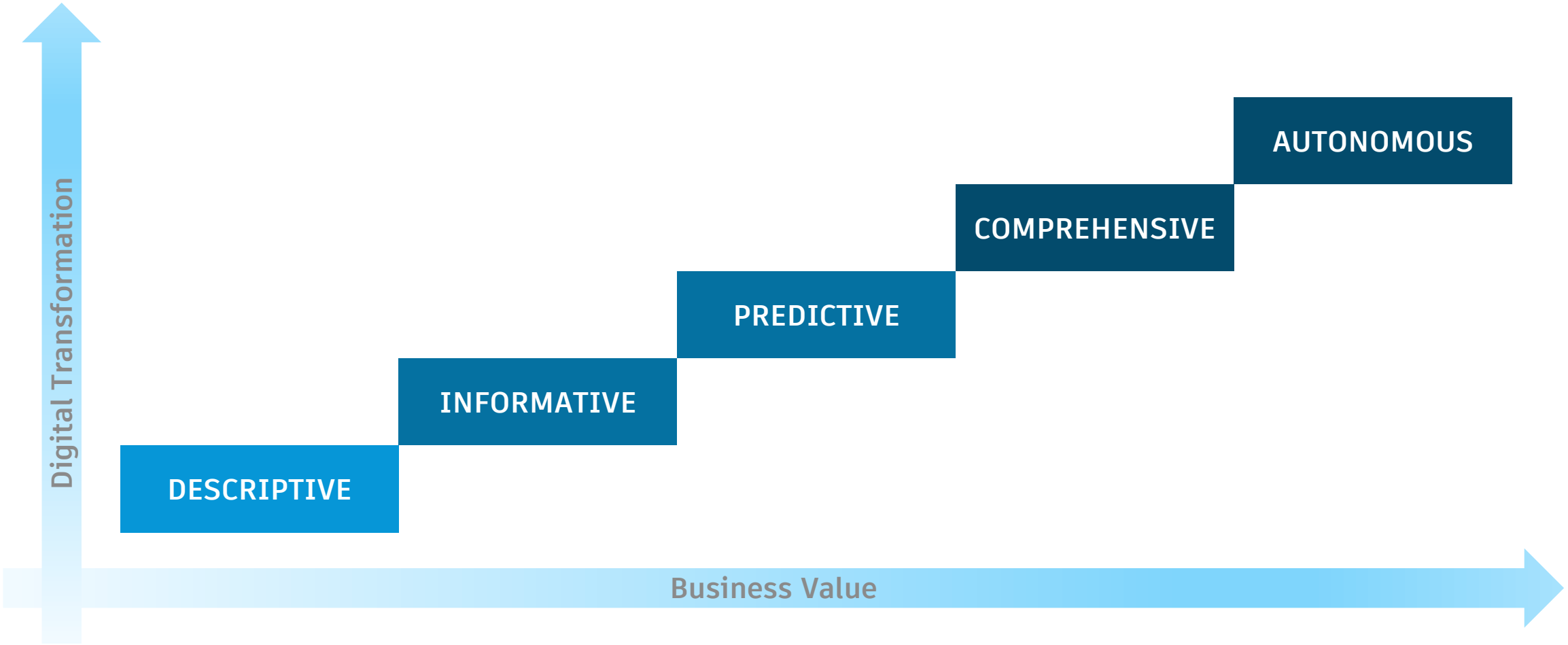
Opportunities and Challenges

What is a Digital Twin?

Transforming the Built Asset Lifecycle



Digital Twin Maturity



Source: Verdantix - Smart Innovators: Digital Twins For Buildings, June 2020

95.5%

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

58%

of owners said they've used or plan to use **design-build**, moving away from traditional design-bid-build[2]

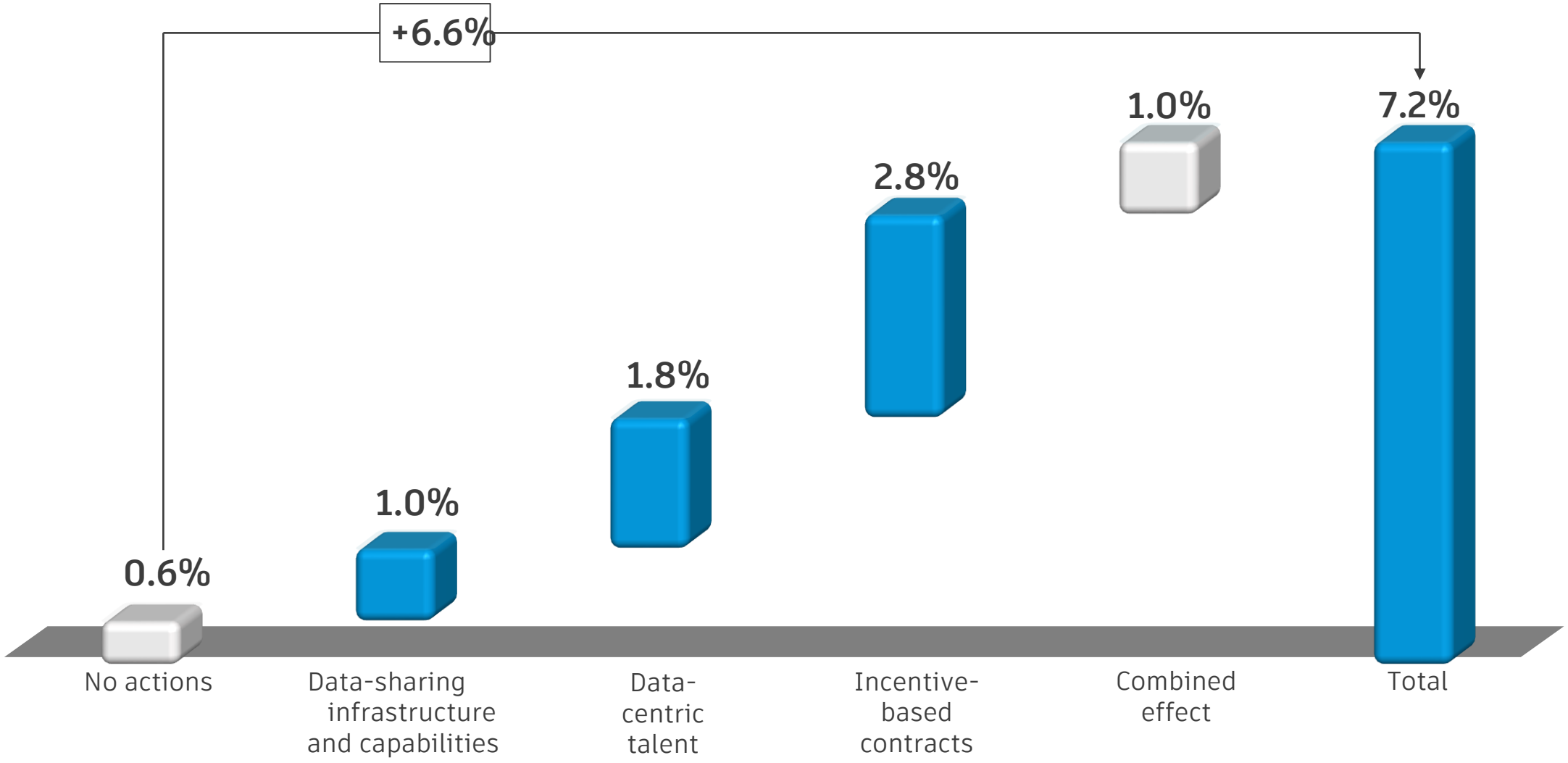
[1] *Source: Big Data = Big Questions for the Engineering and Construction Industry, FMI Report*
[2] *Source: Design-Build Utilization, FMI Combined Market Study*

Owners receive this…

…when they need this!

Impact of Data-Driven Digital Transformation

on the Return on Capital Employed (ROCE) for Owner-Operators



Source: Building More Value With Capital Projects, Accenture

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Digital Handover

Accelerate operational readiness by starting with the end in mind and harnessing the BIM process to handover a digital twin

Smarter Operations

Gain operational efficiency and improve the occupant experience by leveraging the digital twin's reflection of your assets, spaces, and systems

Greater Insight

Optimize your portfolio and inform future investments based on the operational knowledge and usage analytics provided by your digital twin

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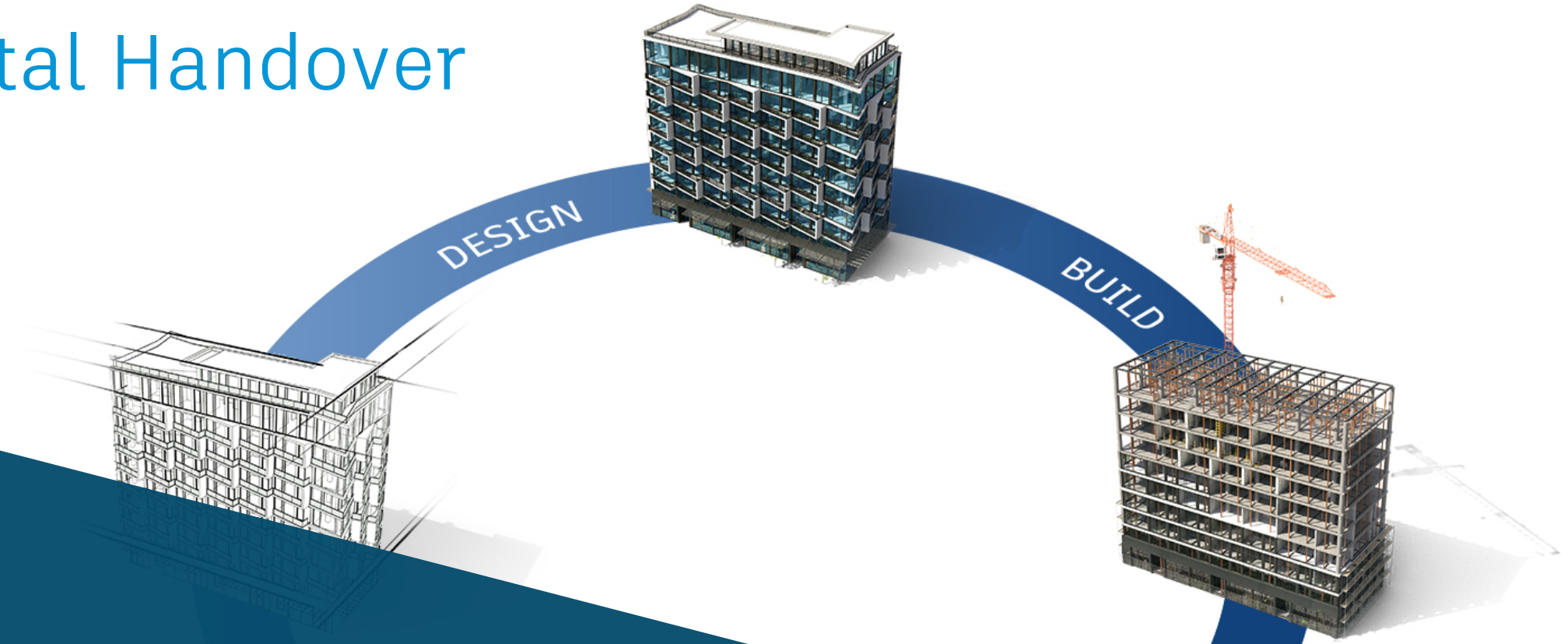
Smarter Handover

Start Digital, Stay Digital, Deliver Digital

Digital Handover



Autodesk Tandem enables you to
harness the BIM process to make digital twins
a highly-repeatable, natural output of the project lifecycle

Specify

Data Requirements and Operational Outcomes

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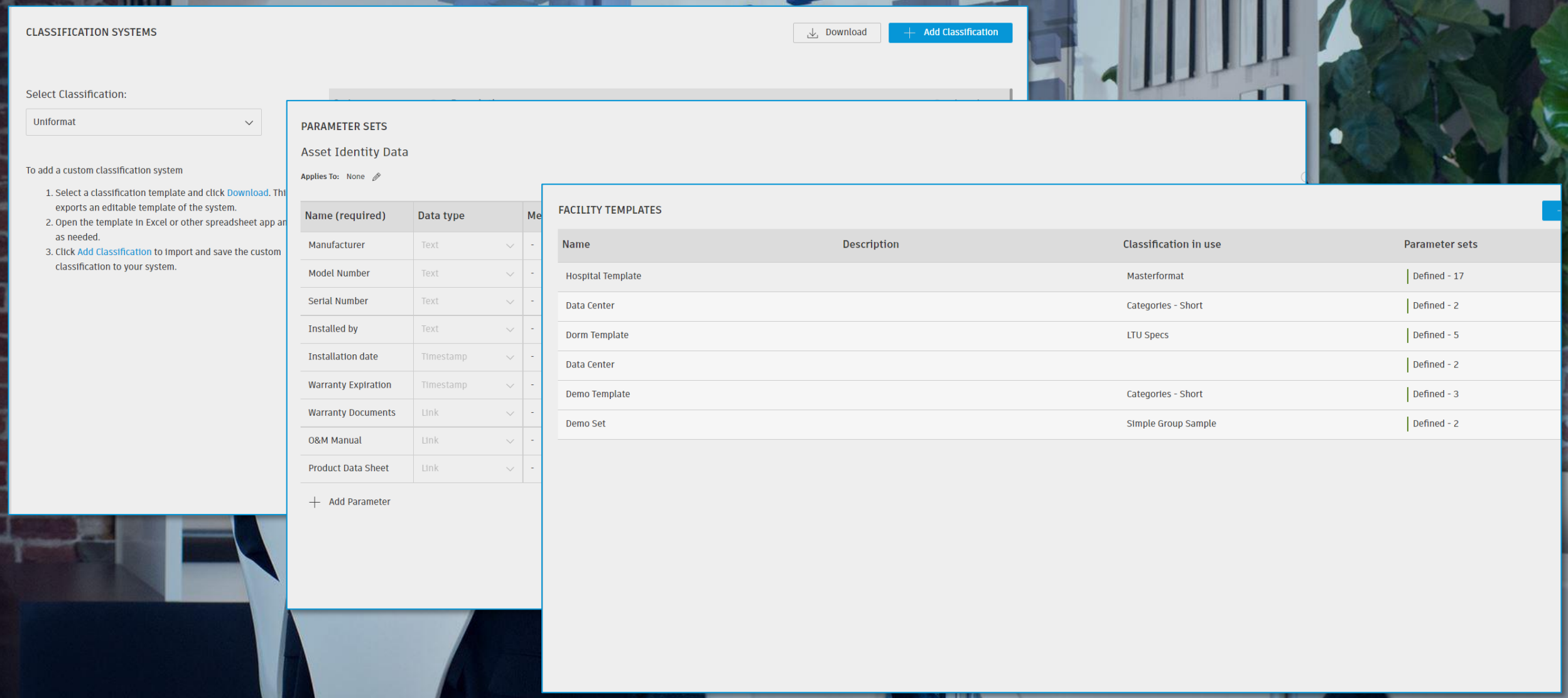
Data Requirements and Operational Outcomes



Capture

Asset, Space, and System Data During Design and Construction

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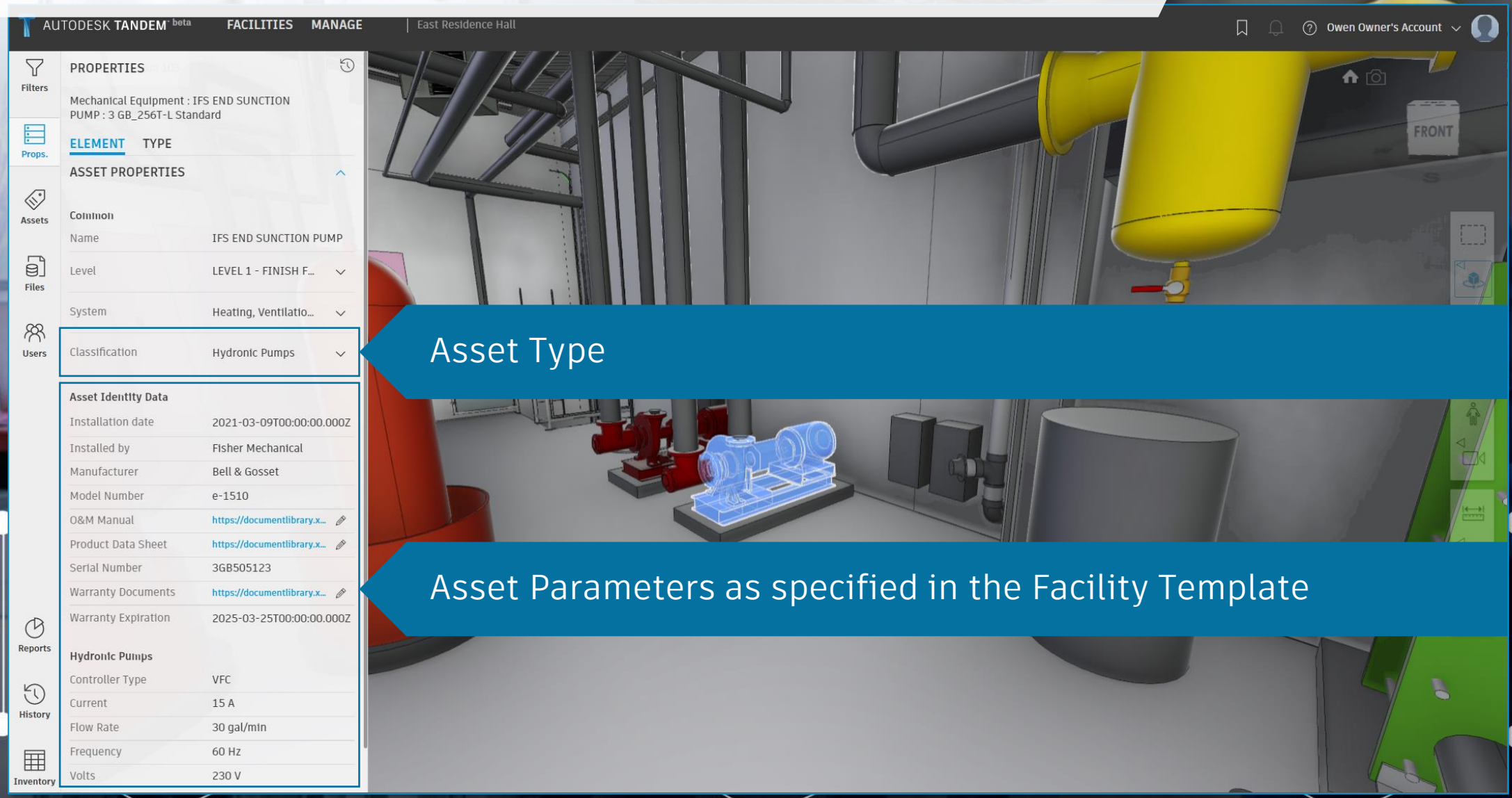
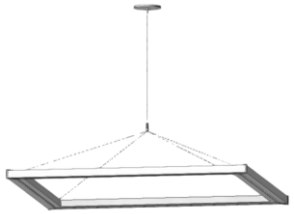
Asset, Space, and System Data During Design and Construction

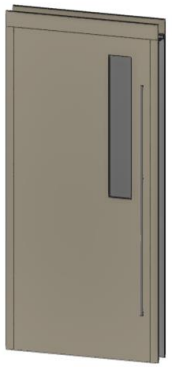


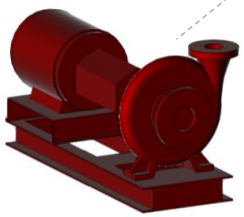
Verify

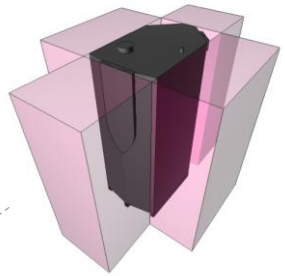
Completeness and Accuracy of Asset, Space, and System Data

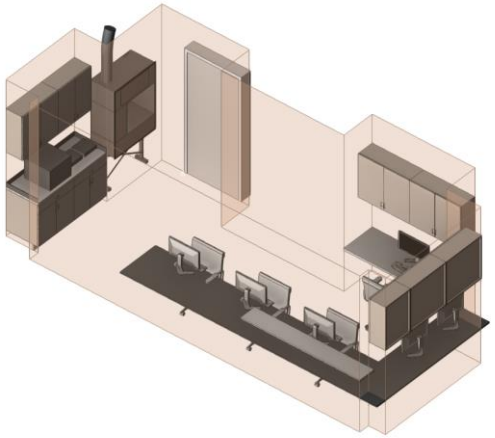
Autodesk Tandem's – Asset Information Model

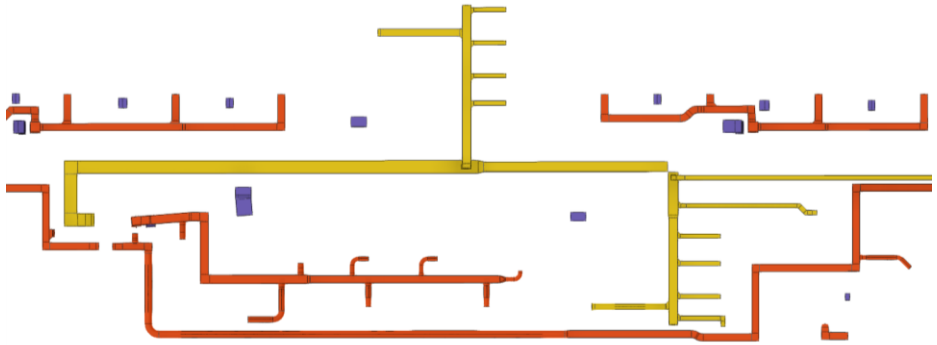












Outcomes of Digital Handover

Transparent collaboration between all stakeholders

Accelerate operational readiness through easy access to detailed facility information

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Enabling Owners

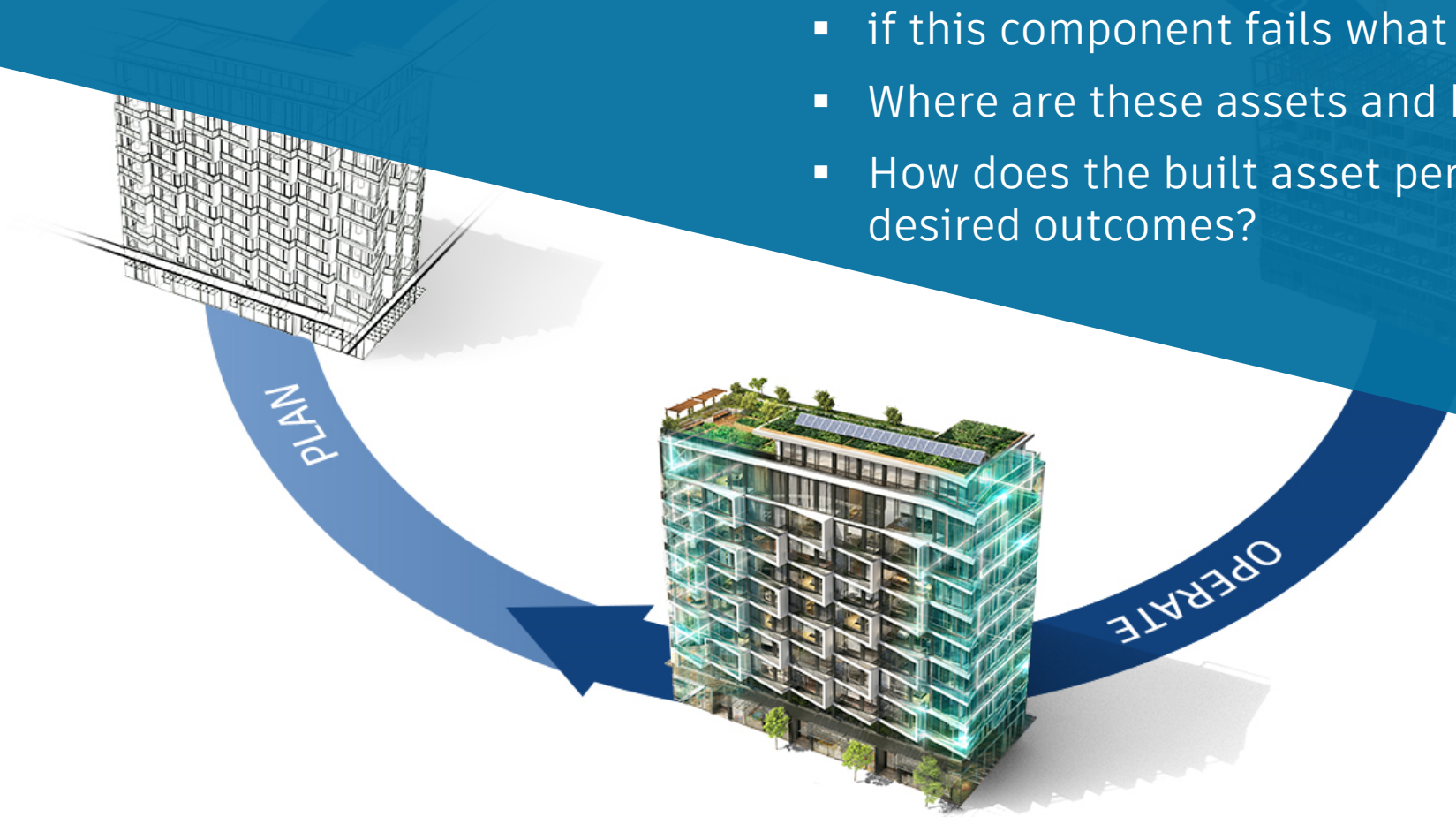
Transforming the Built Asset Lifecycle

Smarter Operations and Greater Insight

Autodesk Tandem provides the context to connect operational data and systems

With these connections, you can answer and visualize complex questions like:

- if this component fails what spaces are affected?
- Where are these assets and how do I access them?
- How does the built asset perform against my desired outcomes?



Connect

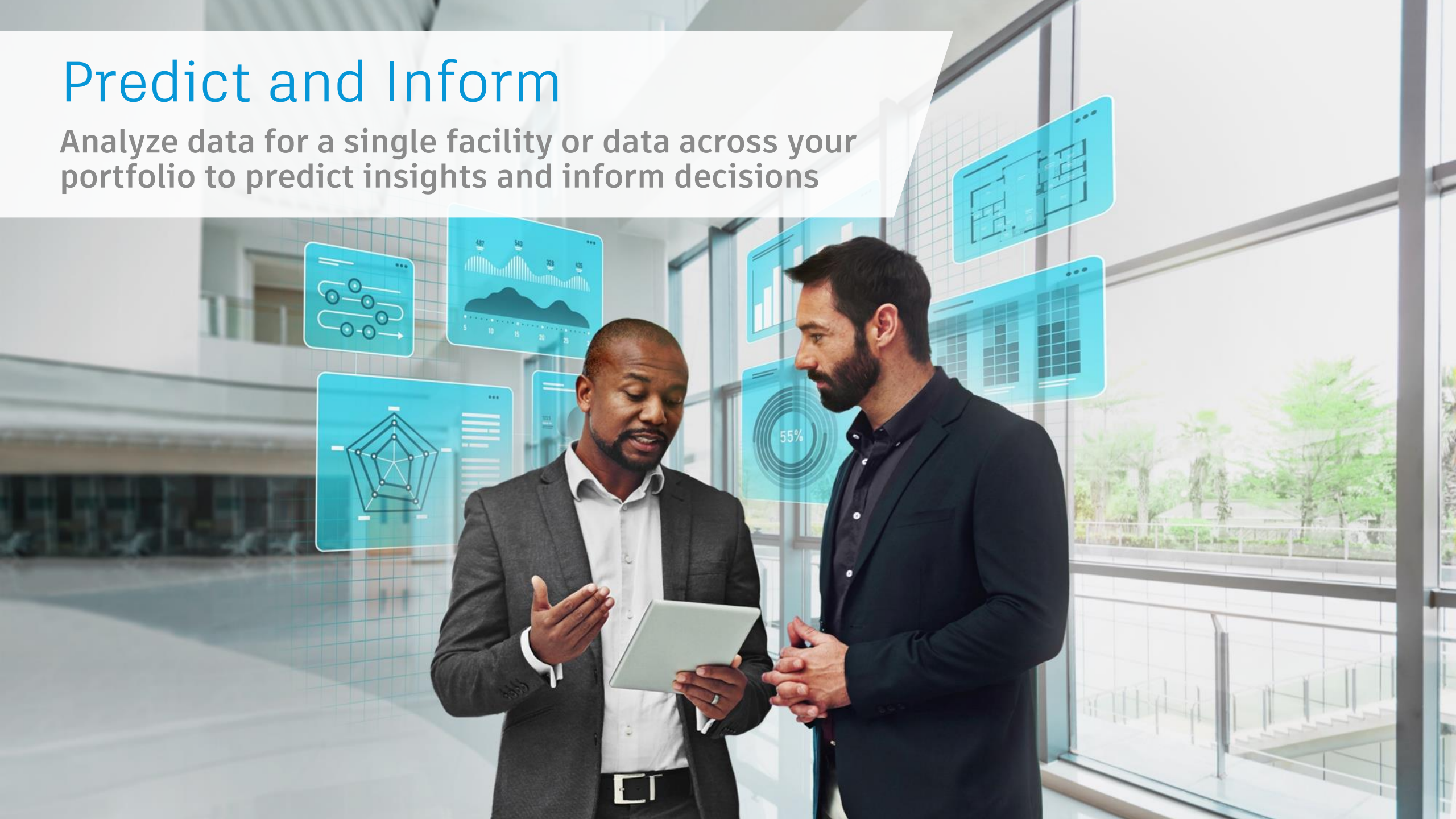
Operational Solutions and Data

Access

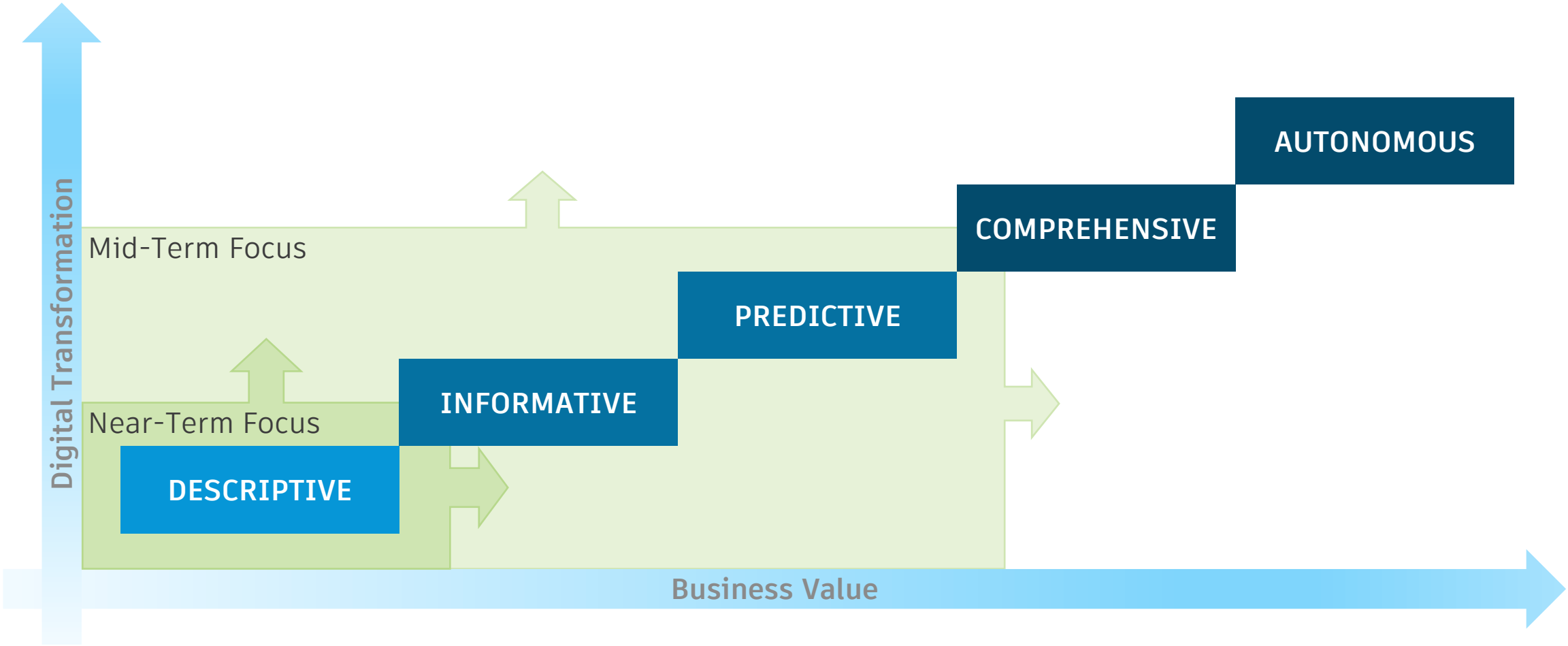
Operational Information through a Single Pane of Glass

Predict and Inform

Analyze data for a single facility or data across your portfolio to predict insights and inform decisions



The Road to Digital Twin Maturity



Source: Verdantix - Smart Innovators: Digital Twins For Buildings, June 2020

Planned Workflows and Personas

	Tandem Platform	Autodesk Tandem			Autodesk Tandem Pro	
Workflow						
	Integrate	**Specify**	**Capture**	**Verify**	**Monitor**	**Operate**
	Power a digital twin ecosystem via open access to asset and space information built on Autodesk Forge	Setup and manage classification, data models, and permissions	Aggregate, view, query, update, and normalize object and asset data	Validate object and asset data deliverables via user defined rule sets	Monitor facility performance through a single pane of glass	Improve efficiency in performing predictive, planned, and on-demand maintenance
Personas	▪ Enterprise Developers ▪ 3rd Party Developers	▪ BIM Manager ▪ Capital Project Manager ▪ IT/Data Manager	▪ BIM Manager ▪ Architects ▪ Engineer/Designer ▪ Project Managers ▪ Commissioning Agents	▪ BIM Manager ▪ Commissioning Agents ▪ Capital Project Manager	▪ Facility Manager ▪ Operations Manager	▪ Facility Manger ▪ Maintenance Technicians ▪ Occupant

AEC Project Team Persona ● Owner/Operator Persona ● Developer Persona

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Make anything™