AUTODESK TANDEM™

Harnessing BIM to Realize Digital Twins

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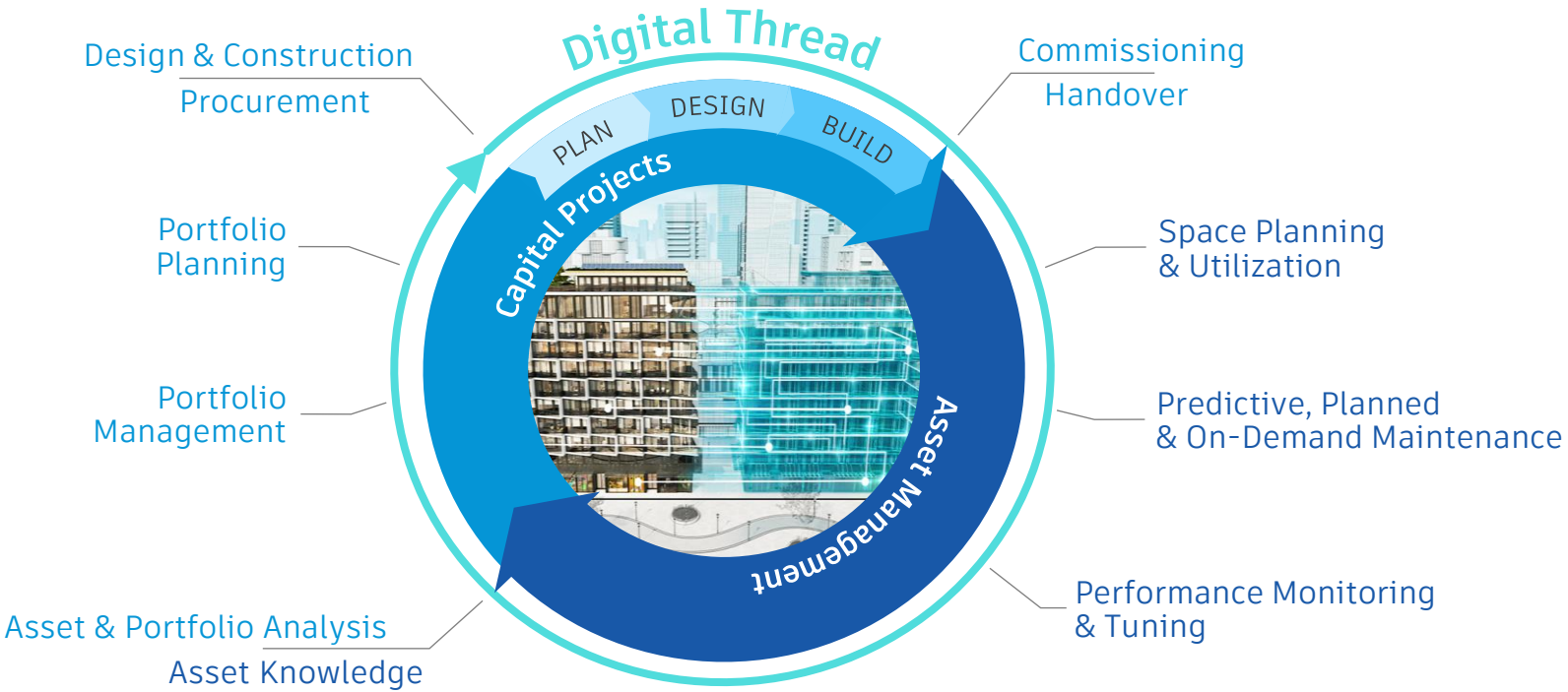
Digital Twin

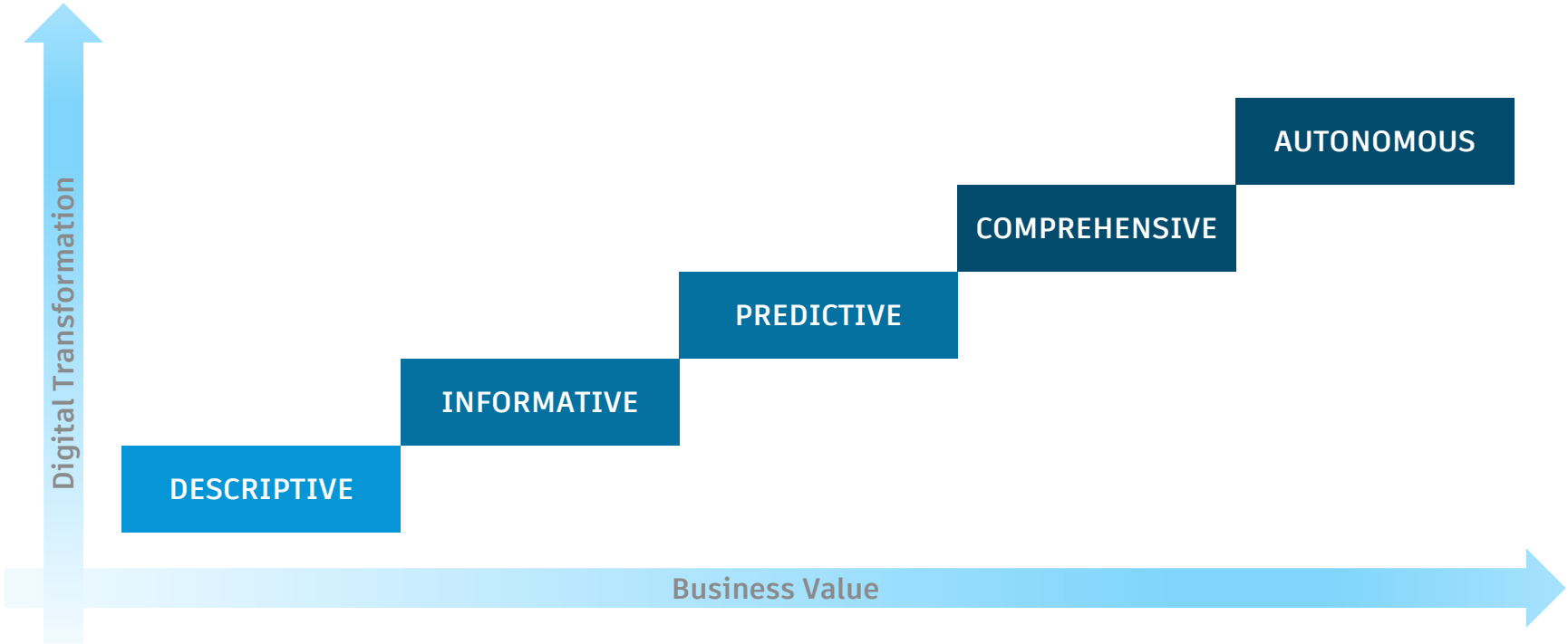
Opportunities and Challenges

What is a Digital Twin?

Transforming the Built Asset Lifecycle



Digital Twin Maturity



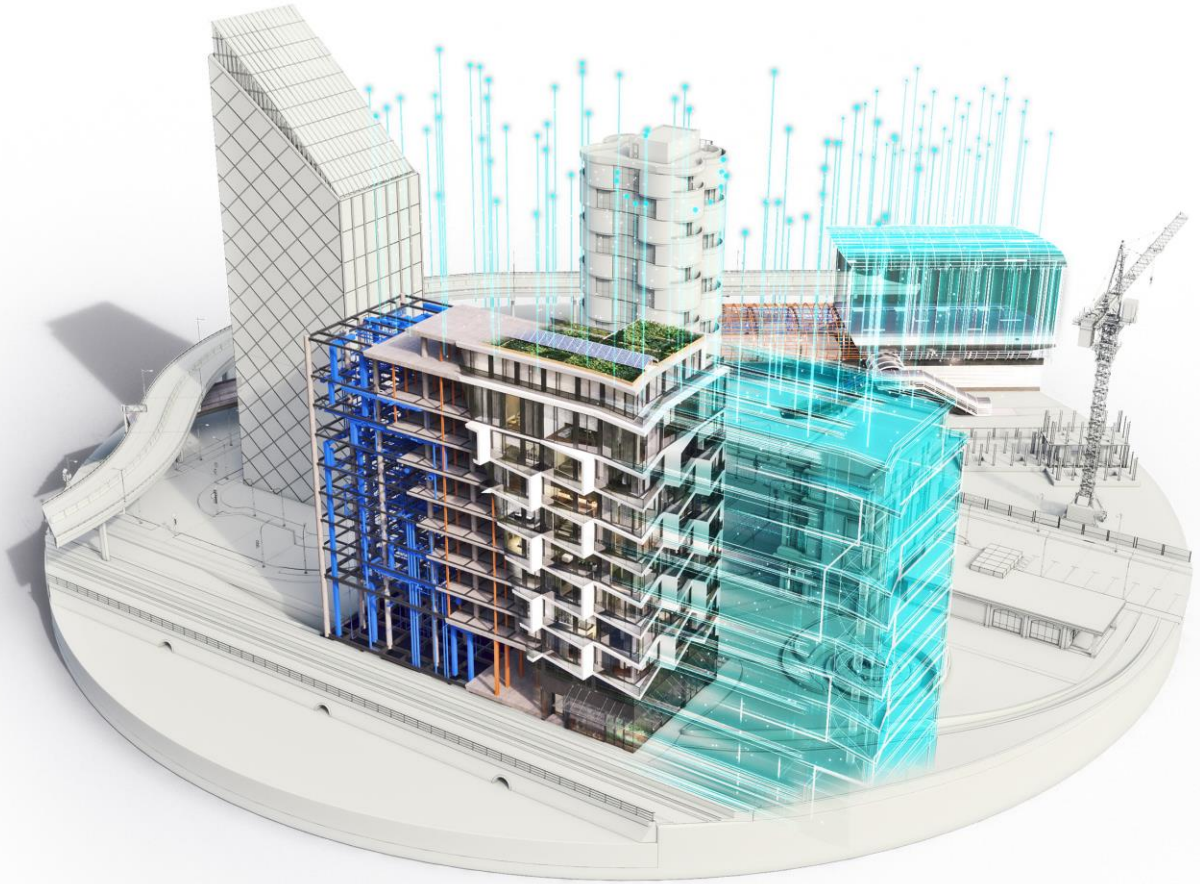
Source: Verdantix - Smart Innovators: Digital Twins For Buildings, June 2020

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]



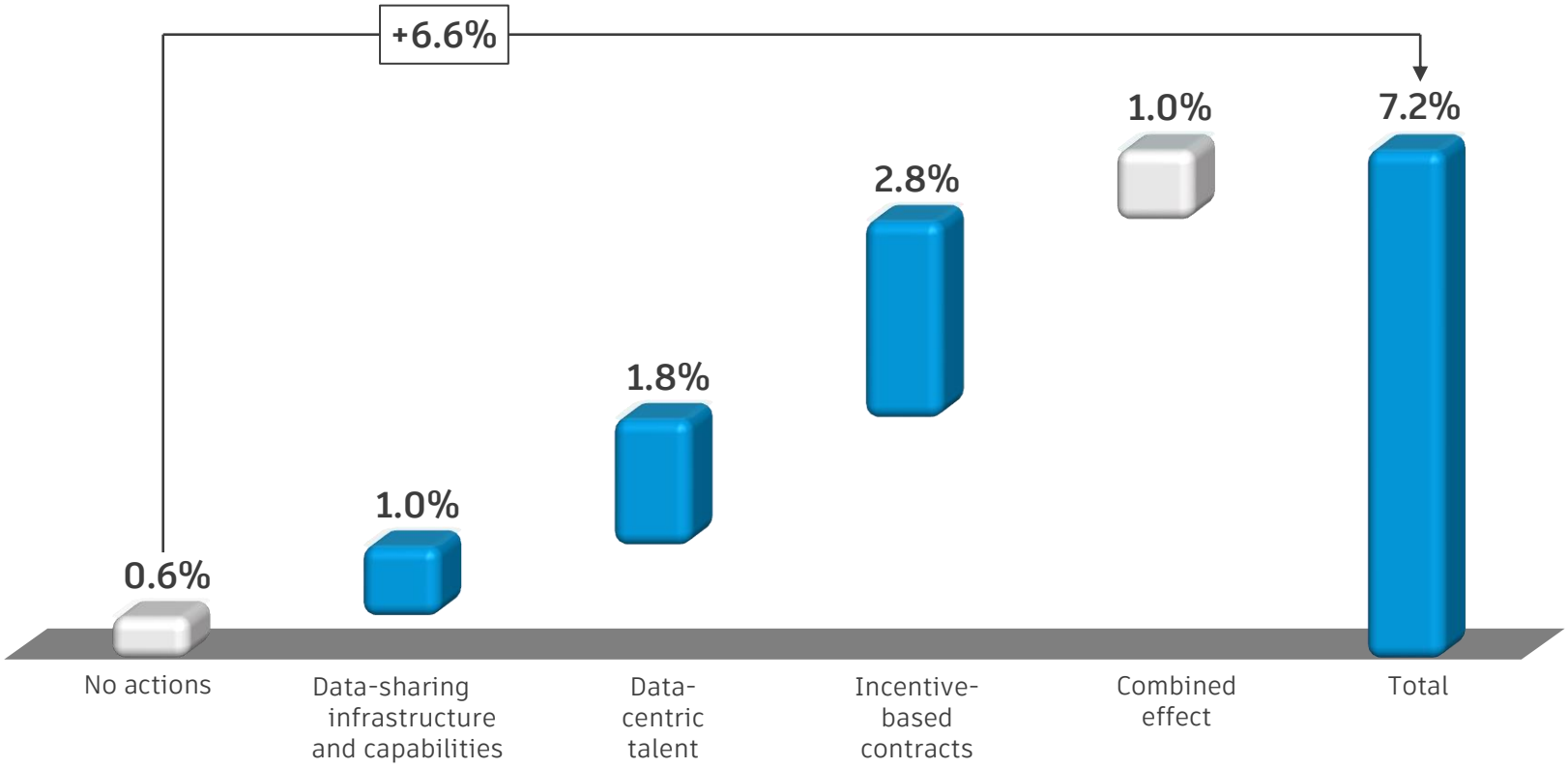
[1] *Source: Big Data = Big Questions for the Engineering and Construction Industry, FMI Report*
[2] *Source: Design-Build Utilization, FMI Combined Market Study*

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

AUTODESK **TANDEM**™

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

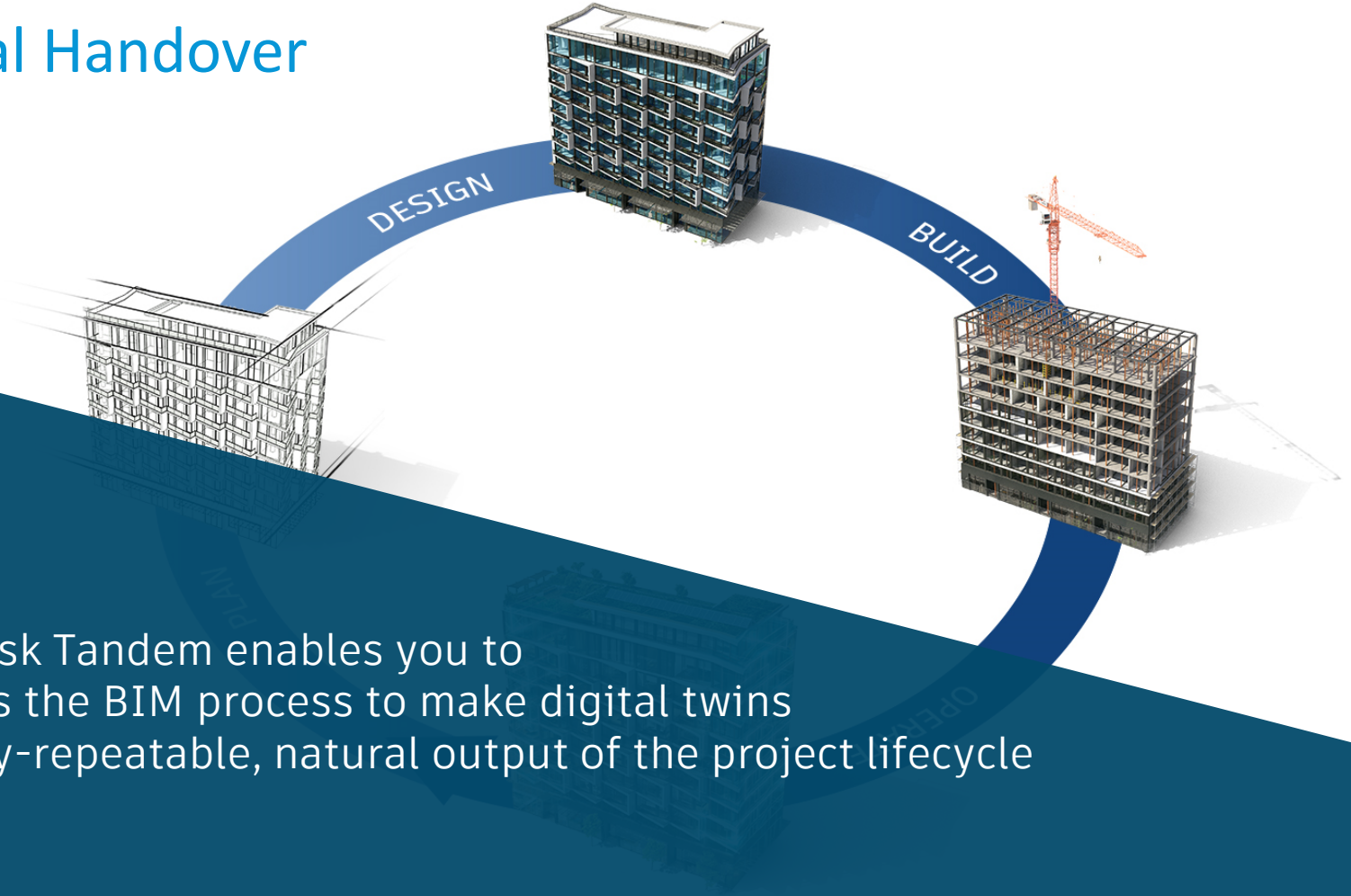
Greater Insight

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

Start Digital, Stay Digital, Deliver Digital with

Autodesk Tandem

Digital Handover



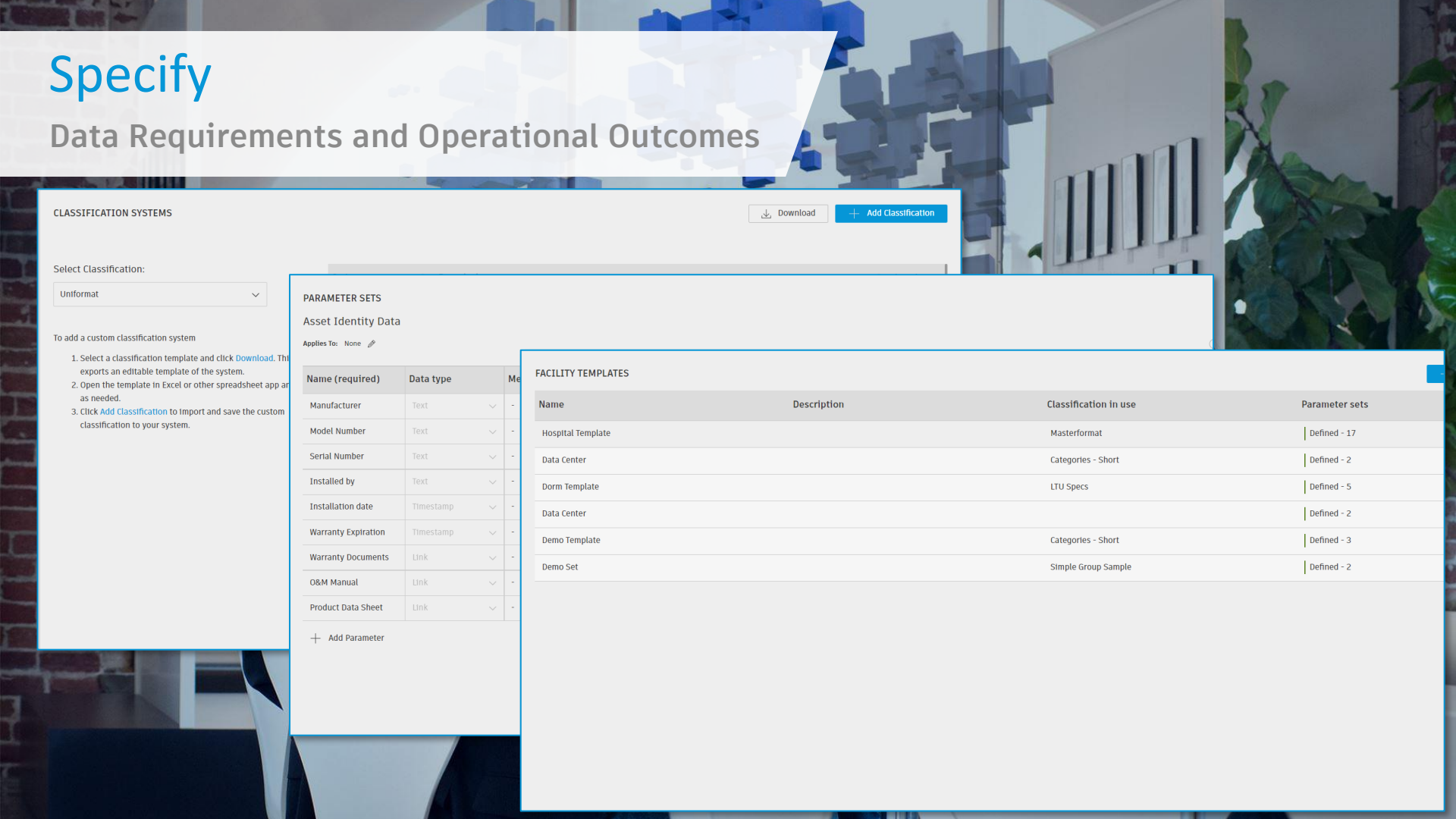
Autodesk Tandem enables you to
harness the BIM process to make digital twins
a highly-repeatable, natural output of the project lifecycle

Specify

Data Requirements and Operational Outcomes

Specify

Data Requirements and Operational Outcomes



Capture

Asset, Space, and System Data During Design and Construction

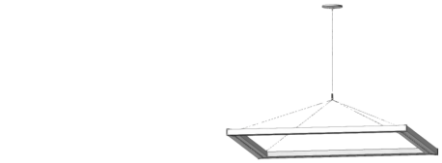
Capture

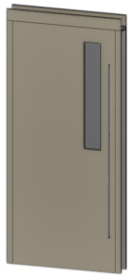
Asset, Space, and System Data During Design and Construction

Verify

Completeness and Accuracy of Asset, Space, and System Data

Autodesk Tandem's – Asset Information Model





Facility

part of

part of

contains

contains

Asset

contains

part of

Space

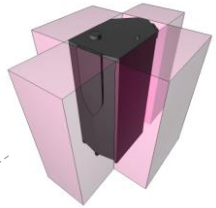
contains

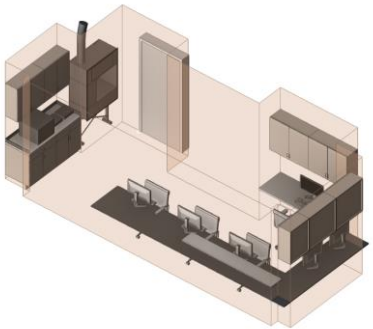
part of

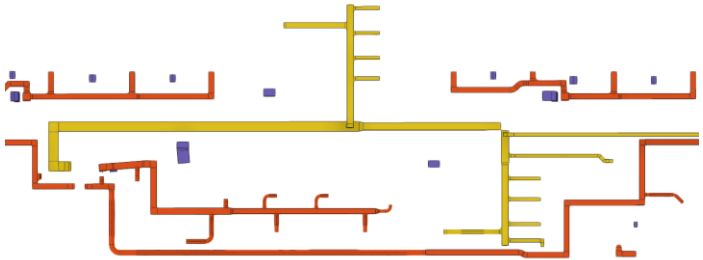
serves

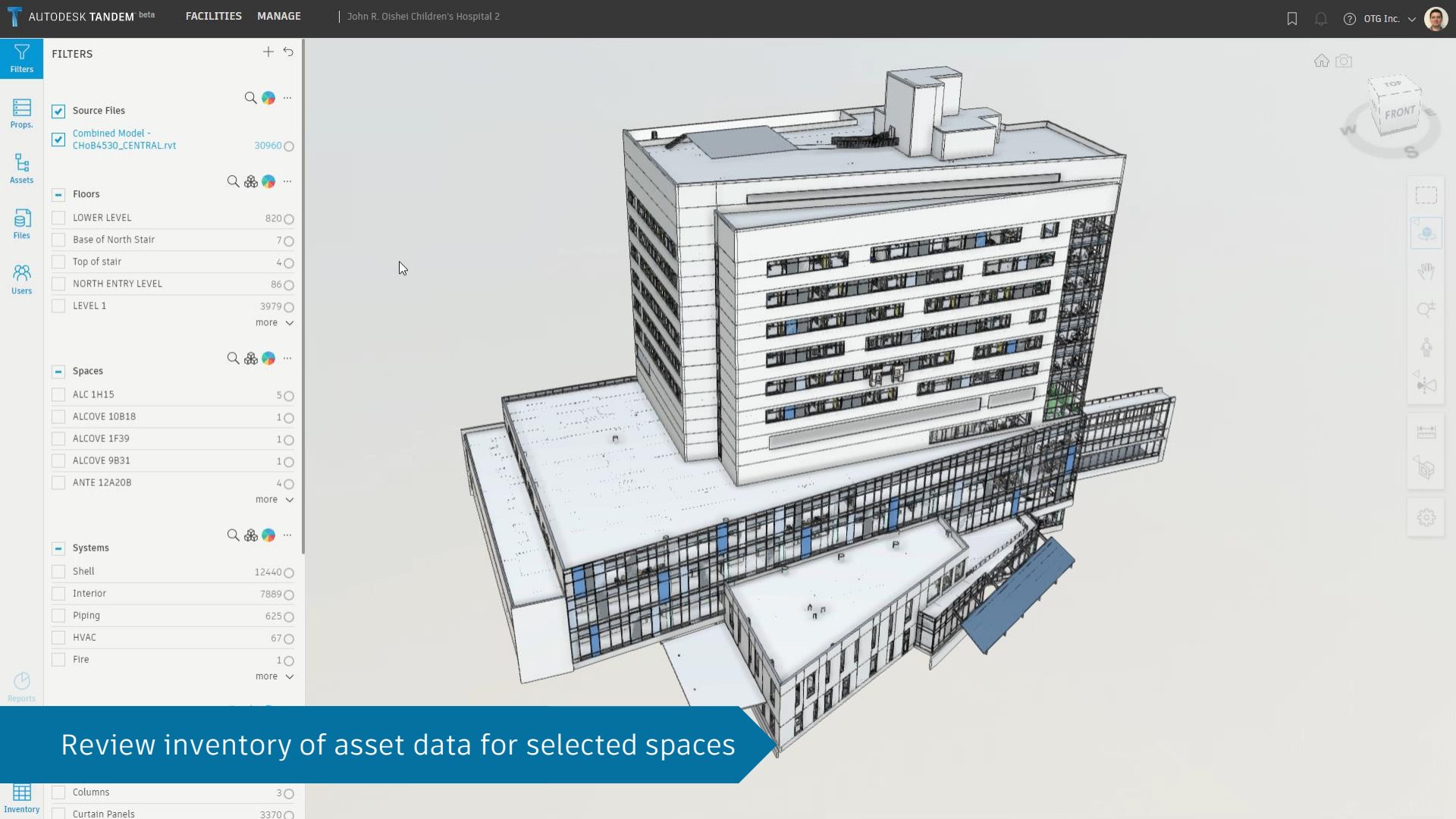
served by

System








AUTODESK TANDEM beta
FACILITIES
MANAGE
John R. Oishei Children's Hospital 2
OTG Inc.
Filters
Props.
Assets
Files
Users
FILTERS
Source Files
Combined Model - CHoB4530_CENTRAL.rvt 30960
Floors
LOWER LEVEL 820
Base of North Stair 7
Top of stair 4
NORTH ENTRY LEVEL 86
LEVEL 1 3979
more
Spaces
ALC 1H15 5
ALCOVE 10B18 1
ALCOVE 1F39 1
ALCOVE 9B31 1
ANTE 12A20B 4
more
Systems
Shell 12440
Interior 7889
Piping 625
HVAC 67
Fire 1
more
Columns 3
Curtain Panels 3370
Reports
Inventory
TOP
FRONT
W
S
Review inventory of asset data for selected spaces

Outcomes of Digital Handover

Transparent collaboration between all stakeholders

Accelerate operational readiness through easy access to detailed facility information

Transforming the Built Asset Lifecycle with

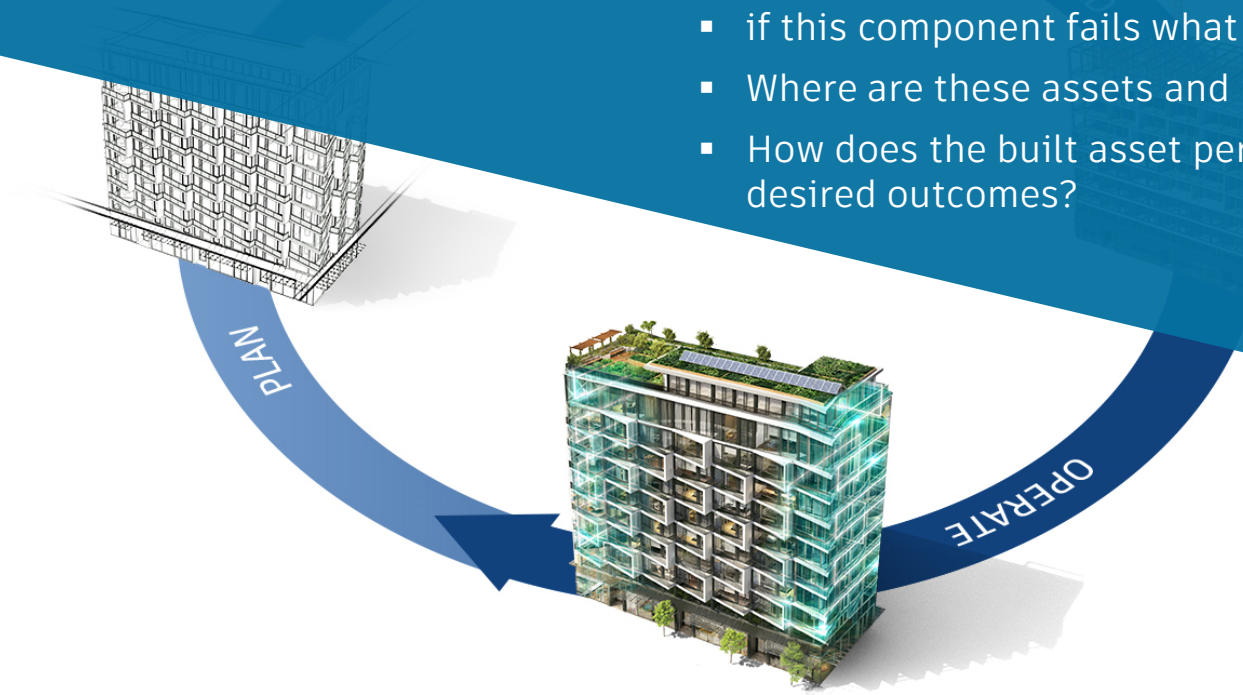
Autodesk Tandem

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

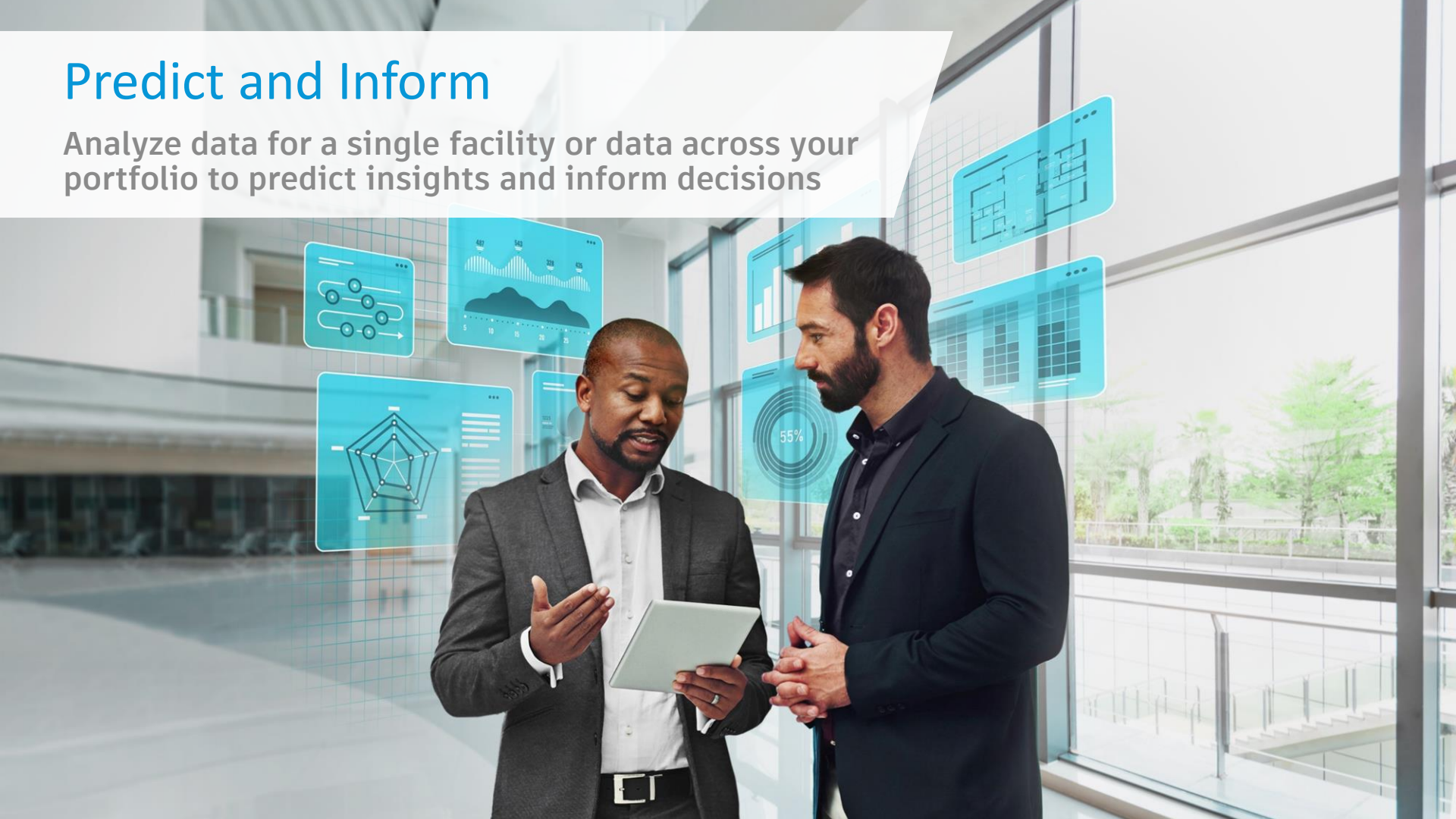
Operational Solutions and Data

Access

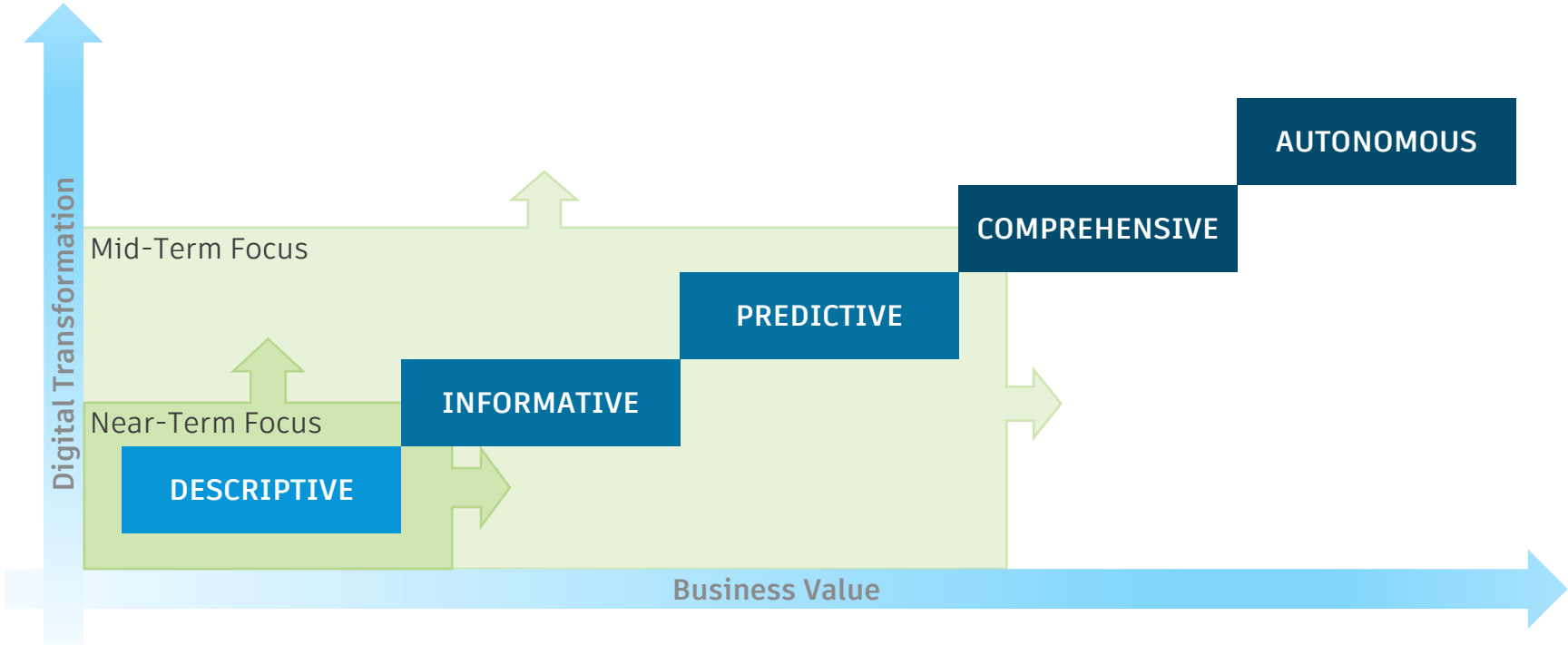
Operational Information through a Single Pane of Glass

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

Autodesk Tandem

Customer Engagement and Collaboration

“This is what it means to have a partner and not a software vendor! This is an important topic for us and having a thought-leadership role on Autodesk Tandem will be good for the future.” – Chief Technologist

- Water Treatment facilities
- Existing and new facilities
- Multiple buildings

- Digital delivery before physical delivery
- Turn-key solution for their clients
- Improve future design decisions

- Easy to use and understand
- Excellent performance
- Valuable partnership

“I like being on this side of the software versus the this-is-what-they-gave-me side”
– Facilities Manager

- Corporate Headquarters
- 8 Million Square Foot Facility
- 30 Buildings

- Improve FM through connected BIM and asset data
- Effective document access
- Supports the rapid evolution of their campus

- Roadmap meets their needs
- Link to BIM 360 is awesome
- No model federation necessary

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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