

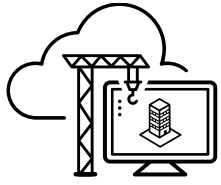
DIGITAL
CONSTRUCTION
SUMMER SCHOOL

Harnessing BIM to Realize Digital Twins



AUTODESK.





DIGITAL
CONSTRUCTION

SUMMER SCHOOL



Tim Kelly
Sr. Product Manager, Autodesk Tandem



DIGITAL
CONSTRUCTION

SUMMER SCHOOL

Digital Twin

Opportunities and Challenges



What is a Digital Twin?



Simulate

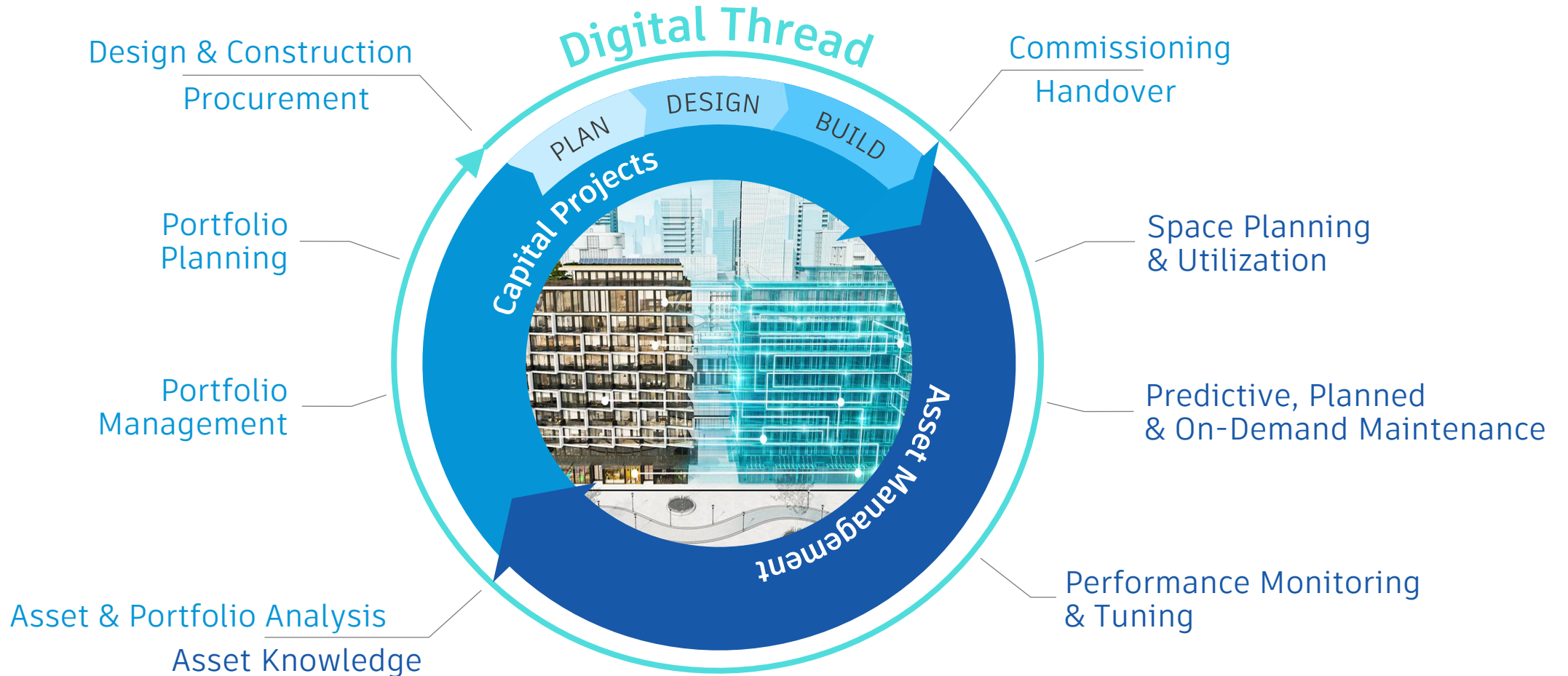


Predict

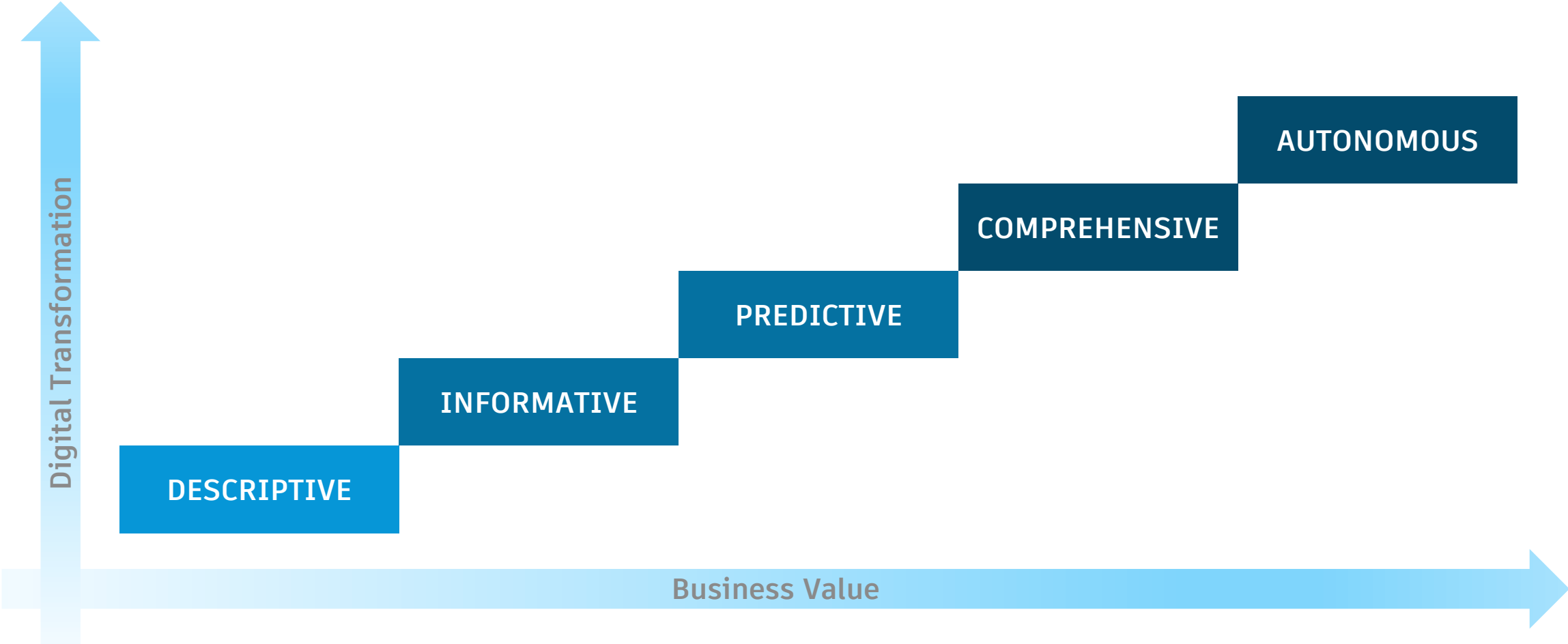


Inform

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 & construction¹

58%

of owners said they've used or
plan to use **design-build**,
moving away from traditional
design-bid-build²



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...

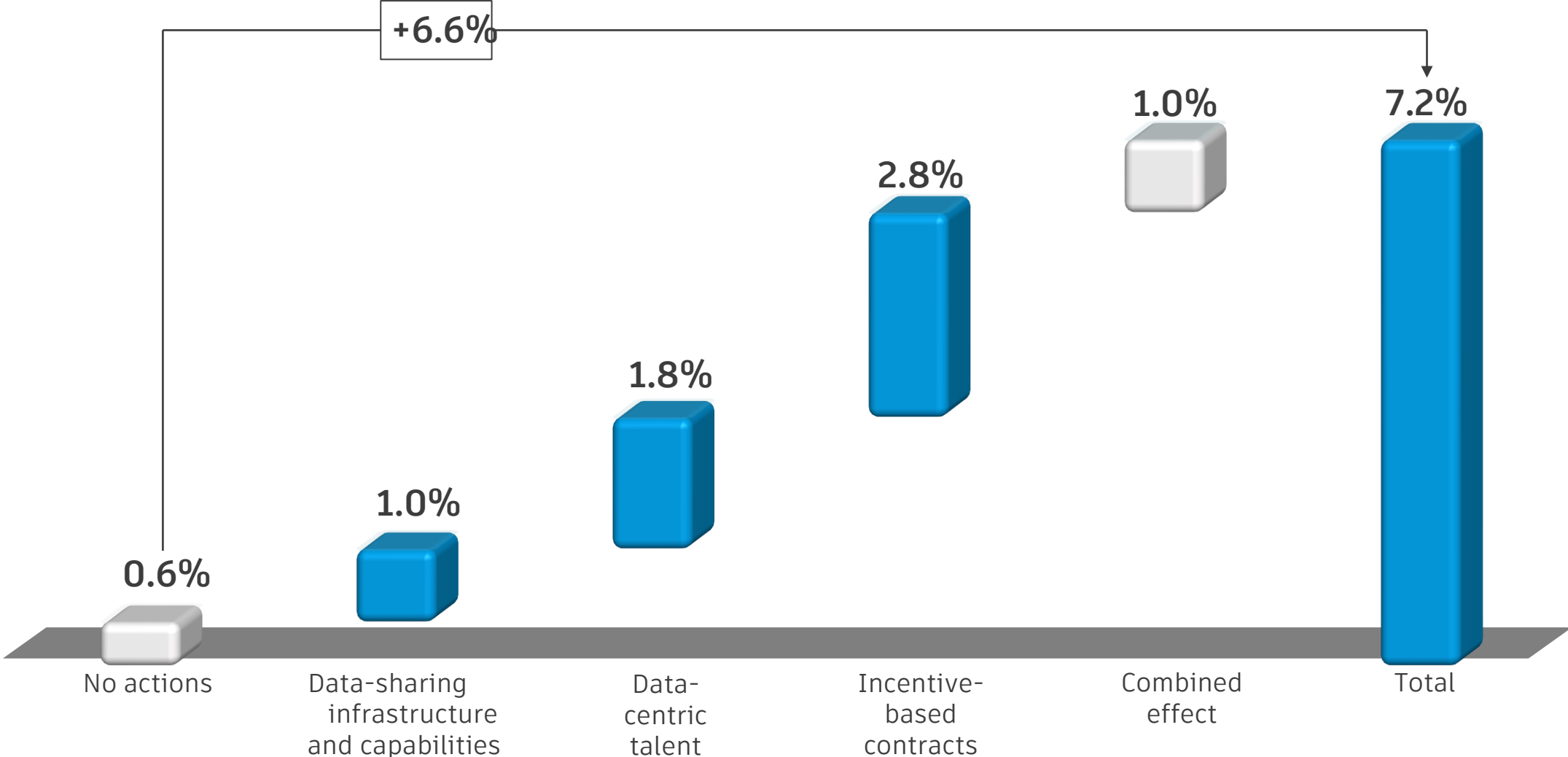


...when they need this!



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



DIGITAL
CONSTRUCTION

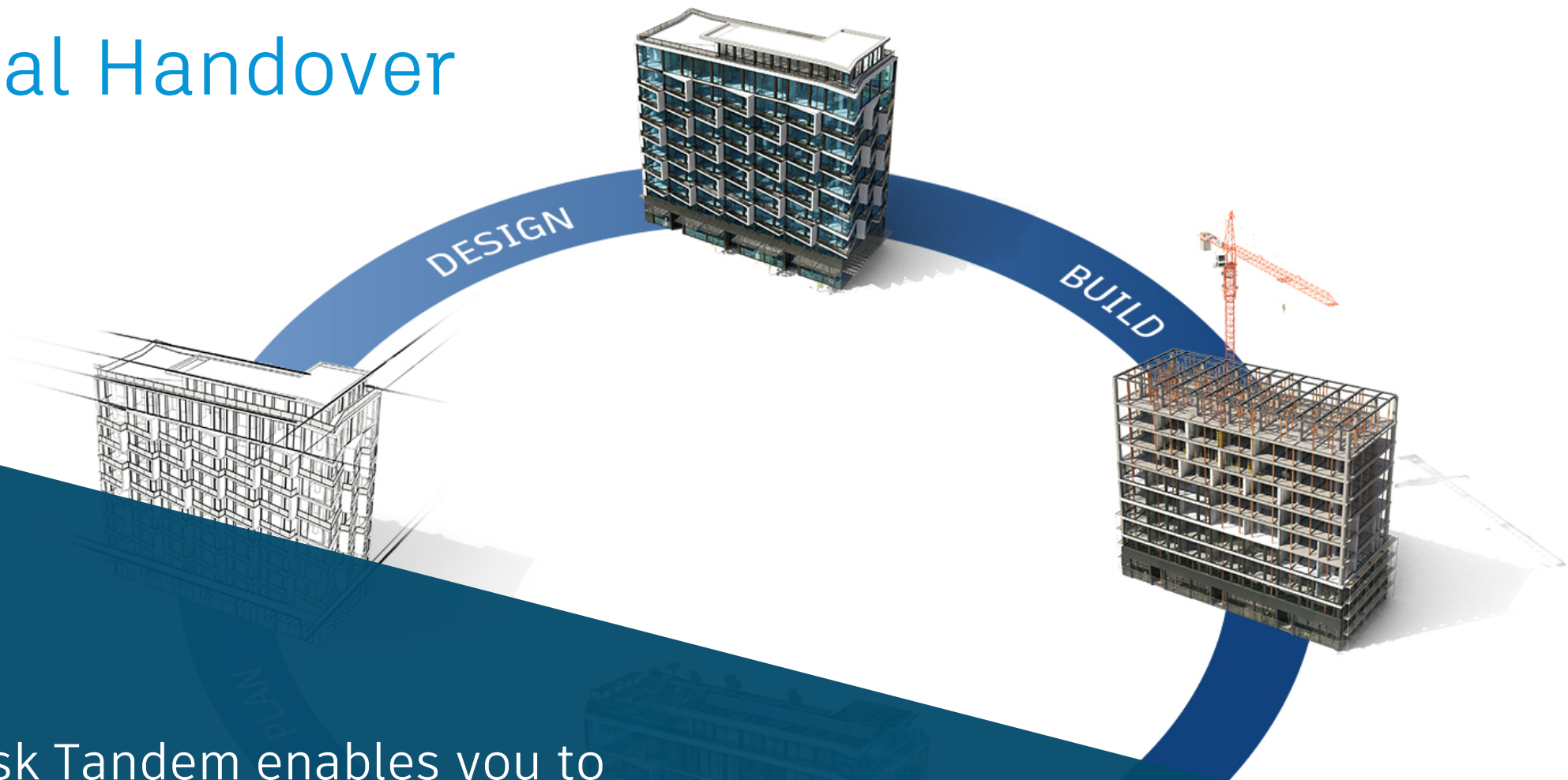
SUMMER SCHOOL

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



Specify

Data Requirements and Operational Outcomes

CLASSIFICATION SYSTEMS

Download

+ Add Classification

Select Classification:

Uniformat

To add a custom classification system

1. Select a classification template and click [Download](#). This exports an editable template of the system.
2. Open the template in Excel or other spreadsheet app as needed.
3. Click [Add Classification](#) to import and save the custom classification to your system.

PARAMETER SETS

Asset Identity Data

Applies To: None

Name (required)	Data type	Me
Manufacturer	Text	-
Model Number	Text	-
Serial Number	Text	-
Installed by	Text	-
Installation date	Timestamp	-
Warranty Expiration	Timestamp	-
Warranty Documents	Link	-
O&M Manual	Link	-
Product Data Sheet	Link	-

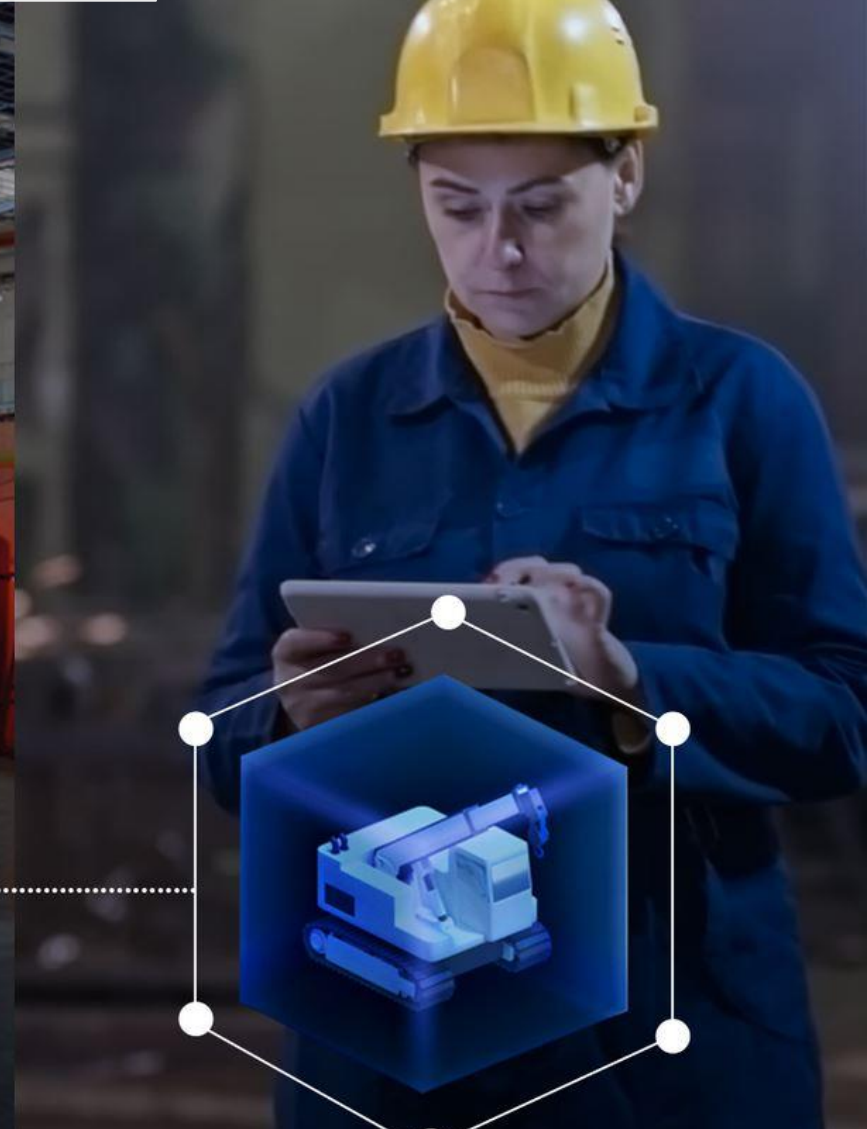
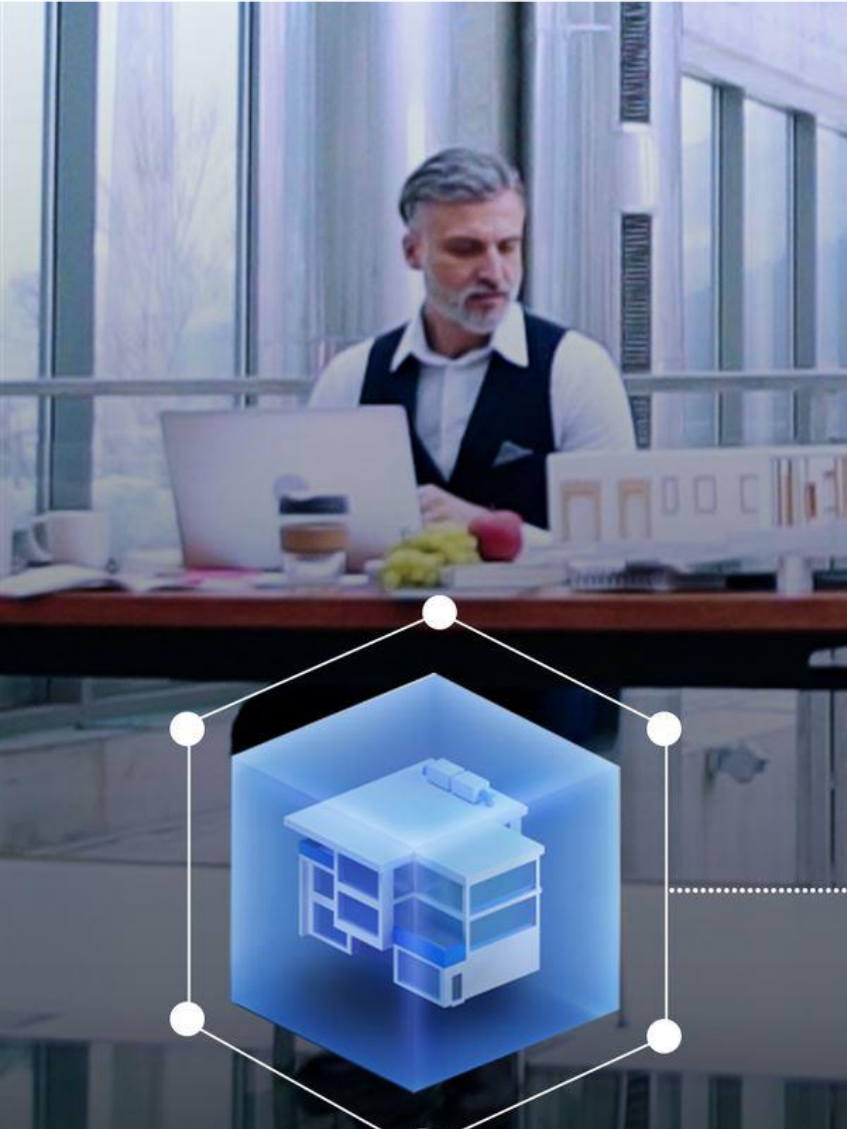
+ Add Parameter

FACILITY TEMPLATES

Name	Description	Classification in use	Parameter sets
Hospital Template		Masterformat	Defined - 17
Data Center		Categories - Short	Defined - 2
Dorm Template		LTU Specs	Defined - 5
Data Center			Defined - 2
Demo Template		Categories - Short	Defined - 3
Demo Set		Simple Group Sample	Defined - 2

Capture

Asset, Space, and System Data During Design and Construction



Capture

Asset, Space, and System Data During Design and Construction

The screenshot displays the Autodesk Tandem interface for a facility named "East Residence Hall". The main view is a 3D model of a mechanical room with a large yellow cylindrical tank and various pipes. A blue semi-transparent callout box highlights the "Asset Type" field in the "ASSET PROPERTIES" section, which is set to "Hydronic Pumps". Another blue semi-transparent callout box highlights the "Asset Identity Data" section, which contains detailed information about the pump's installation and specifications.

Asset Type

Asset Parameters as specified in the Facility Template

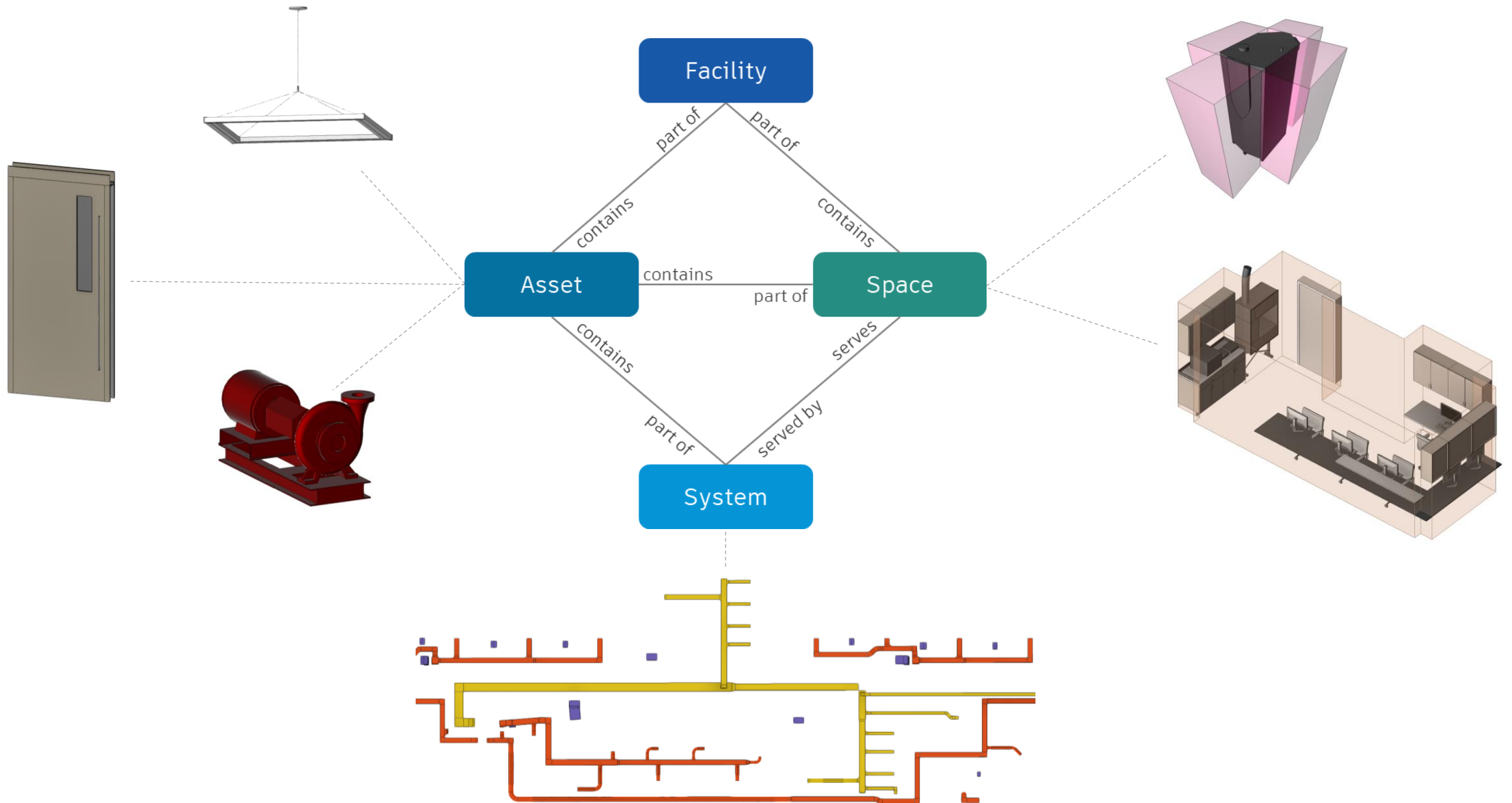
PROPERTIES	
Mechanical Equipment : IFS END SUNCTION PUMP : 3 GB_256T-L Standard	
ELEMENT	TYPE
ASSET PROPERTIES	
Common	
Name	IFS END SUNCTION PUMP
Level	LEVEL 1 - FINISH F...
System	Heating, Ventilatio...
Classification	Hydronic Pumps
Asset Identity Data	
Installation date	2021-03-09T00:00:00.000Z
Installed by	Fisher Mechanical
Manufacturer	Bell & Gosset
Model Number	e-1510
O&M Manual	https://documentlibrary.x...
Product Data Sheet	https://documentlibrary.x...
Serial Number	3GB505123
Warranty Documents	https://documentlibrary.x...
Warranty Expiration	2025-03-25T00:00:00.000Z
Hydronic Pumps	
Controller Type	VFC
Current	15 A
Flow Rate	30 gal/min
Frequency	60 Hz
Volts	230 V

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



DIGITAL
CONSTRUCTION

SUMMER SCHOOL

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

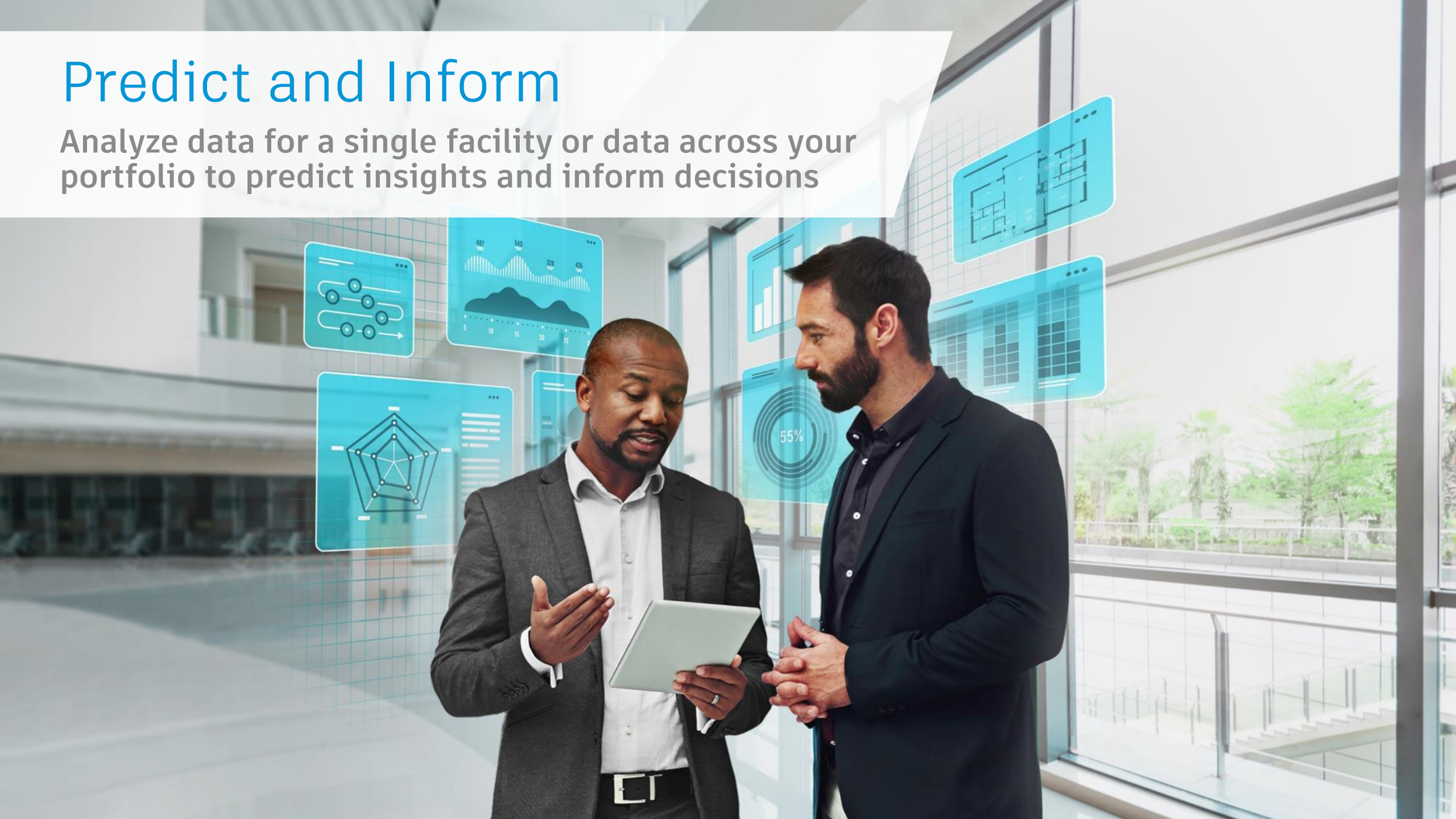


Access

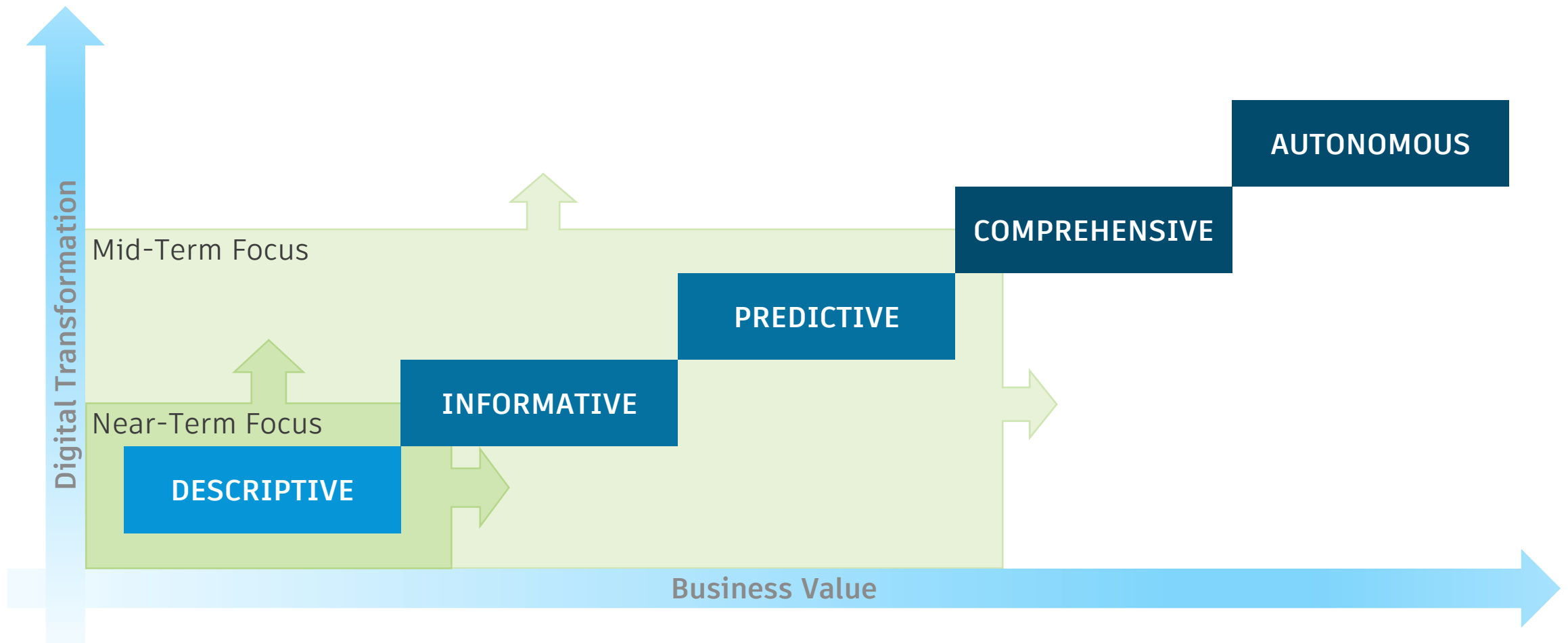
Operational Information through a Single Pane of Glass

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



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	<ul style="list-style-type: none"> Enterprise Developers 3rd Party Developers 	<ul style="list-style-type: none"> BIM Manager Capital Project Manager IT/Data Manager 	<ul style="list-style-type: none"> BIM Manager Architects Engineer/Designer Project Managers Commissioning Agents 	<ul style="list-style-type: none"> BIM Manager Commissioning Agents Capital Project Manager 	<ul style="list-style-type: none"> Facility Manager Operations Manager 	<ul style="list-style-type: none"> Facility Manger Maintenance Technicians Occupant

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



AUTODESK[®]

Make anything[™]