BUILDING INNOVATION
Emerging Technologies Series

Enhancing Sustainability and Energy Conservation Through Digital Twin Technology

Raj Setty, P.E., CxA LEED AP

National Institute of BUILDING SCIENCES™

First Principles of Facility Management

business continuity

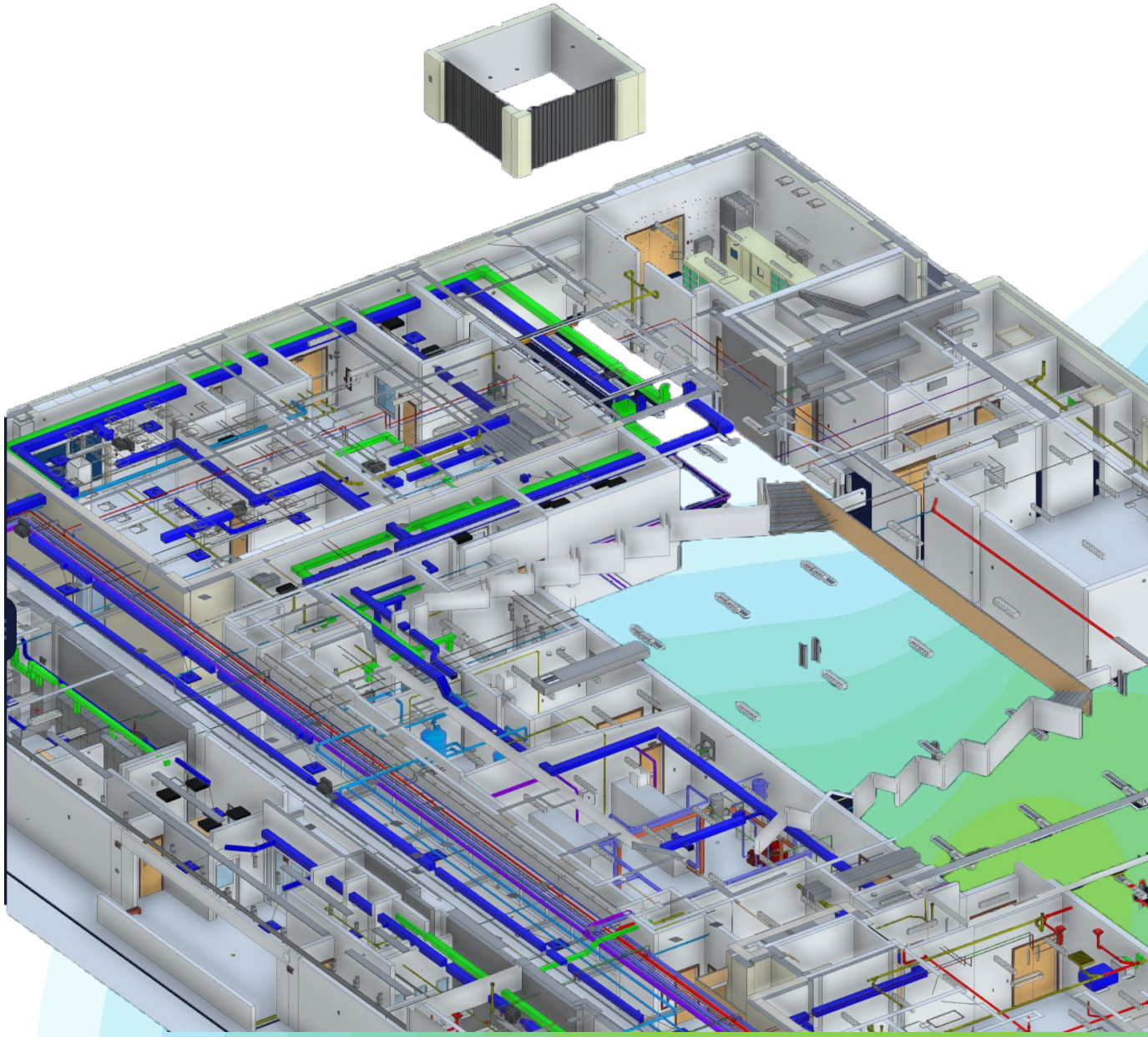
operate with cost and energy efficiency

National Institute of BUILDING SCIENCES™

A digital twin is a virtual representation of a physical object, system, or process.

Here is why that is important

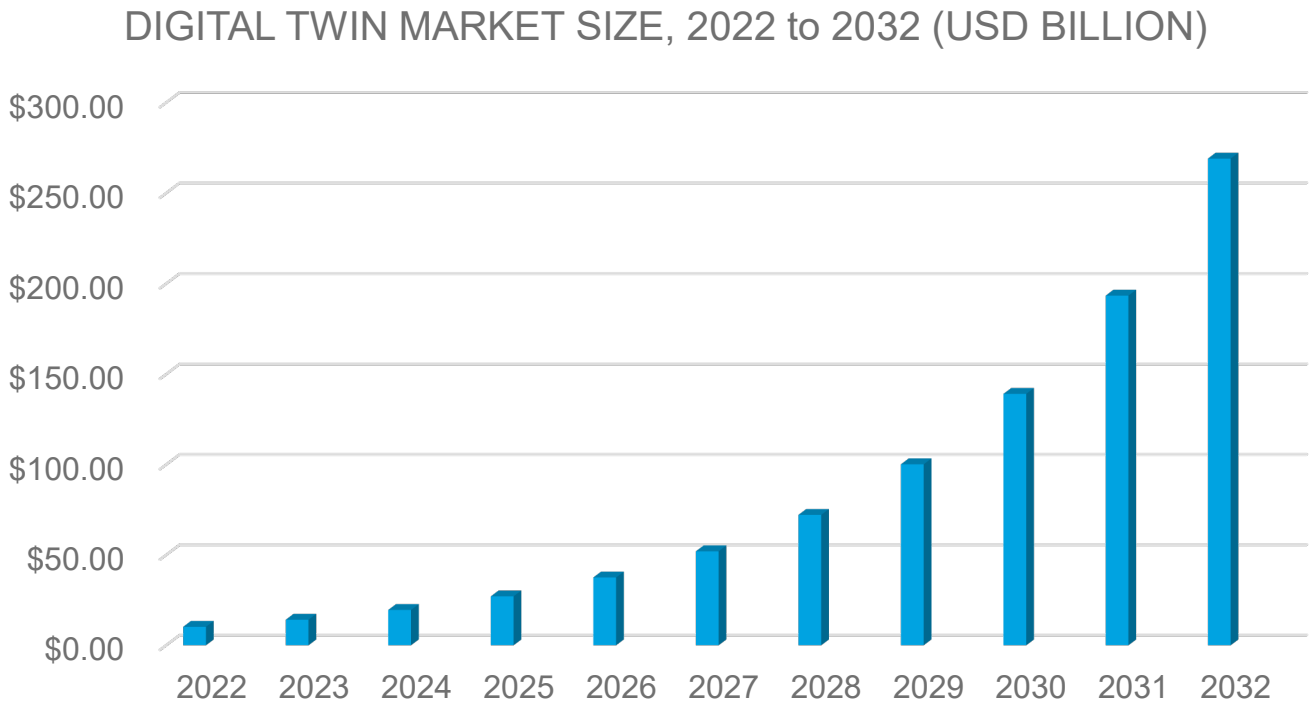
To accomplish your mission, we want to arm you with your own data inside of a digital twin. This will allow you to diagnose the problem and move faster towards the solution



Expected Growth

Why Now?

- Smart Building deployment for efficiency and decarbonization goals
- IOT Sensor Cost
- IOT Sensor Battery life
- Wide spread adoption of BMS
- Revit and BIM advancements
- Low cost data storage
- Interoperability standards in place
- API’s available
- Explosion of competing software



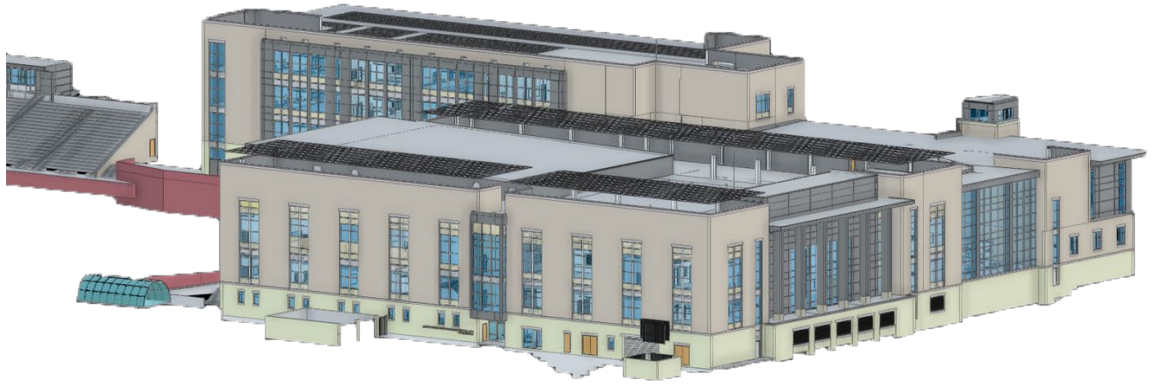
We Need To Get Adopt A New Paradigm In How We Operate Buildings?

I believe that existing buildings are the cornerstone of cutting emissions and decarbonization.

Digital Twins with AI will bring you certainty

Even with all of this Data and Optimization, we are not successful in optimizing buildings – Why?

- Hand over of information
- Energy emission goals and regulations – we fill out paperwork not make impactful engineering decisions.
- Aging workforce
- Disparate Data Silos
- Lack of a common ontology



What is your organization's single source of truth?

VALUE PROPOSITION OF A DIGITAL TWIN with AI

CENTRALIZE YOUR DATA: As new software and equipment are introduced into your ecosystem, your data becomes de-centralized. This leads to complete inefficiency.

EMPOWER STAFF: Co-pilot for your office and field staff. Close generational knowledge gaps.

IMPROVE FORECASTING: Business continuity, Perform capital expenditure planning with greater fidelity, fewer surprises.

REDUCE RISK: Instantly access maintenance disparate data silos. Identify and address faulty system information. Predict repairs proactively. Data fidelity, Insurance policy.

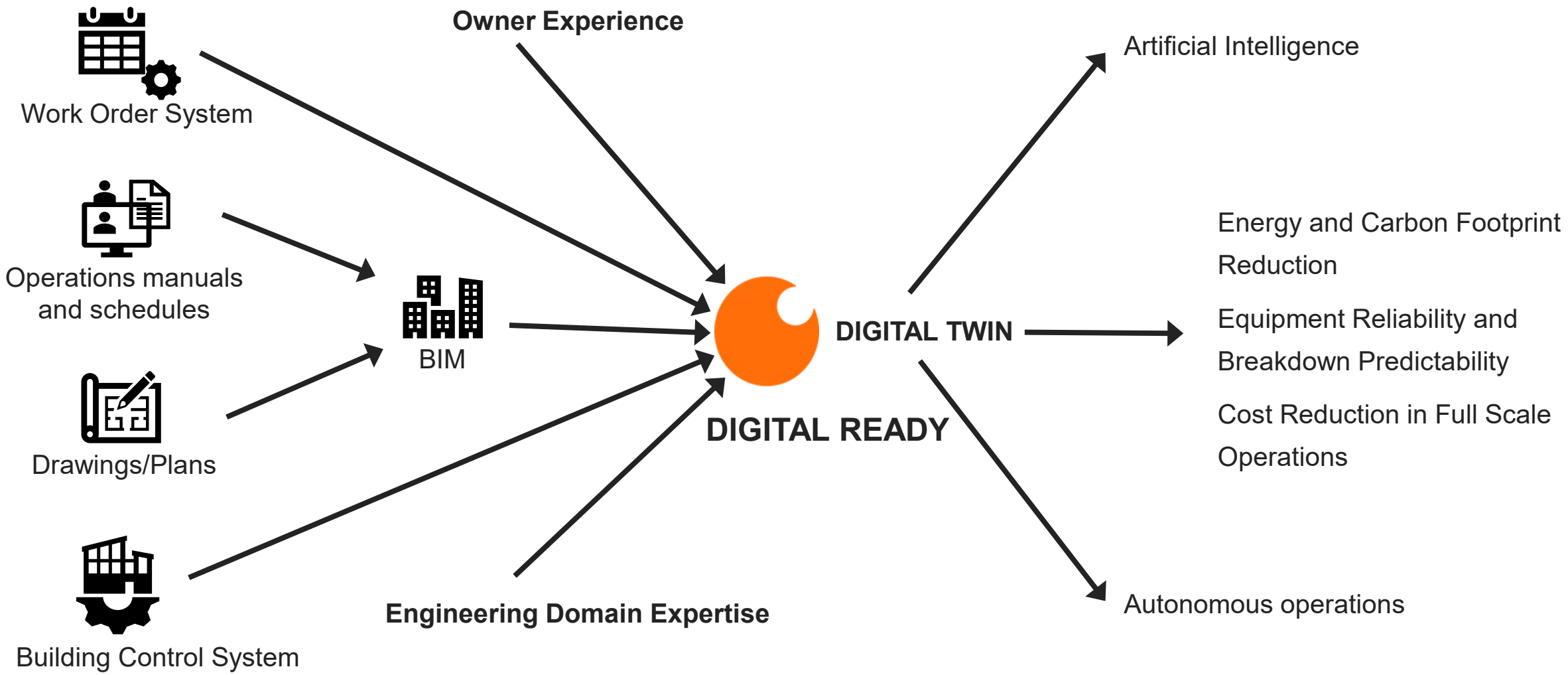
CONTROL COSTS: Reduce the time to find model numbers and operational manuals. The single source of truth. Find efficiencies and prioritize maintenance dollar.

The Solution

Fully Autonomous Building Operations

Gates to become digitally ready

1. All (4) data streams flowing into DT
2. Ontology and knowledge graph
3. Digitize work flows
4. Humans operate and iterate on the DT
5. Deploy additional sensors and control points


Work Order System
Owner Experience
Artificial Intelligence
Operations manuals and schedules
BIM
Energy and Carbon Footprint Reduction
DIGITAL TWIN
Equipment Reliability and Breakdown Predictability
Drawings/Plans
DIGITAL READY
Cost Reduction in Full Scale Operations
Building Control System
Engineering Domain Expertise
Autonomous operations


Dunbar HS
Admin panel
SYYCLOPS
DGS
Home
Rooms
Drawings & Plans
Data Studio
Asset Inventory
Search Inventory...
Filter Category
Architectural
Mechanical
Electrical
Plumbing
Architectural
Beams
Casework
Chairs
Coiling Doors
Columns
Show All (154)
Mechanical
Air Ductwork
Climate Control (HVAC)
Exterior Louvers and Grilles
Power Ventilators
Air Filters
Show All (15)
Electrical
Alternating Current (AC) Motors
Distribution Boards and Control Panels
Engine Generators
Exterior Floodlights
Ground Fault Receptacles
Show All (29)
Indoor Air Quality
5
Spaces
Space Comfort
167
Spaces
Work orders
0
Open
Energy
80.2
EUI Kbtu/ft2
Anomalies
2
This week
Condition Assessment "RUL"
M283 $976.6K
A3.3K $0
P1 $0
P106 $0
A120 $0
M24 $0
E3 $0
E10 $0
2023
2028
2033
2038
Cost estimation on Oct 16, 2023
Select Level
Architectural
Electrical
Mechanical
Plumbing
XRAY
Preventative maintenance 2023 Q4

Thank You

Raj Setty, P.E., CxA LEED AP

Website
https://www.setty.com/ | https://syyclops.com/

Email
rsetty@setty.com

Social
https://www.linkedin.com/in/raj-setty-36a7033/