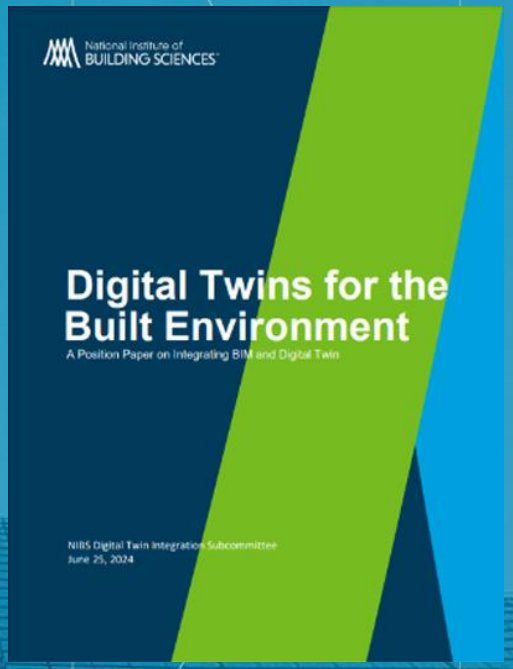
Integrating BIM and Digital Twins

Unveiling a Position Paper for the AECO Industry



https://www.nibs.org/reports/digital-twins-built-environment

The Paper is Here!

https://qrco.de/bfECJL

How the paper works

Executive Summary

Introductions

Definitions

Four work groups

Four paper sub-sections

Calls to Action

More to come

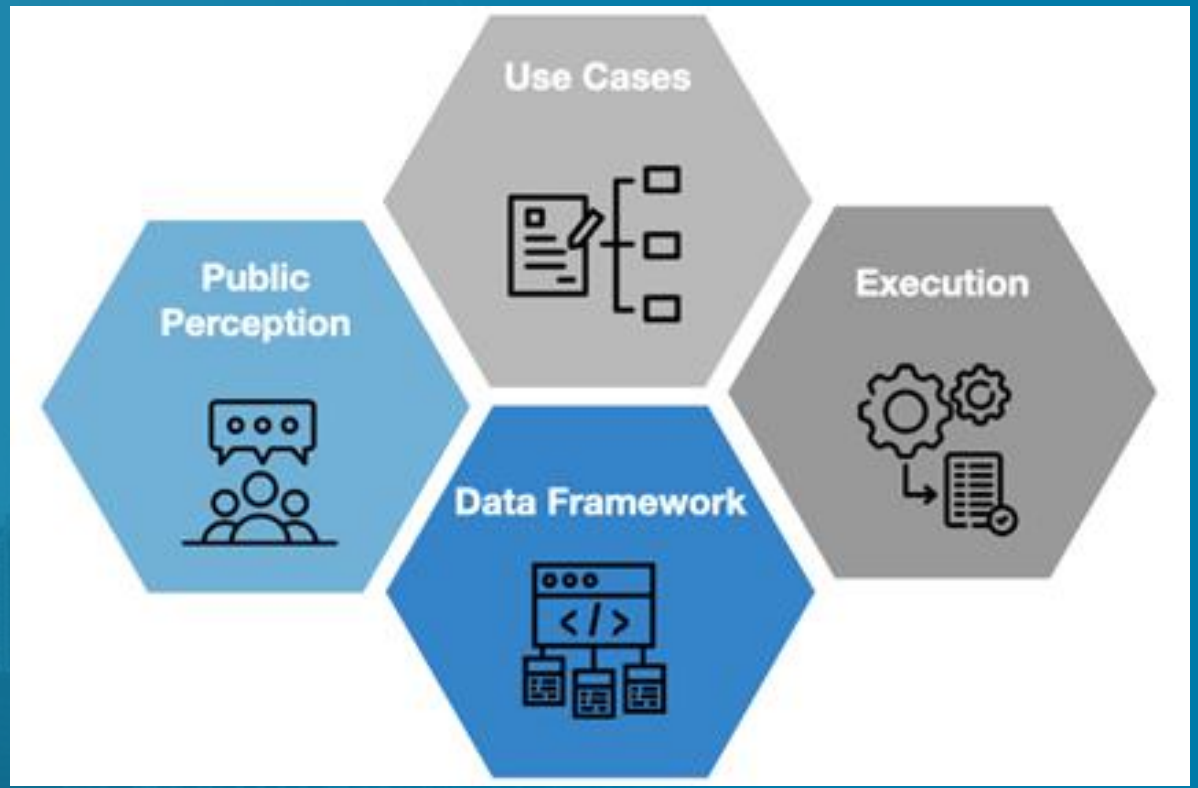
About the position paper

Public Perception

Use Cases

Execution

Data Frameworks



Public Perception

…is undervalued as an essential component integration efforts,

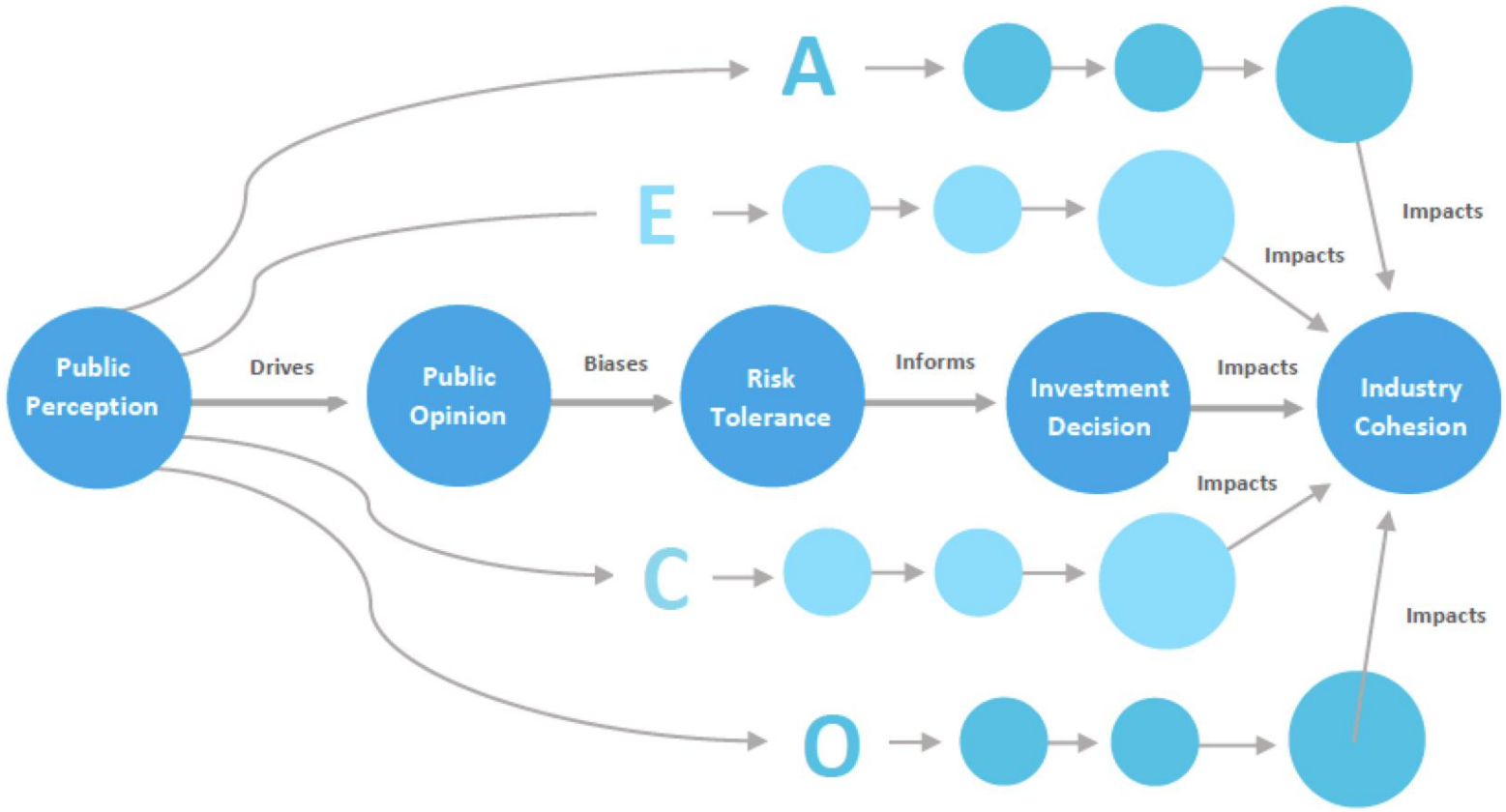
…has not been leveraged to align these two approaches,

…collaboration can be instrumental in efficiently managing disruption.

Public Perception

Figure 3 – The impact of public perception on industry cohesion (through a single organization)

Public Perception



Public Perception

Sub-positions

Groups and Organizations

Current State of Definitions

Influential Forces of Change

Tools and Practices

Building Information Management (BIM)

The acquisition, analysis, retention, retrieval, and distribution of built environment asset information all within an information processing system.

Building Information Model (BIM Model)

Digital representation of physical and functional characteristics of a built environment asset.

Building Information Modeling (BIM Modeling)

Generating and using a shared digital representation of a built asset to facilitate design, construction, and operation processes to form a reliable basis for decisions.

DIGITAL TWIN

A virtual representation of real-world entities and processes, synchronized at a specified frequency and fidelity.

…transform business by accelerating holistic understanding, optimal decision-making, and effective action.

…use real-time and historical data to represent the past and present and simulate predicted futures.

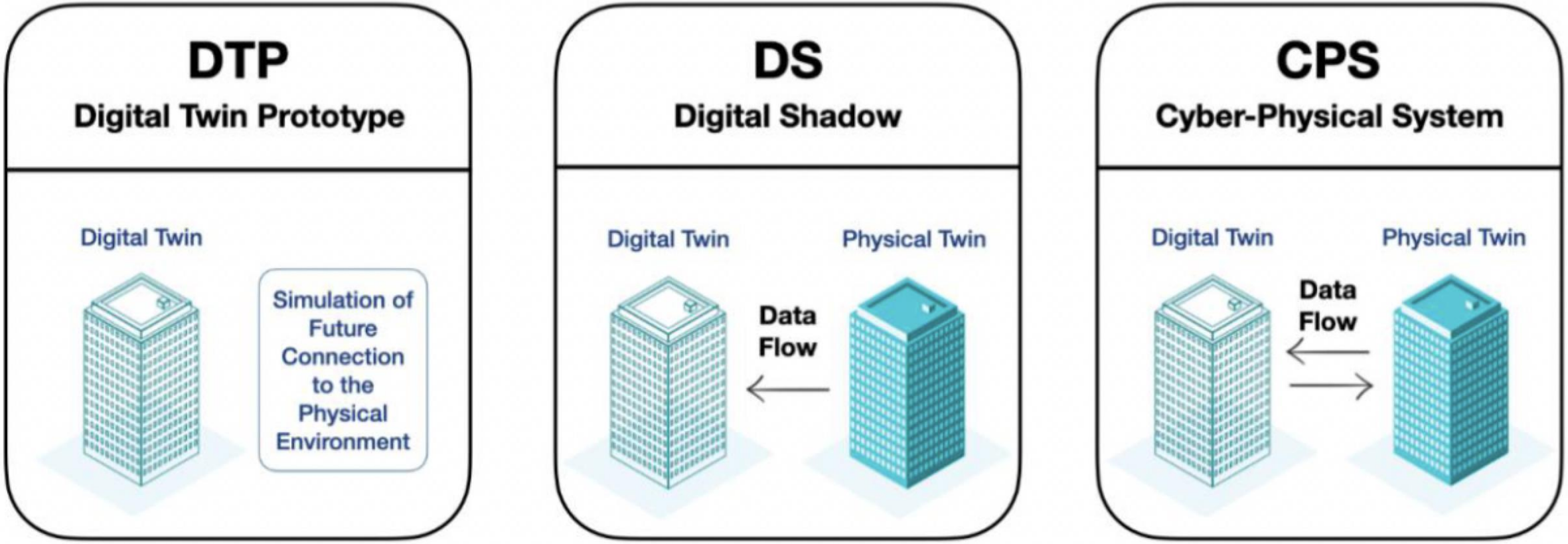
…motivated by outcomes, tailored to use cases, powered by integration, built on data, guided by domain knowledge, and implemented in IT/OT systems.

Use Cases

Use cases are the cornerstone of BIM and Digital Twin

Clear and well-defined use cases is significant as the foundation for integration.

Digital Twin Categories



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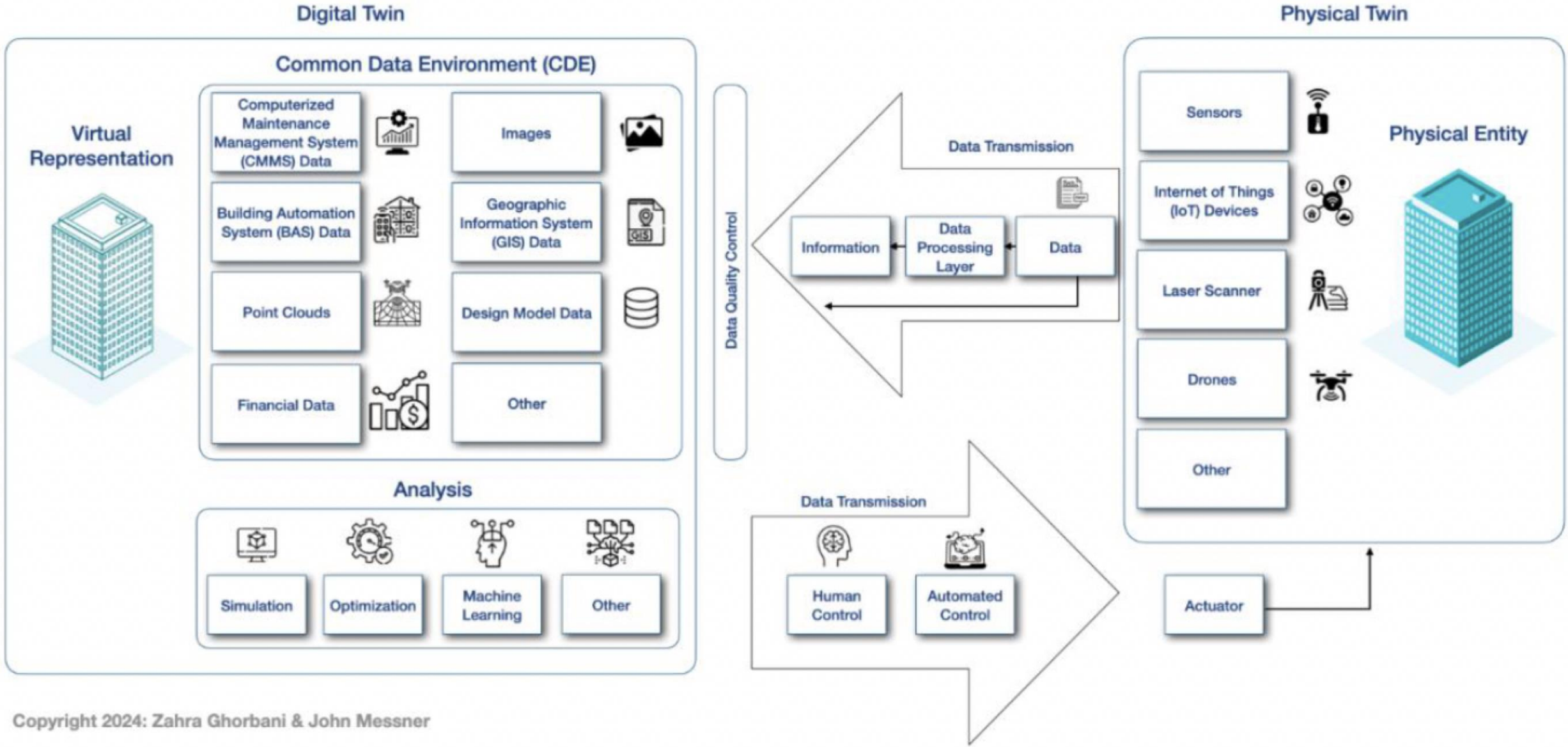
Cyber-Physical System (CPS)



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Use Cases

Sub-positions

Use-Case Applicability

State of Standards

Physical-Digital Relationships

Execution

BIM and Digital Twin can be executed by harnessing the differences between both

BIM <u>can</u> serve as a basis for delivering digital twins by streamlining execution.

Execution

Sub-Positions

Agility and Simplicity

Minimum Viable Products (MVP)

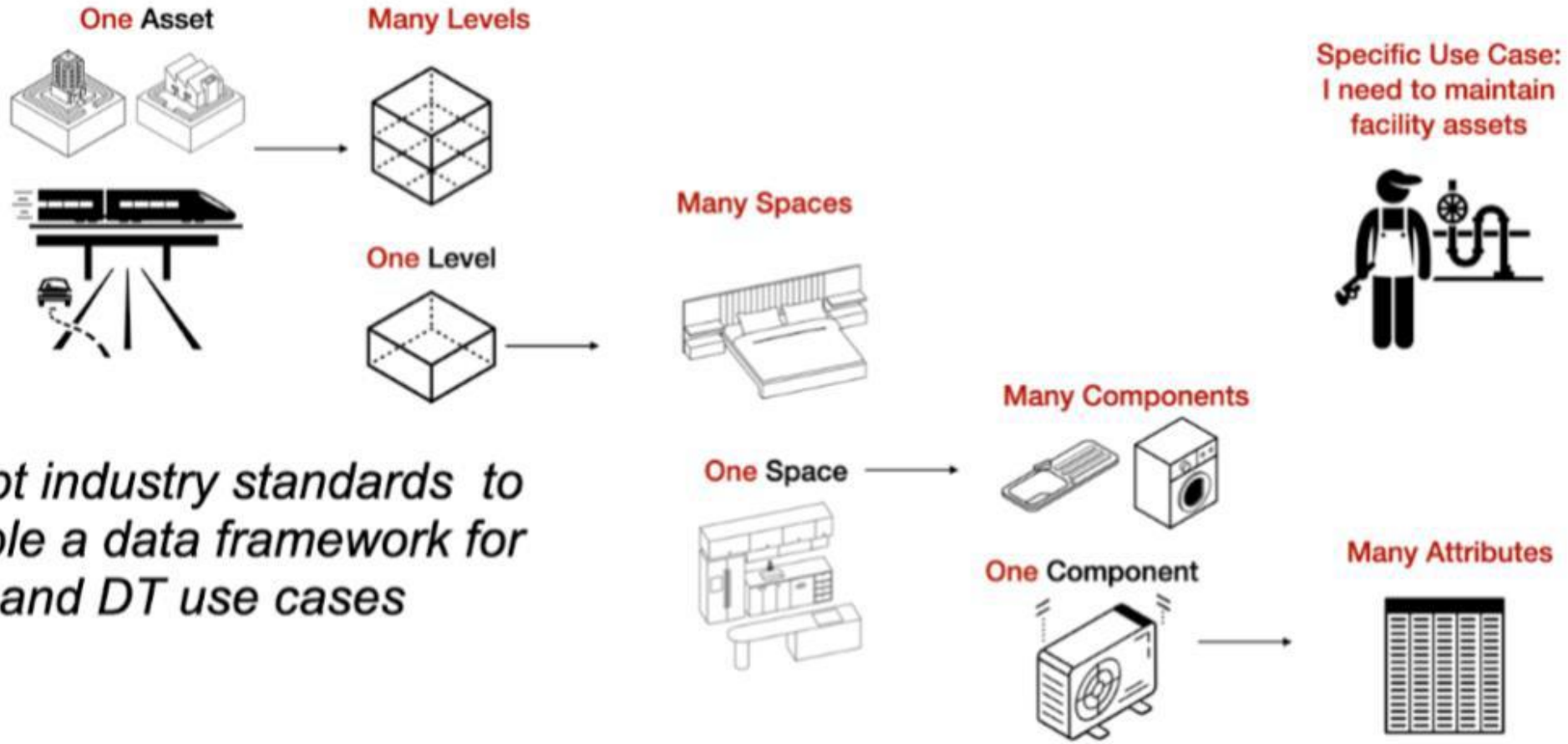
Asset Lifecycle Management

Scalability

The Creation of BIM and Digital Twin

Expanding the Horizon

To generate value and benefit from the differences between BIM and DT



Adopt industry standards to enable a data framework for BIM and DT use cases

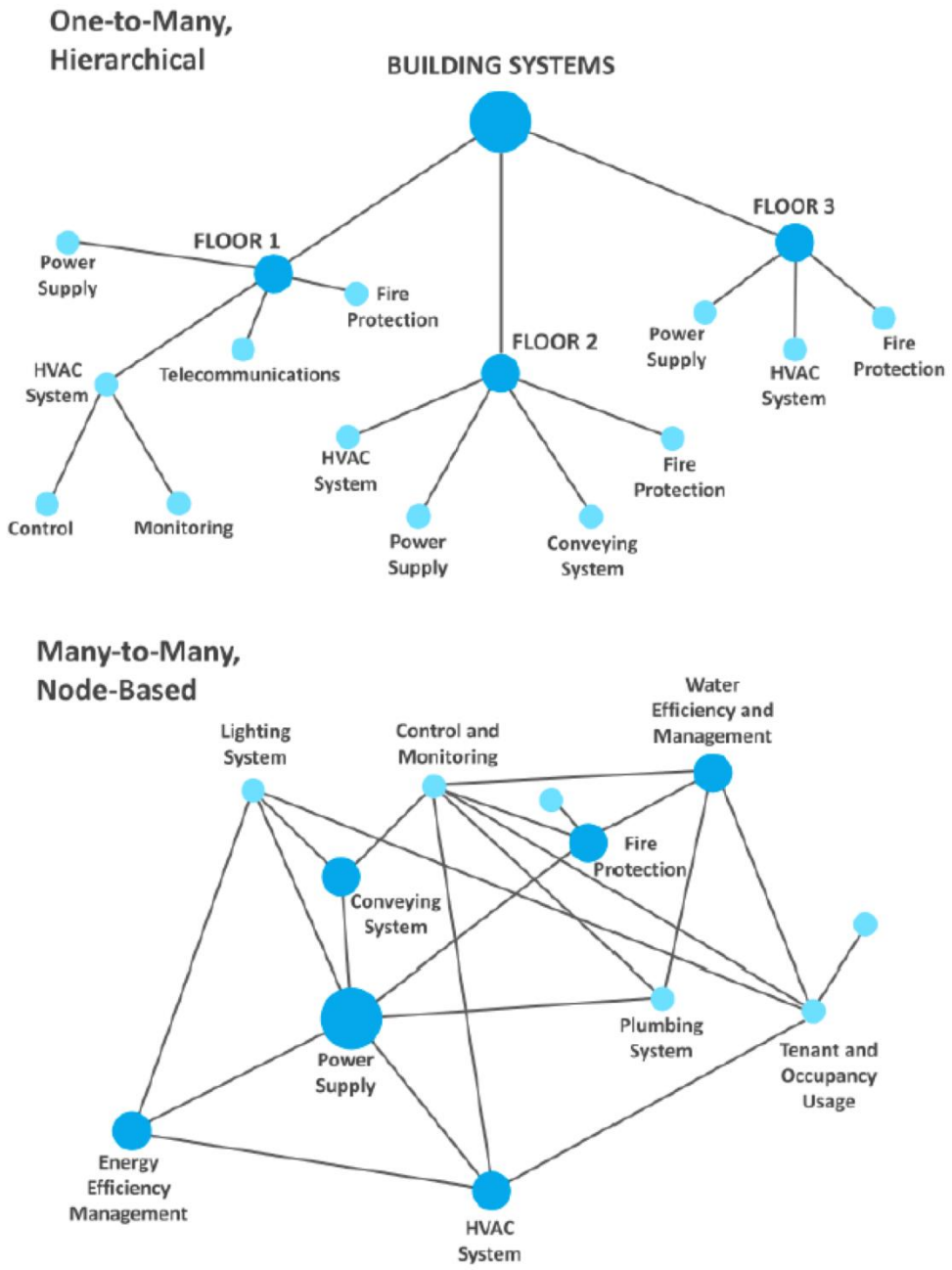


Figure 9 – Comparison between BIM (Above) and Digital Twin (Below) Native Data Structures

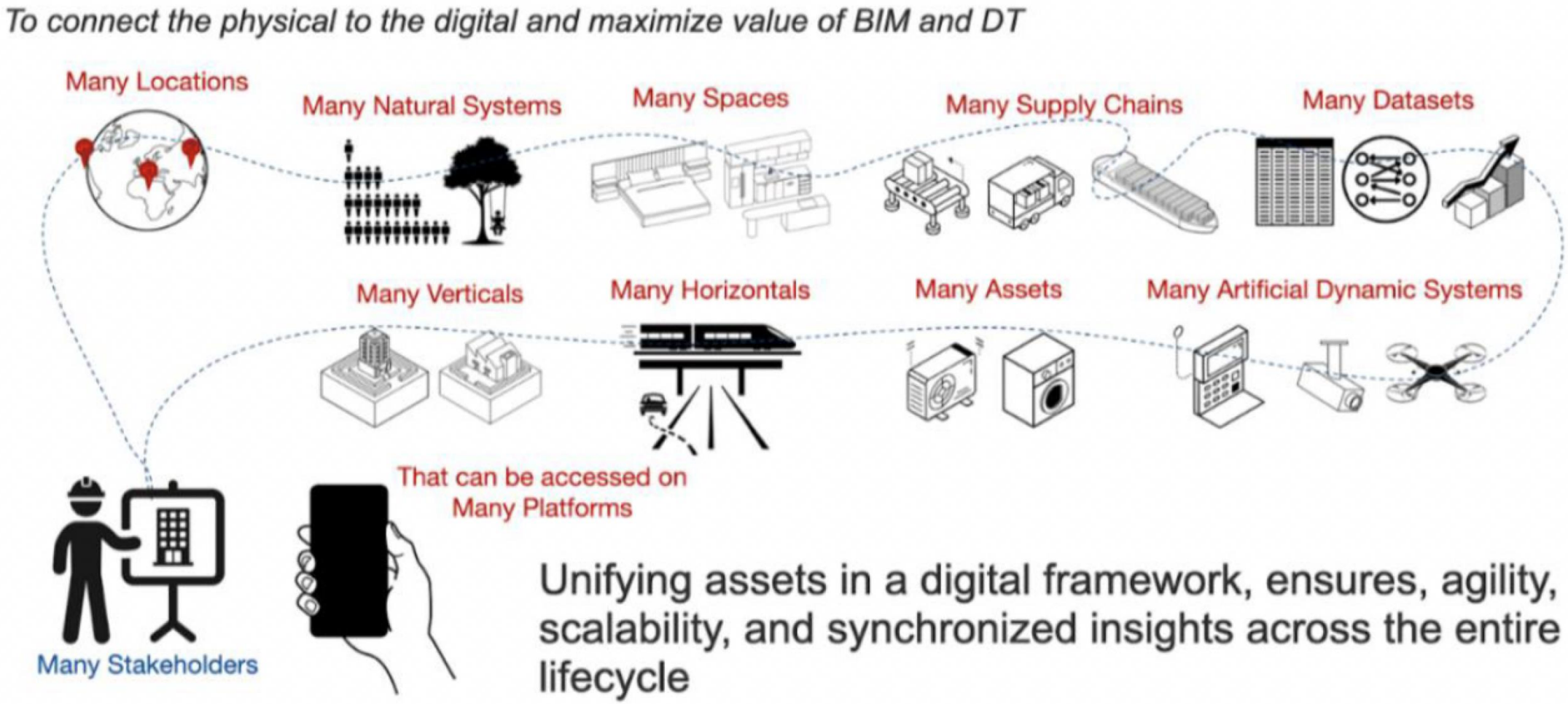


Figure 8 – Expand the horizon from single assets to lifecycle of assets and linked systems. ©ONUMA, Inc. 2024

Data Frameworks

(1) There are synergies between the BIM and Digital Twin data frameworks

(2) Combining BIM and Digital Twin synthesizes a value greater than the sum of its parts.

Data Frameworks

Sub-positions

Data Requirements

Data Structure

Decoupled Data

Exchanging Information

Use Case Layer

Monitor MEP Asset
Manage Portfolio
Track Site Productivity
Optimize Energy Use
Coordinate Design
etc.

Application Layer

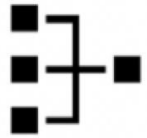
BMS/BAS	EDMS	AI/ML
FDD	EMS	AMS
CMMS	IWMS	etc.

Data Layer

Asset Information
Project Information
Organizational Information

Information and Communication Technology (ICT) Layer

IT Infrastructure
IoT Infrastructure
Communication Network



Calls to Action

Engage the NIBS Digital Twin Integration Subcommittee

Address Public Perception of BIM and Digital Twin

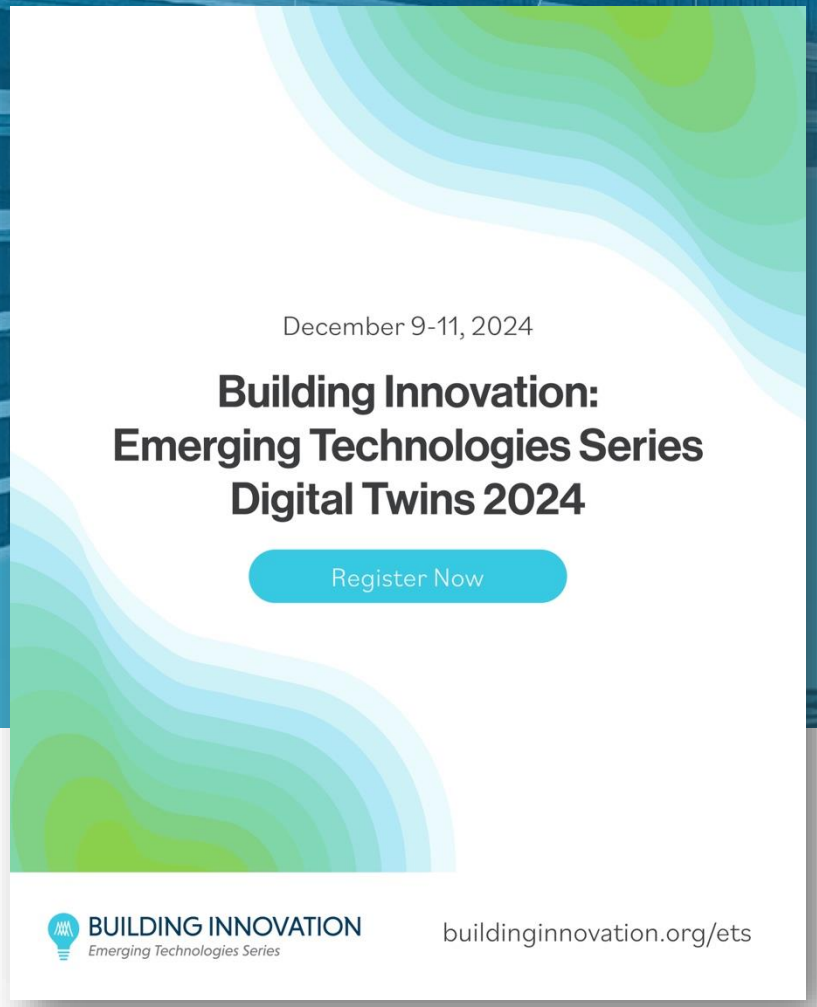
Implement and Standardize BIM and Digital Twin

Optimize Data Management for BIM and Digital Twin

Refine BIM and Digital Twin Use Cases

Advance Development and Scaling of BIM and Digital Twin

Thank You



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