Transformative Partnership: Pioneering the Construction Industry through Blockchain, Digital Twins, & Metaverse JV Synergy

Based on the MIT Program:
Data Monetization Strategy: Creating Value Through Data

Abdelrahman Abouhadid
Digital Transformation Manager
Mace Group
Digital Twin in Construction
What is digital twin?

A virtual replica of a physical asset, process or system
What is digital twin in construction? A virtual replica of a physical asset, process or system in construction.
What is digital twin in construction? A virtual replica of a physical asset, process or system in construction.
What is digital twin in construction? A virtual replica of a physical asset, process or system in construction

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3D Coordination

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<tr>
<th>Site Utilization Planning</th>
<th>Construction System Design</th>
<th>Digital Fabrication</th>
<th>3D Control and Planning</th>
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Record Model

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<th>Maintenance Scheduling</th>
<th>Building System Analysis</th>
<th>Asset Management</th>
<th>Space Mgmt/Tracking</th>
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Primary BIM Uses

Secondary BIM Uses

![BIM diagram](image)
What is digital twin in construction? A virtual replica of a physical asset, process or system in construction.
Blockchain-Powered Digital Twin
Blockchain-Powered Digital Twin

Blockchain is a secure, decentralized digital ledger of transactions.
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Digital Twin Key Components
Digital Twin Key Components

- Data Assets
- Data Management
- Stakeholder Engagement
- Visualization
- Data Science
Digital Twin Key Components

★ Data Collection

★★ BIM & GIS

★★★ IoT

Data Assets

Data Management

Visualization

Data Science

Stakeholder Engagement

Excel

SharePoint Lists

Forms

Sheets
Digital Twin Key Components

Data Management

Data Science

Stakeholder Engagement

Visualization

Data Assets

Data Collection

★ Data Collection

BIM

GIS

IoT

BIM & GIS

IoT

IoT

IoT

IoT

IoT

IoT

IoT

IoT

IoT

IoT
Digital Twin Key Components

- Data Collection
- ★★ BIM & GIS
- ★★★ IoT

Data Assets

- Environmental sensors
- Structural sensors
- Equipment sensors
- Safety sensors
- Asset tracking sensors
- Energy management sensors
- Location-based sensors
- Lighting sensors
- Acoustic sensors
Digital Twin Key Components

- **Integration**
- **Customization**
- **Blockchain**

- Data Assets
- Visualization

---

Data Management

- ACC/BIM 360
  - Ineight
  - Procure
  - Trimble Connect
  - Project Wise

- Aconex

- SharePoint

- Data Science

- Stakeholder Engagement
Digital Twin Key Components

- Integration ★
- Customization ★ ★
- Blockchain ★ ★ ★

Data Assets | Visualization
Data Management
Data Science | Stakeholder Engagement

Bentley
 iTwin Platform
Open Platform For Infrastructure Digital Twins
Take A Tour
Digital Twin Key Components

- **BIM & GIS**
- **AR/VR**
- **Metaverse**

Visualization

Data Assets

Data Management

Data Science

Stakeholder Engagement
Digital Twin Key Components

Visualization

★ BIM & GIS
★ ★ AR/VR
★★★ Metaverse

AR
VR

Data Assets
Data Management
Data Science
Stakeholder Engagement
Digital Twin Key Components

- ★ BIM & GIS
- ★ ★ AR/VR
- ★★★ Metaverse

Visualization

Data Assets

Data Management

Data Science

Stakeholder Engagement

Metaverse
Digital Twin Key Components

- Data Assets
- Data Management
- Visualization
- Stakeholder Engagement

Data Science

Get inspired by: novypro.com
Digital Twin Key Components

- Data Assets
- Data Management
- Visualization
- Stakeholder Engagement

★ BI Reporting

★ ★ Analytics

★ ★ ★ ML/AI

Tools:
- Python – Pandas
- R

Data Science
Digital Twin Key Components

- Data Assets
- Data Management
- Visualization
- Stakeholder Engagement

★ BI Reporting

★ ★ Analytics

★ ★ ★ ML/AI

Energy Consumption Prediction

Issues Identification

Site Safety
Digital Twin Key Components

- **Data Assets**
- **Data Management**
- **Stakeholder Engagement**
- **Visualization**
- **Data Science**

**Stakeholder Journey Mapping**

- **Gains**
- **Pains**

**Key Components**

- ★★ ★ Understand
- ★★★ Co-creation
- ★★★★ Experimentation
Digital Twin Key Components

- **Data Assets**
- **Data Management**
- **Stakeholder Engagement**
- **Visualization**
- **Data Science**

Understand ★ ★ ★ Co-creation ★ ★ ★ Experimentation

Co-creation & Engagement
Digital Twin Key Components

- Data Assets
- Data Management
- Stakeholder Engagement
- Visualization
- Data Science

- ★ Understand
- ★ ★ Co-creation
- ★★★ Experimentation

- MVP
- A/B Testing
Digital Twin Key Components

- Data Assets
- Data Management
- Visualization
- Data Science
- Stakeholder Engagement

- ★ Data Collection
- ☆☆ BIM & GIS
- ★☆☆ IoT
- ★ Integration
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- ★☆☆ Co-creation
- ★☆☆☆ Experimentation
- ★☆☆☆ Understand
How to create Financial Value?  [I-W-S Approaches]

**Improve**
(Indirect)
by improving operational processes, making them better, faster, and cheaper, and improving decision-making quality

**Wrap**
(Indirect)
by enhancing the customer value proposition of existing products through data analytics features

**Sell**
(Direct)
by delivering new information offerings such as raw data, packaged insights, and information services
# How to create Financial Value? [I-W-S Approaches]

<table>
<thead>
<tr>
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<td>Change the economics of work</td>
<td>Change the economics of product</td>
<td>Deliver new information offerings</td>
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<tr>
<td><strong>Common Outcomes</strong></td>
<td>Better, faster, cheaper production</td>
<td>Increased customer willingness to pay</td>
<td>New revenue streams</td>
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<tr>
<td><strong>People accountable</strong></td>
<td>Process owner</td>
<td>Product owner</td>
<td>Profit and loss (P&amp;L) owner</td>
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Identifying Your Place in the Digital Landscape

Consultant

Contractor

PMO/PMC

Software Provider

Client

Improve

Improve

Improve

Sell

Sell

Wrap

Wrap

Sell

Sell
Align with your Business Goals & Objectives
## Current Situation Assessment

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### Business Testing

**Create a Business Model**

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<th>Key Partnerships</th>
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<th>Value Propositions</th>
<th>Customer Relationship</th>
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<th>Revenue Streams</th>
<th>Cost Structure</th>
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Business Testing

Create a lot of quick business models

Key Partnerships  Key Activities  Value Propositions  Customer Relationship  Customer Segments

Key Resources  Channels

Cost Structure  Revenue Streams
Business Testing

Quick Wins

Impact-Effort Matrix

- Idea 1
- Idea 2
- Idea 3
- Idea 7
- Idea 8
High Uncertainty

High Certainty

Business Testing

Quick Wins

Spending

High Uncertainty

High Certainty

search

execution

high risk

medium risk

low risk

Business Testing
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Abdelrahman AbouHadid
BIM Manager at Mace | Digital Transformation | AI/ML

THANK YOU

GWF 2023
Geospatial World Forum
2-5 May 2023, Rotterdam, The Netherlands