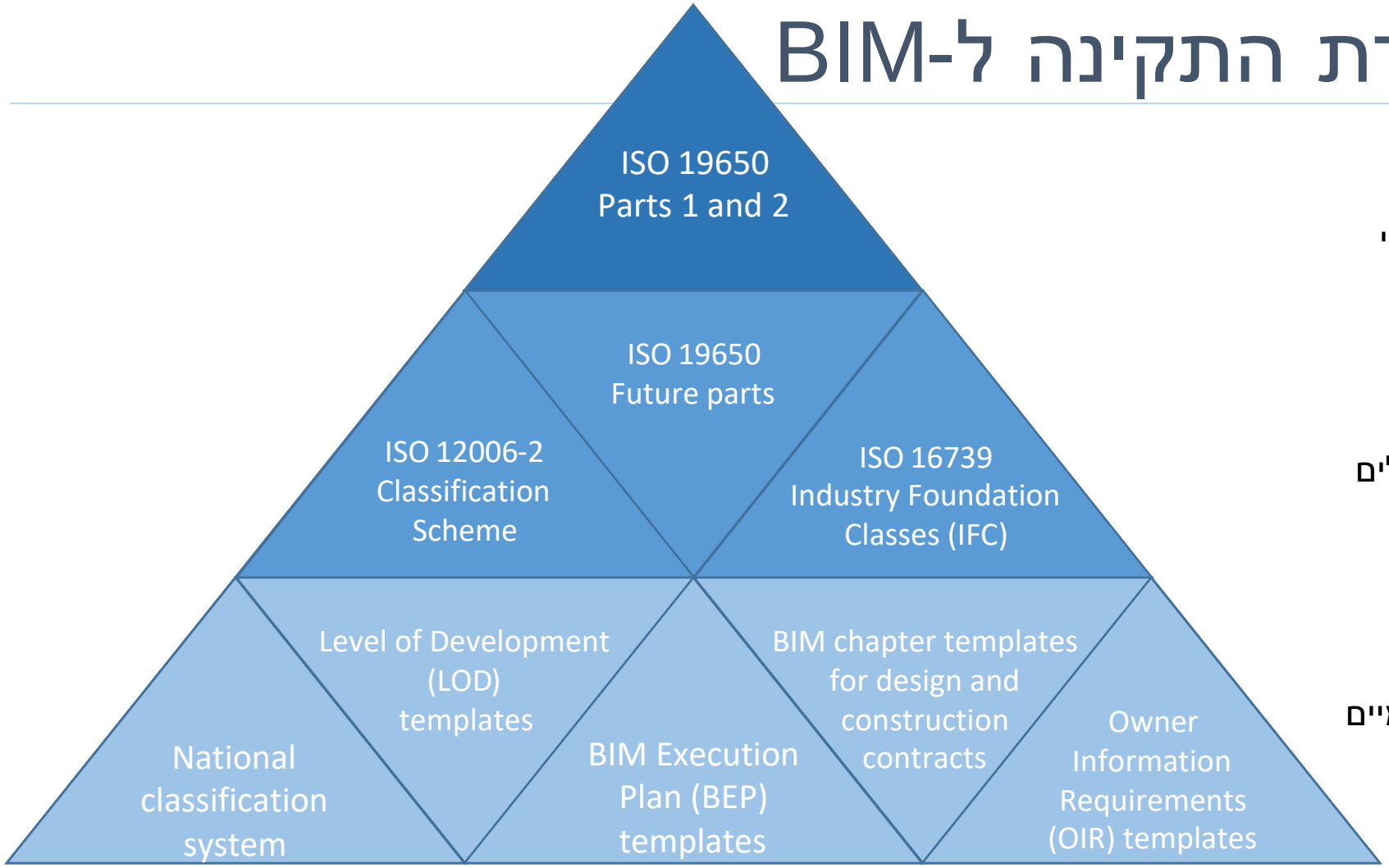
2020

202

פירמידת התקינה ל-BIM



תקן ראשי

תקנים מוכלים

נספחים מקומיים
מדריכים

Additional appendices:

SeskinVirtual Construction Laboratory
VClab
The Faculty of Civil and Environmental Engineering
TECHNION Israel Institute of Technology

- Project information requirements (PIR) for permitting applications
- Asset information requirements (AIR) for operations and maintenance (e.g. COBie)
- Prequalification templates for organisations and for individuals

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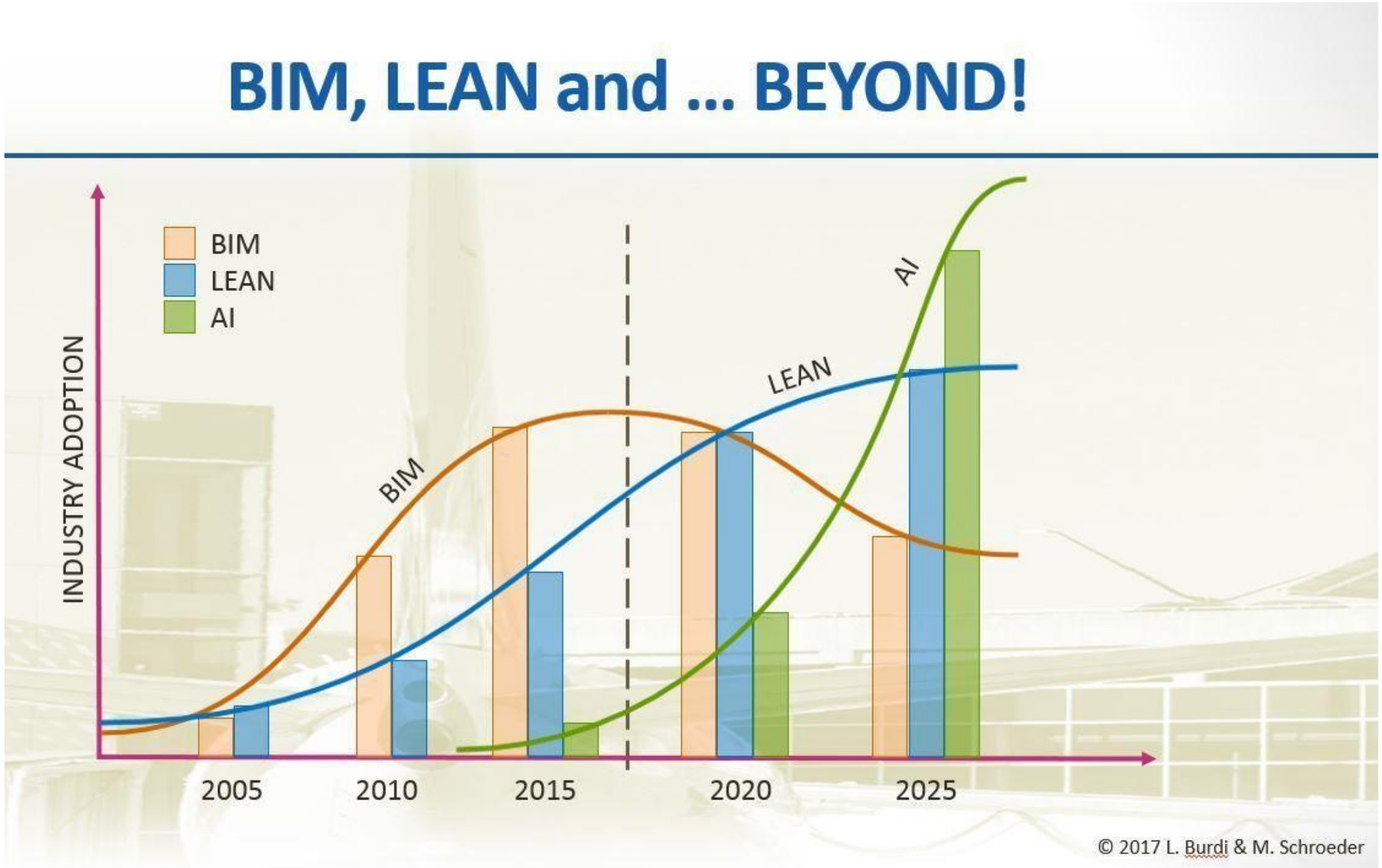
פני העתיד בעולם

BIM, LEAN and … BEYOND!



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SeskinVirtual Construction Laboratory
VClab
The Faculty of Civil and Environmental Engineering
TECHNION Israel Institute of Technology

House of Construction Tech

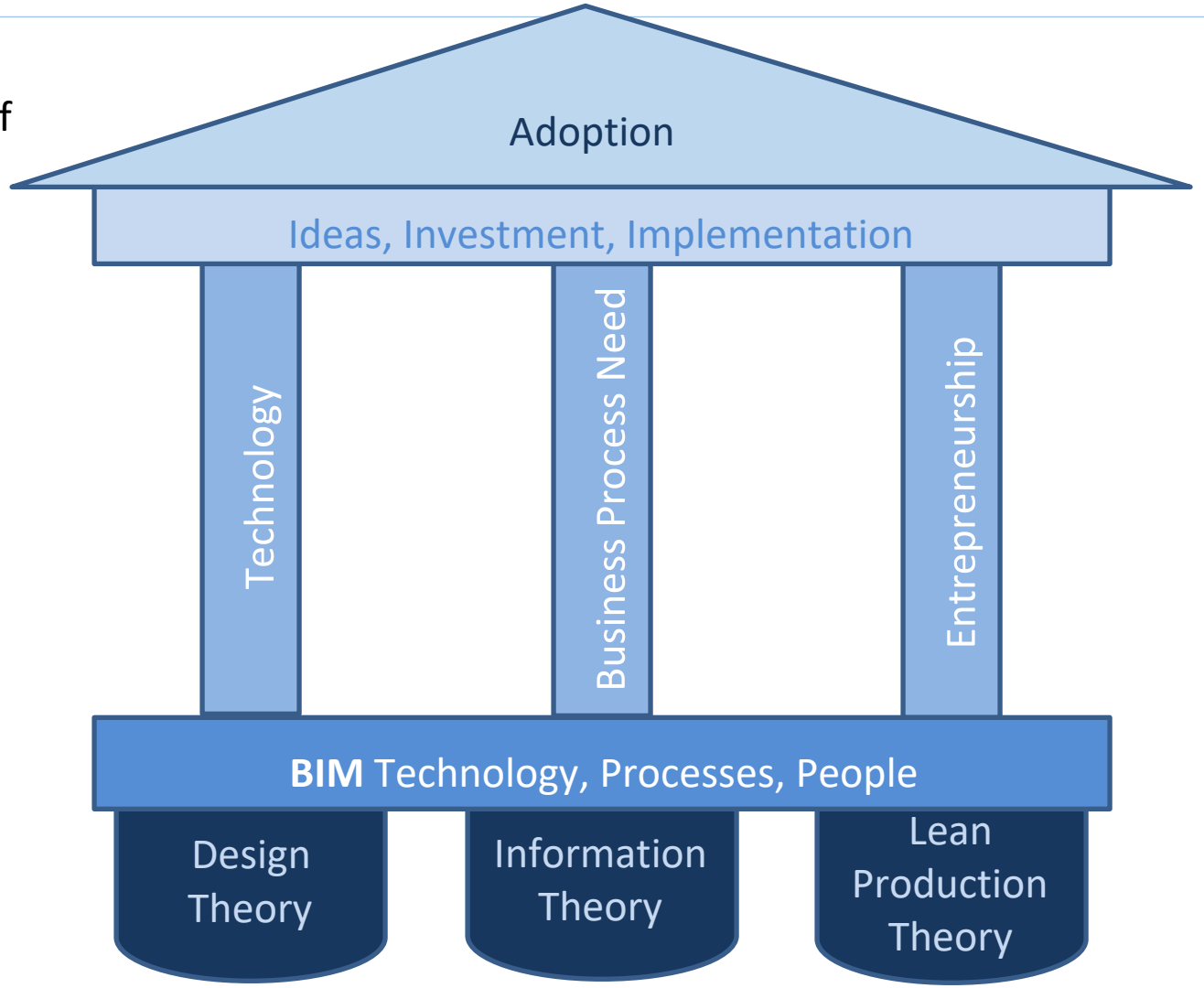
Adoption roof

Innovation beams

Construction Tech columns

BIM foundation

Theory piles

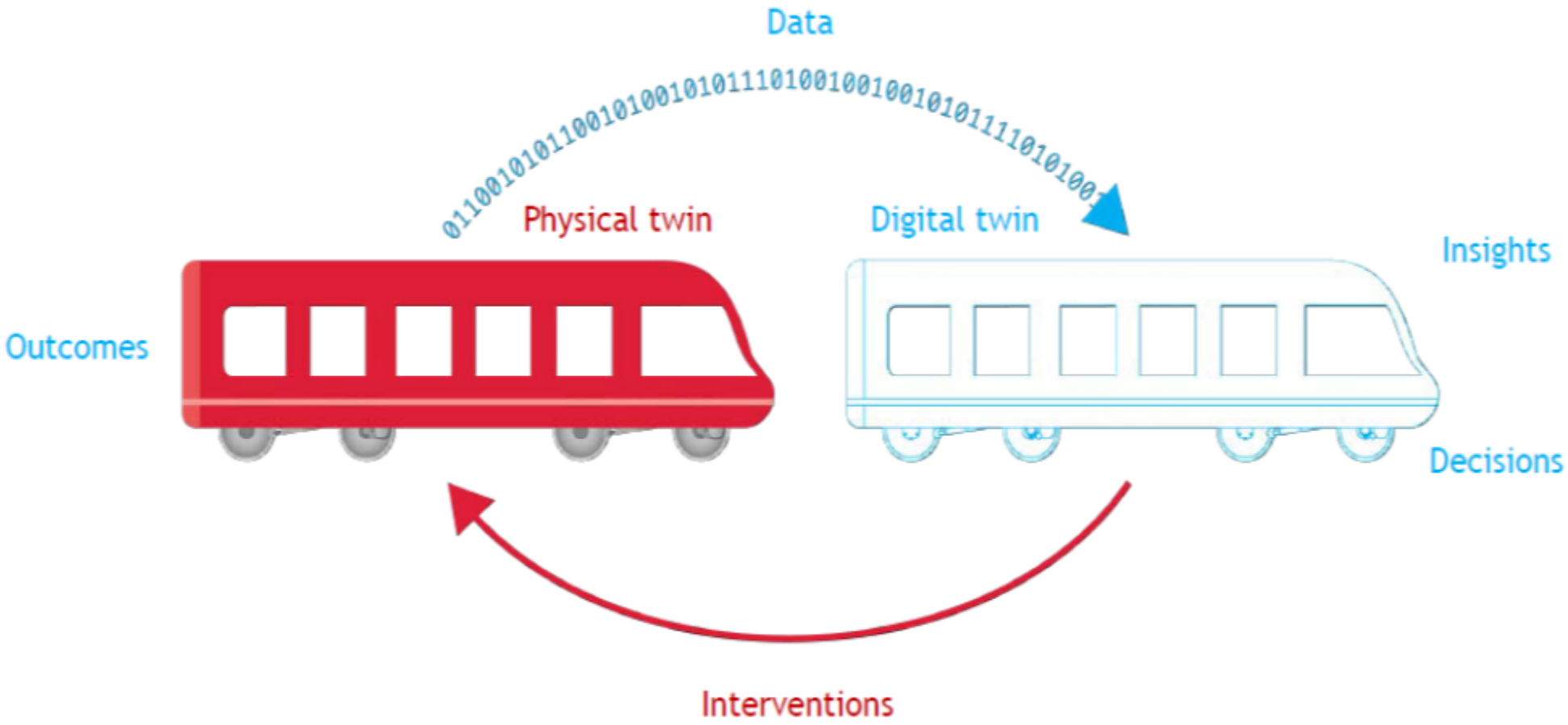


Sacks, R., Girolami, M., and Brilakis, I. (2020). 'Building Information Modelling, Artificial Intelligence and Construction Tech', Developments in the Built Environment.

ישראל איננה נפרדת מהעולם....

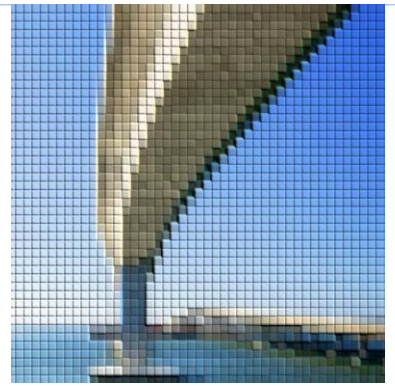
...גם ב-BIM, היא חלק מהעולם

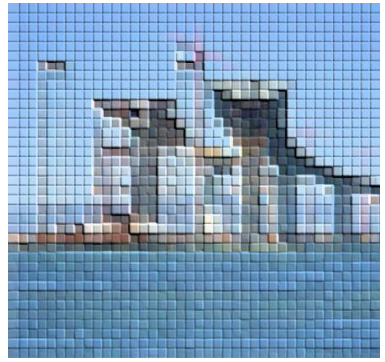
What is a Digital Twin?

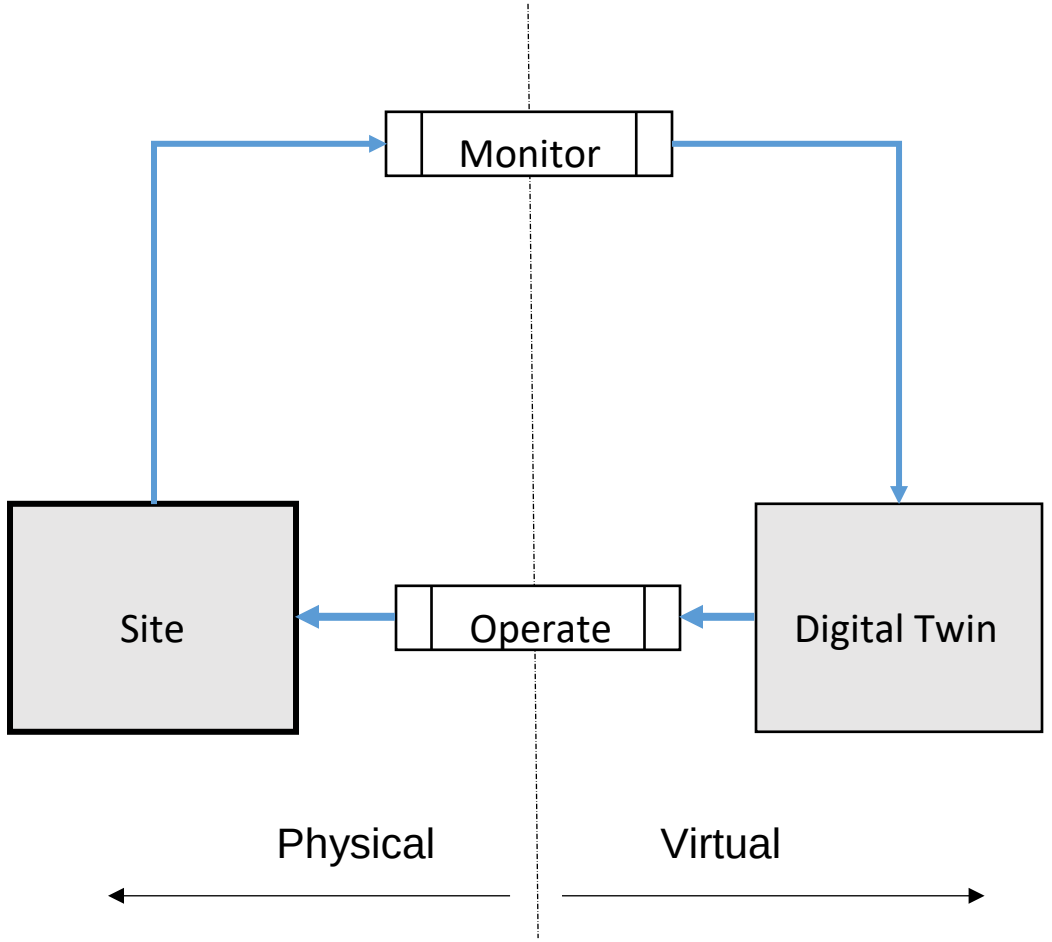


Physical vs. Virtual

Physical vs. Virtual







Physical vs. Virtual

Physical vs. Virtual

Sensors (temp, humidity)
Laser scanning
Photogrammetry
360 and other images
Barcodes
RFID or BLE tags
Equipment 'black box'
Digital reports by users
ERP transaction records
Audio recordings

Acquired monitoring data

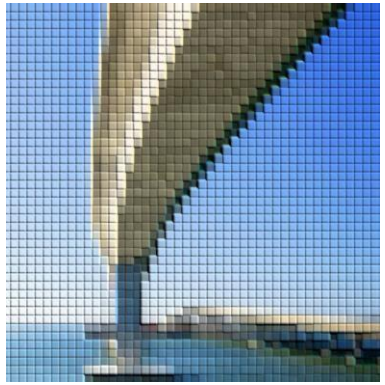
Site

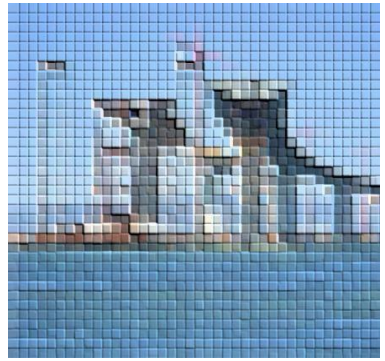
Operate

Digital Twin

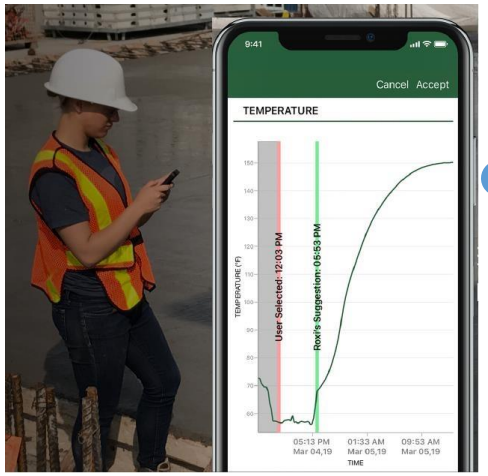
Physical

Virtual





Physical vs. Virtual



- Sensors (temp, humidity)
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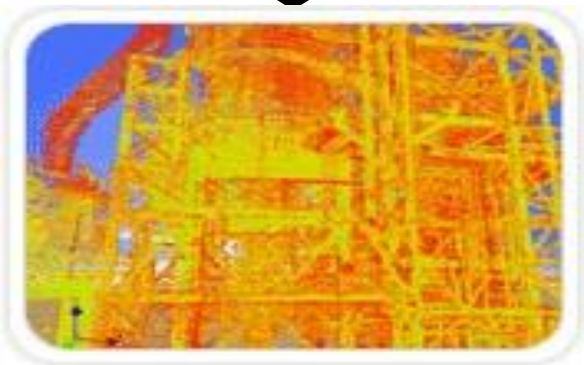
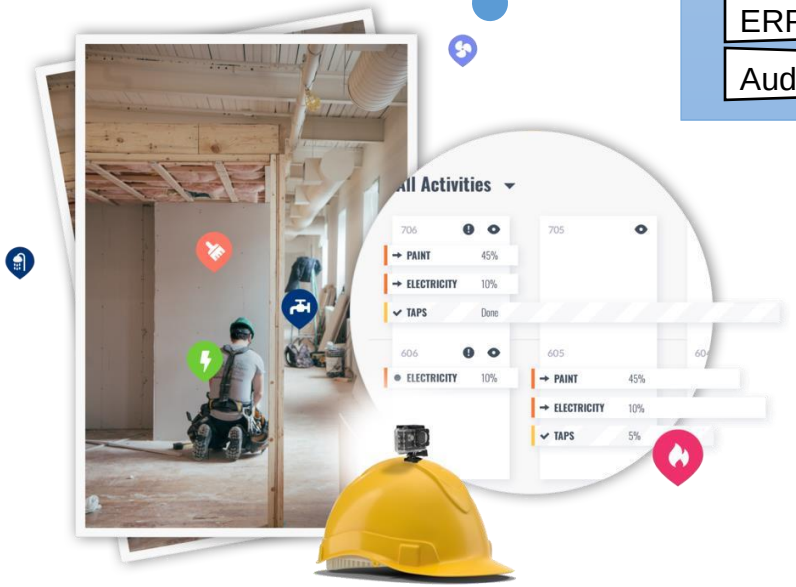
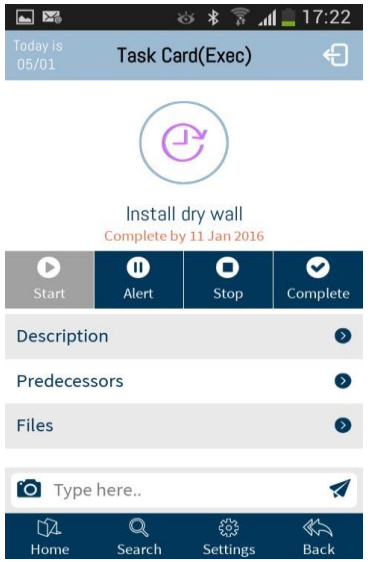
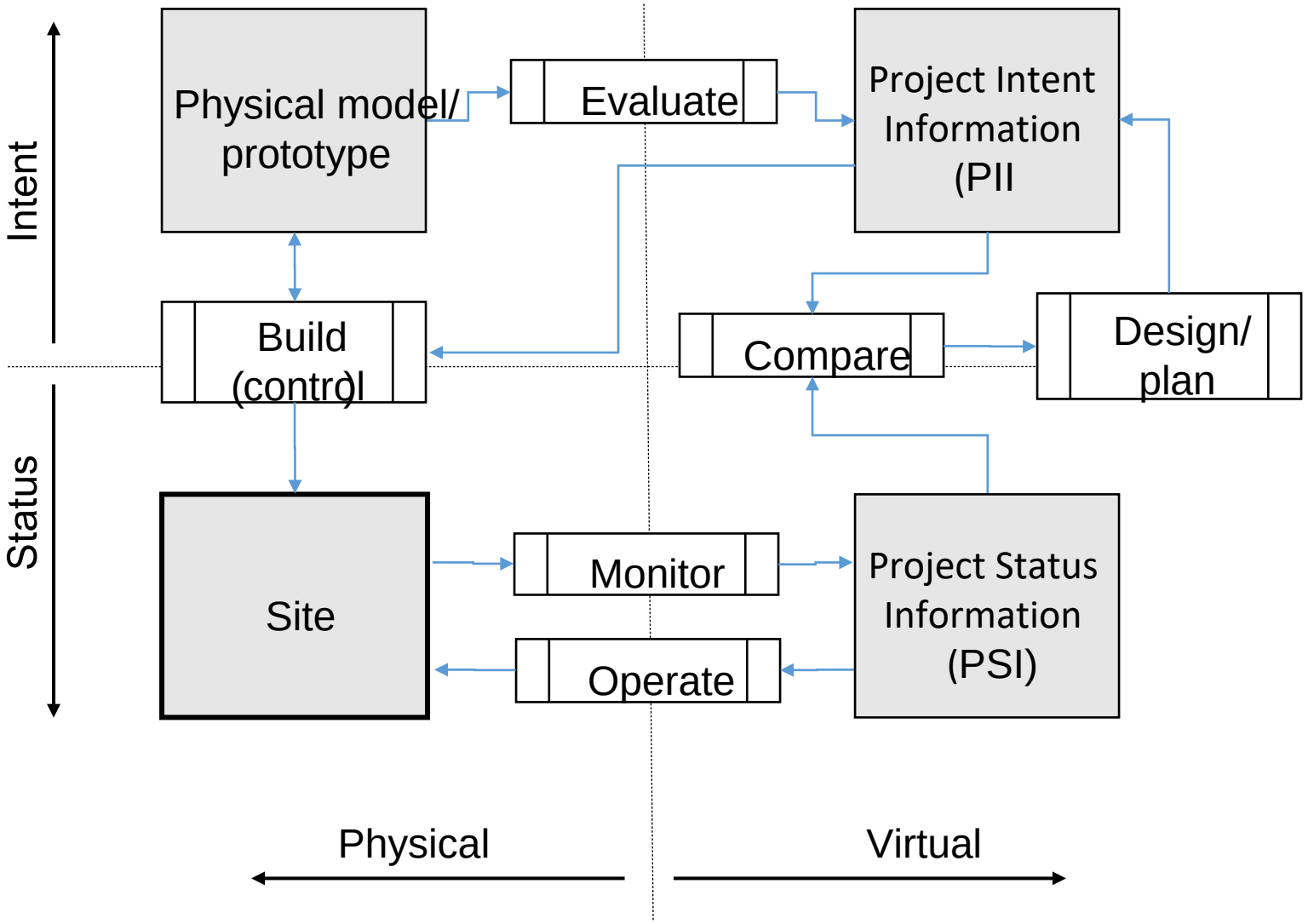
Acquired monitoring data







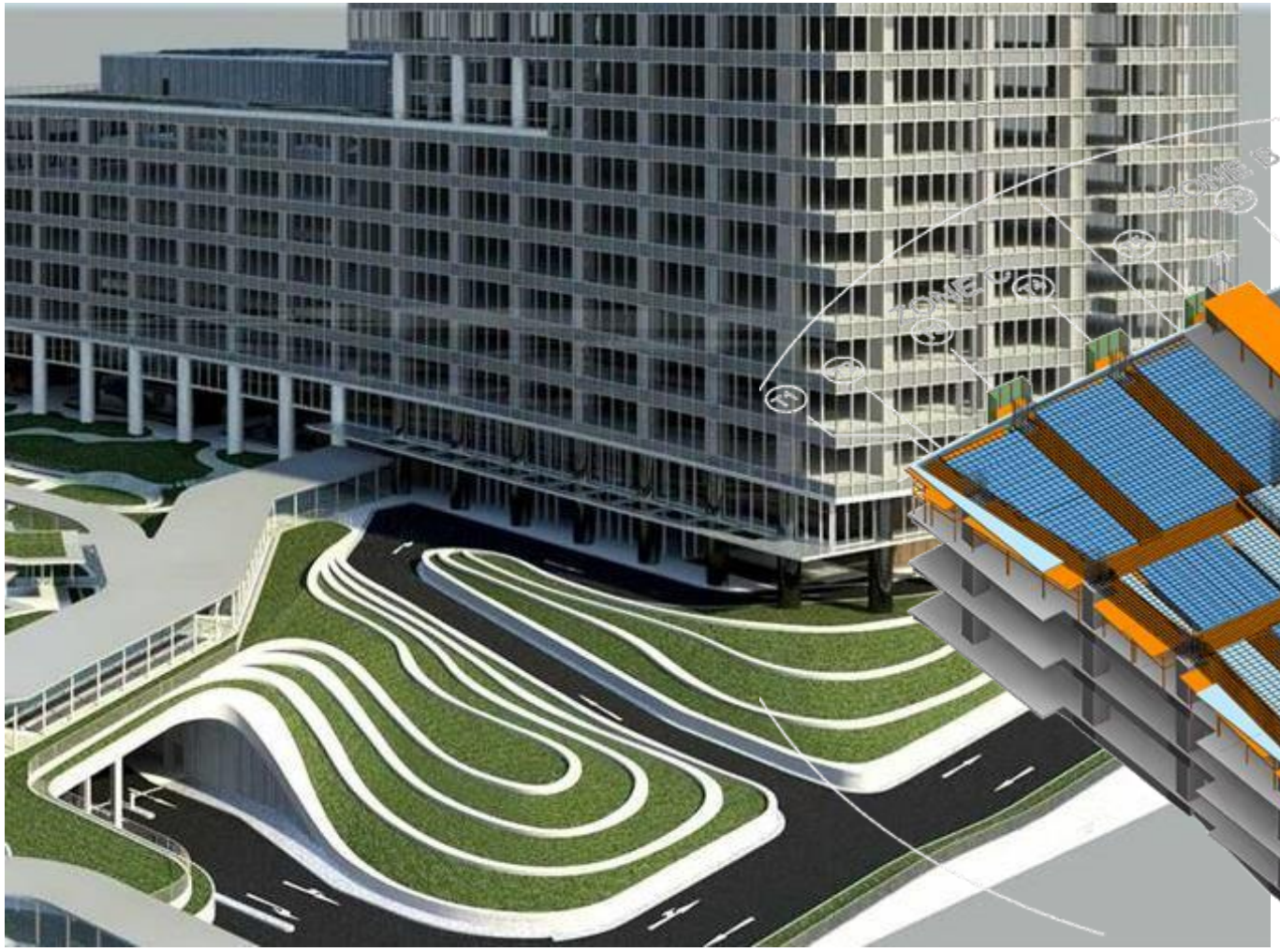
Intent vs. Status

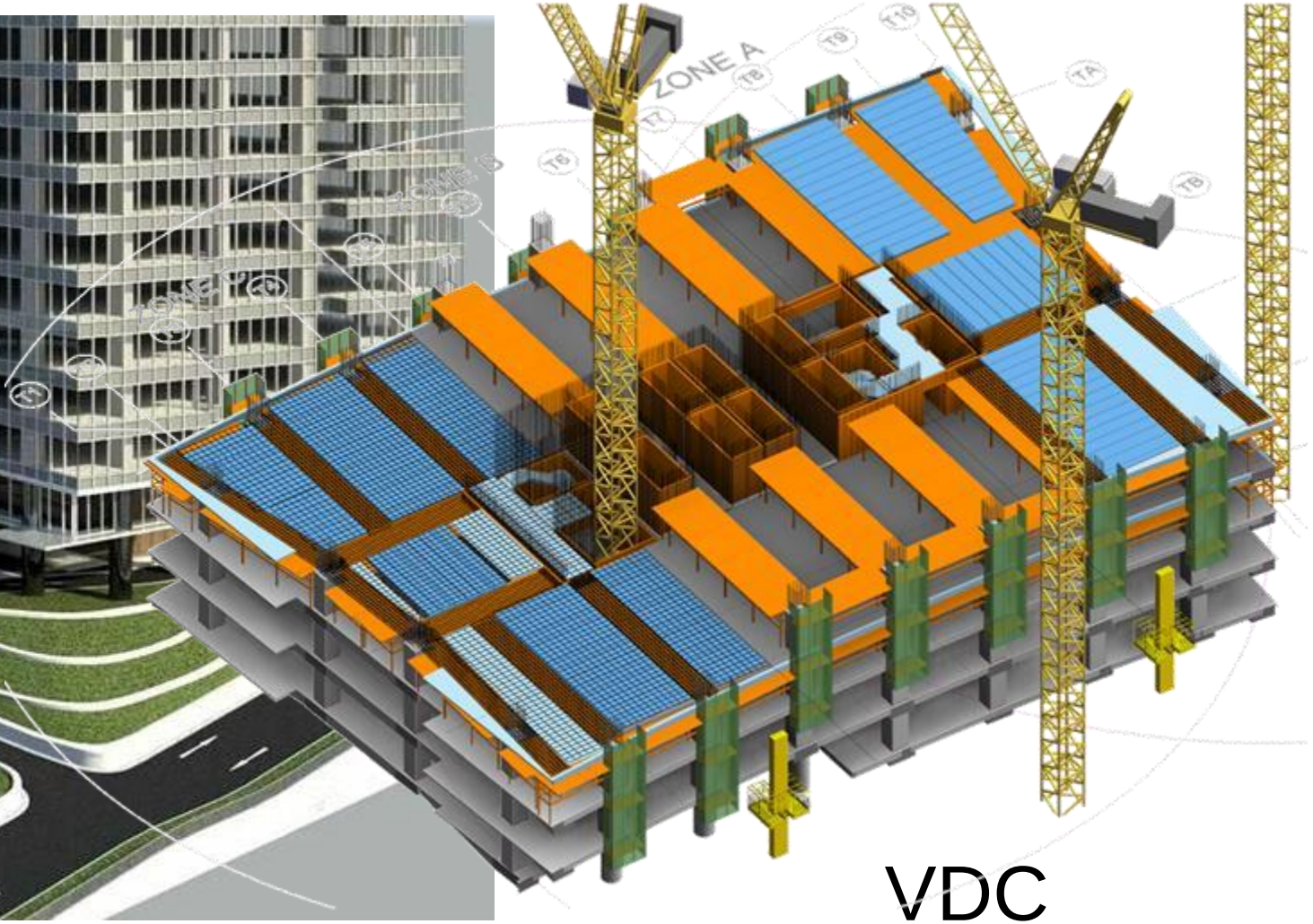

Intent
Status
Physical model/ prototype
Evaluate
Project Intent Information (PII
Build (control)
Compare
Design/ plan
Site
Monitor
Project Status Information (PSI)
Operate
Physical
Virtual

Product vs. Process

BIM

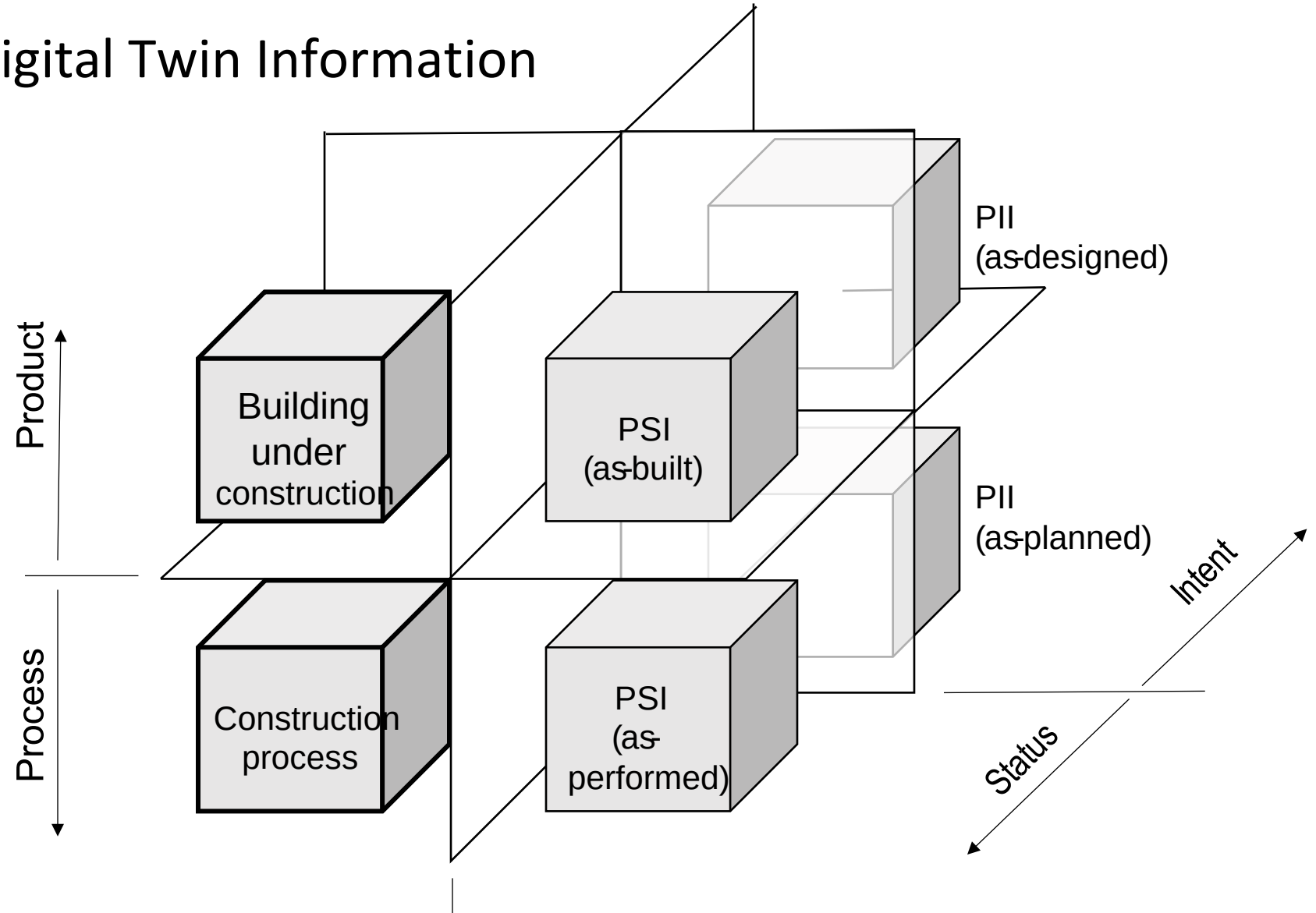
N	DAY 0	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12
N+1										DAY 1	DAY 2	DAY 3	DAY 4





VDC

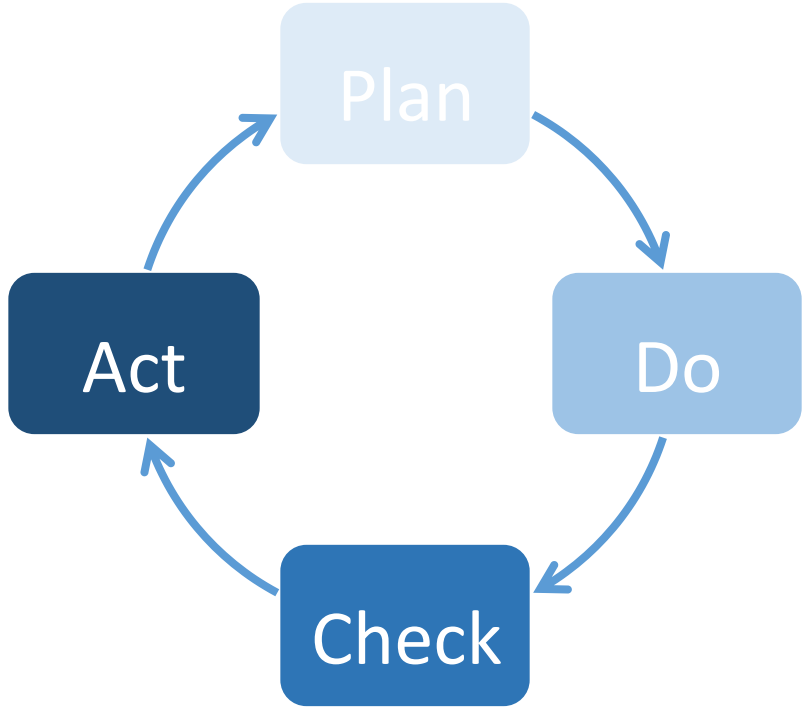
Digital Twin Information

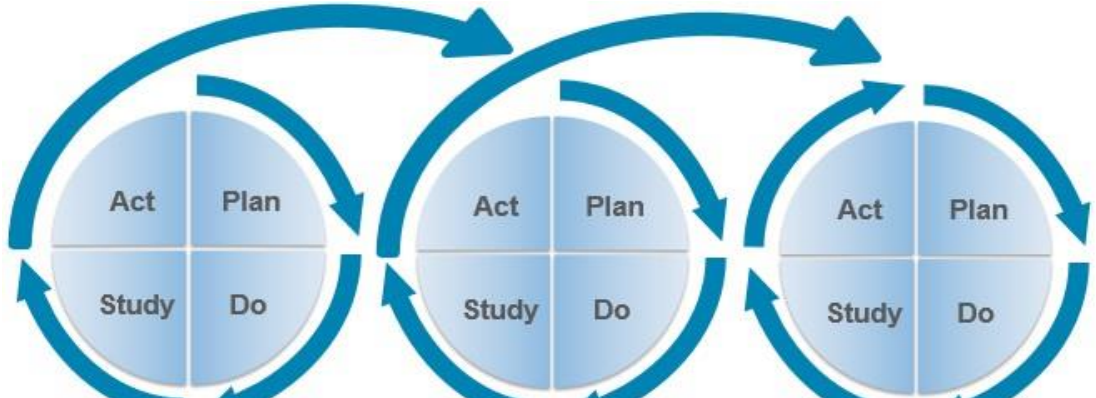


Sacks, R., Brilakis, I., Pikas, E., Xie, H., and Girolami, M. (2020). '**Digital Twin Construction**', Engineering, under review.

PSI – Project Status Information 12 Data-centric

Plan, Do, Check, Act

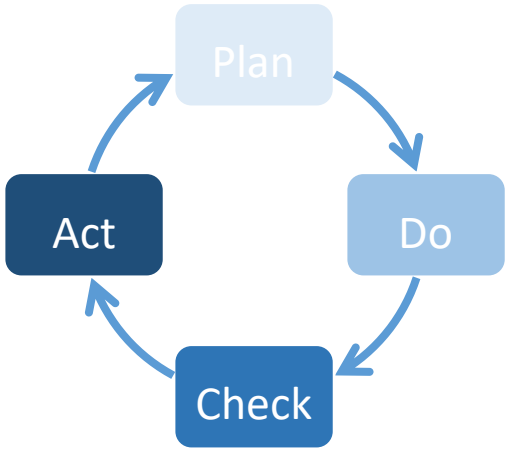


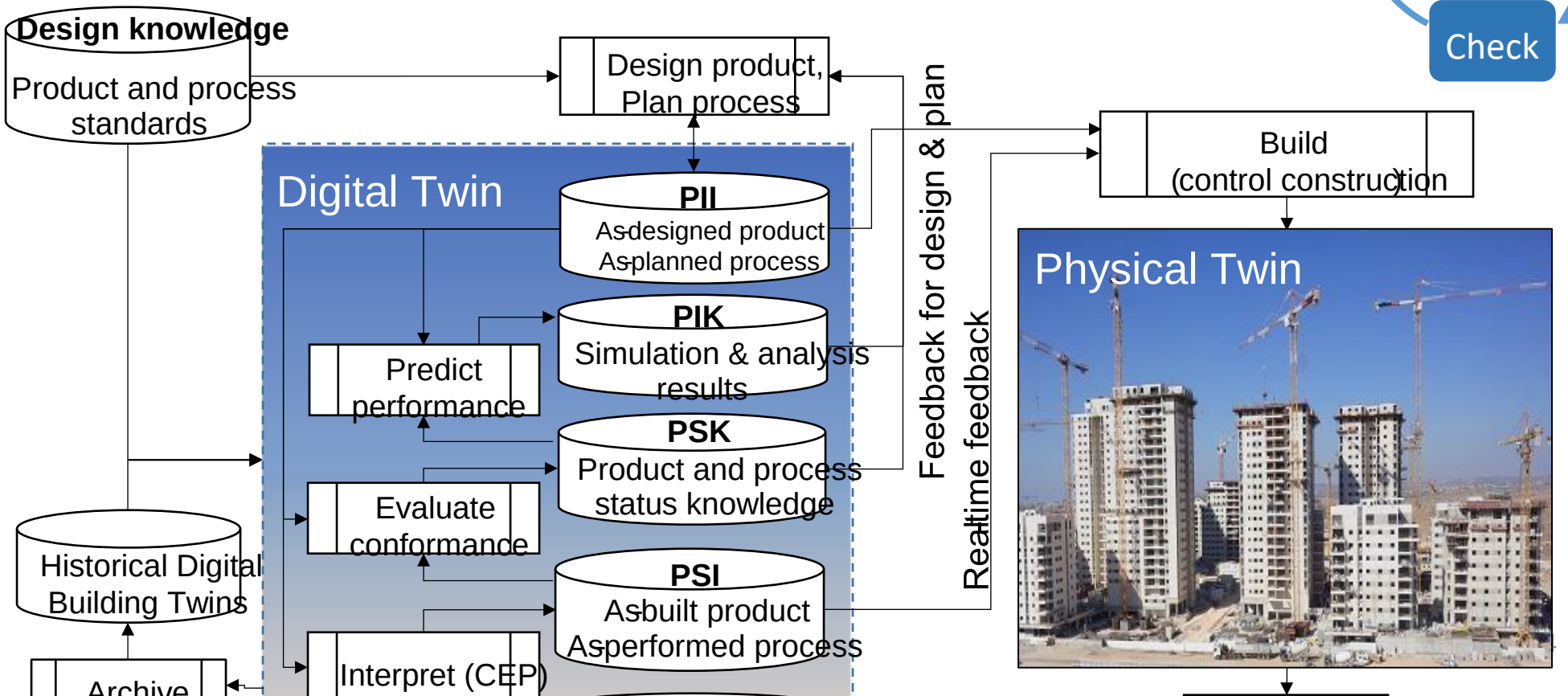


- The real-time information streams from the construction project, provided by monitoring and data processing technologies, enable a closed loop model of construction control that has not been possible to date.
- The Plan, Do, Check, Act (PDCA) cycle (Deming 1982) provides the process structure to closed loop production control
- *Planning and Control* is implemented according to the principles of

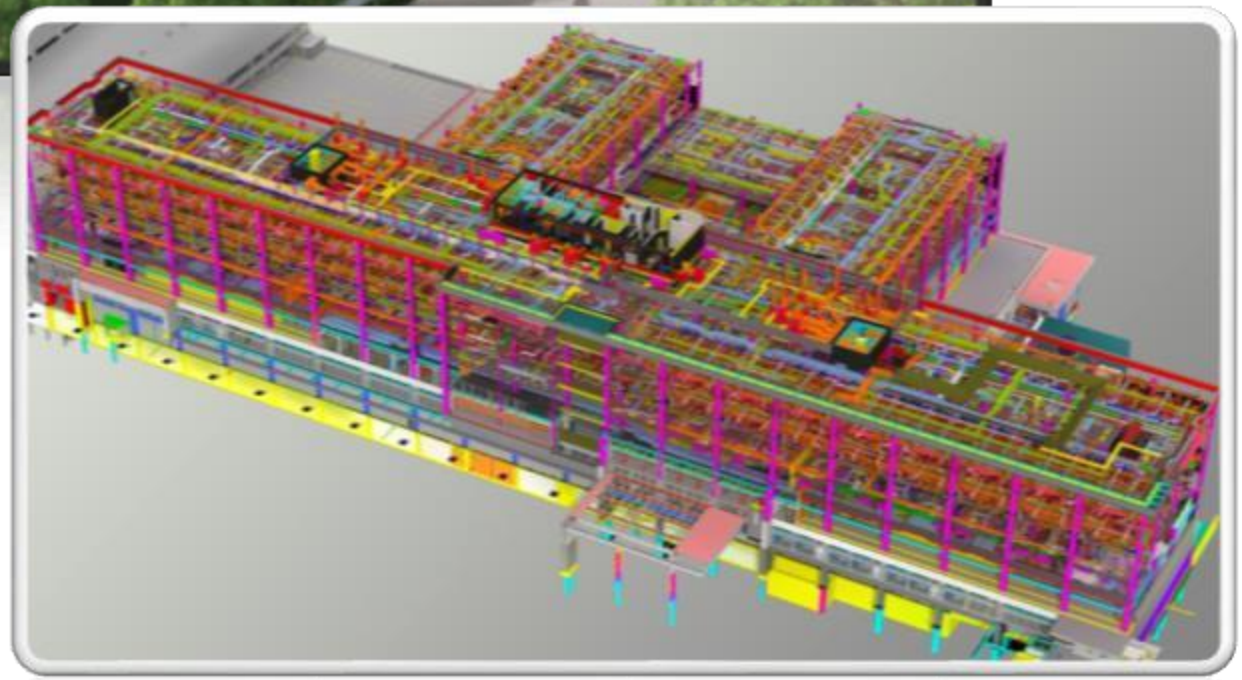
  Continuous Improvement

System workflow- PDCA





Digital Twin Construction



Information dimensions

- Virtual vs. Physical
- Intent vs. Status
- Product vs. Process
- Data – Information – Knowledge

Process dimensions

- Information life-cycle
- Plan, Do, Check, Act
- Model, Build, Monitor & Interpret, Evaluate and Improve

DTC Business Case

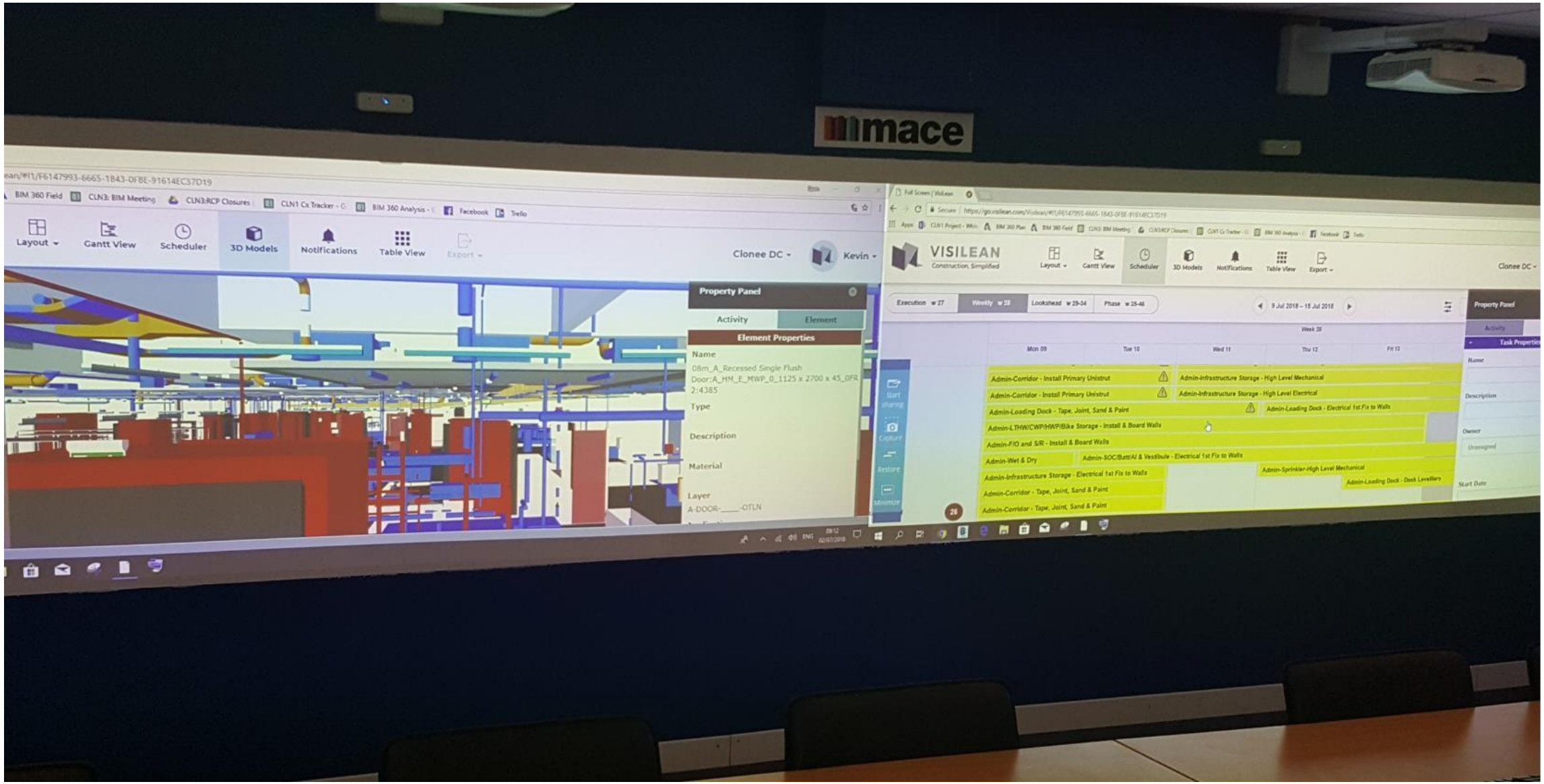
Decisions and Actions

Digital Twin Construction Control Room

Business opportunity for companies to provide a full construction and production management service, that can manage portfolios of projects from remote centralized control rooms

IGLC 2020 Keynote Lecture – Digital Twin Construction

Mace – VISILEAN project control room

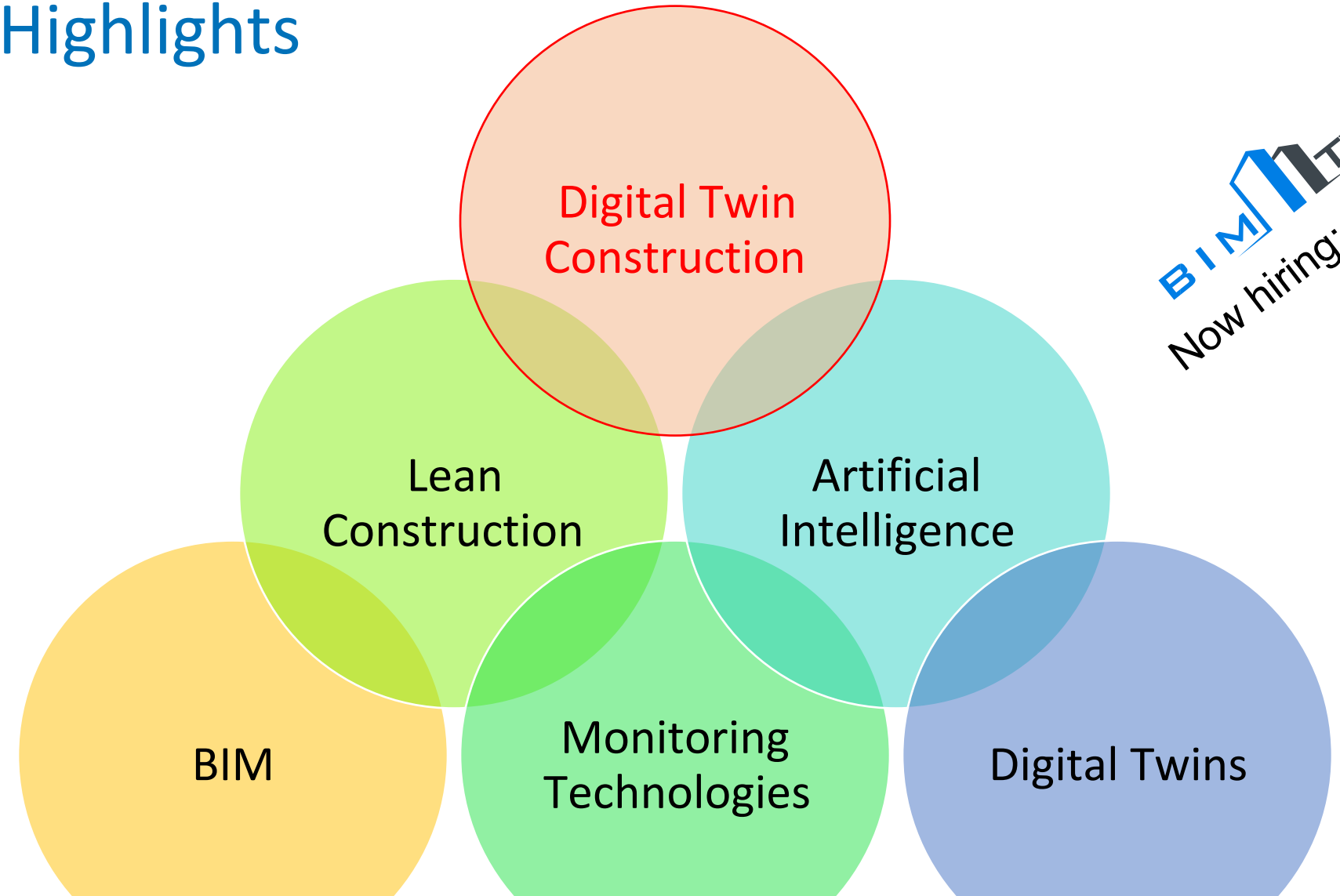

mace
BIM 360 Field
CLN3: BIM Meeting
CLN3:RCP Closures
CLN1 Cx Tracker - C
BIM 360 Analysis - C
Facebook
Trello
Layout
Gantt View
Scheduler
3D Models
Notifications
Table View
Export
Clonee DC
Kevin
Property Panel
Activity
Element
Element Properties
Name
08m_A_Recessed Single Flush Door:A_HM_E_MWP_0_1125 x 2700 x 45_0FR 2:4385
Type
Description
Material
Layer
A-DOOR-____-OTLN
VISILEAN
Construction, Simplified
Execution w 27
Weekly w 28
Lookahead w 29-34
Phase w 35-46
9 Jul 2018 – 15 Jul 2018
Week 28
Mon 09
Tue 10
Wed 11
Thu 12
Fri 13
Admin-Corridor - Install Primary Unistrut
Admin-Infrastructure Storage - High Level Mechanical
Admin-Corridor - Install Primary Unistrut
Admin-Infrastructure Storage - High Level Electrical
Admin-Loading Dock - Tape, Joint, Sand & Paint
Admin-Loading Dock - Electrical 1st Fix to Walls
Admin-LTHW/CWP/HWP/Bike Storage - Install & Board Walls
Admin-F/O and S/R - Install & Board Walls
Admin-Wet & Dry
Admin-SOC/Batt/AI & Vestibule - Electrical 1st Fix to Walls
Admin-Infrastructure Storage - Electrical 1st Fix to Walls
Admin-Sprinkler-High Level Mechanical
Admin-Corridor - Tape, Joint, Sand & Paint
Admin-Loading Dock - Dock Levellers
Admin-Corridor - Tape, Joint, Sand & Paint
Start sharing
Capture
Restore
Minimize
Property Panel
Activity
Task Properties
Name
Description
Owner
Unassigned
Start Date

Mace – VISILEAN project control room

mace
mace

Mace – VISILEAN project control room

Highlights



BIM TWIN

Now hiring: Postdocs

2008
1st Edition

2011
2nd Edition

2018
3rd Edition

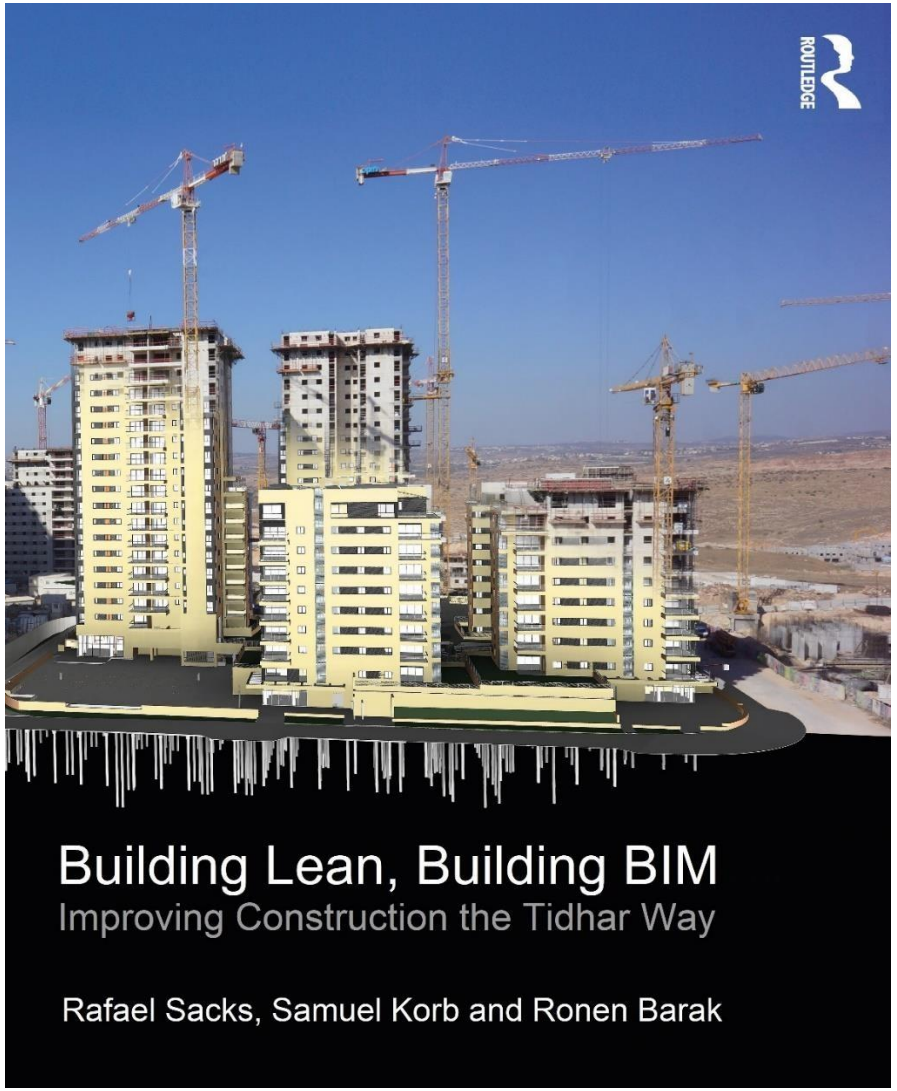
Building Lean, Building BIM

TIDHAR

SKANSKA

LEASE CRUTCHER LEWIS

Fira



ברכות לבאי הכנס,
ובהצלחה לדוברים

פרופ' רפאל זקס

Virtual Construction Lab
Faculty of Civil and Environmental Engineering
Technion - Israel Institute of Technology

Visiting Professor, CDBB and Division of Civil Engineering, University of Cambridge

TECHNION Israel Institute of Technology | The Faculty of Civil and Environmental Engineering

UNIVERSITY OF CAMBRIDGE

cdbb Centre for Digital Built Britain