CONFERENCE
OMAINTEC
2026
EXHIBITION
FM

The 23ʳᵈ International Asset
Facility and Maintenance
Management Conference

DRIVING FACILITY MANAGEMENT EFFICIENCY
THROUGH SMART INFORMATION MANAGEMENT

DATA AS THE NEW FUEL

📅 12-14 January 2026   📍 Riyadh, KSA

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DIGITAL TRANSFORMATION (MANTRA): THEN AND NOW...

*"We started by digitalising drawings;
today, we digitalise decisions."*

AGENDA

1 INTRODUCTION
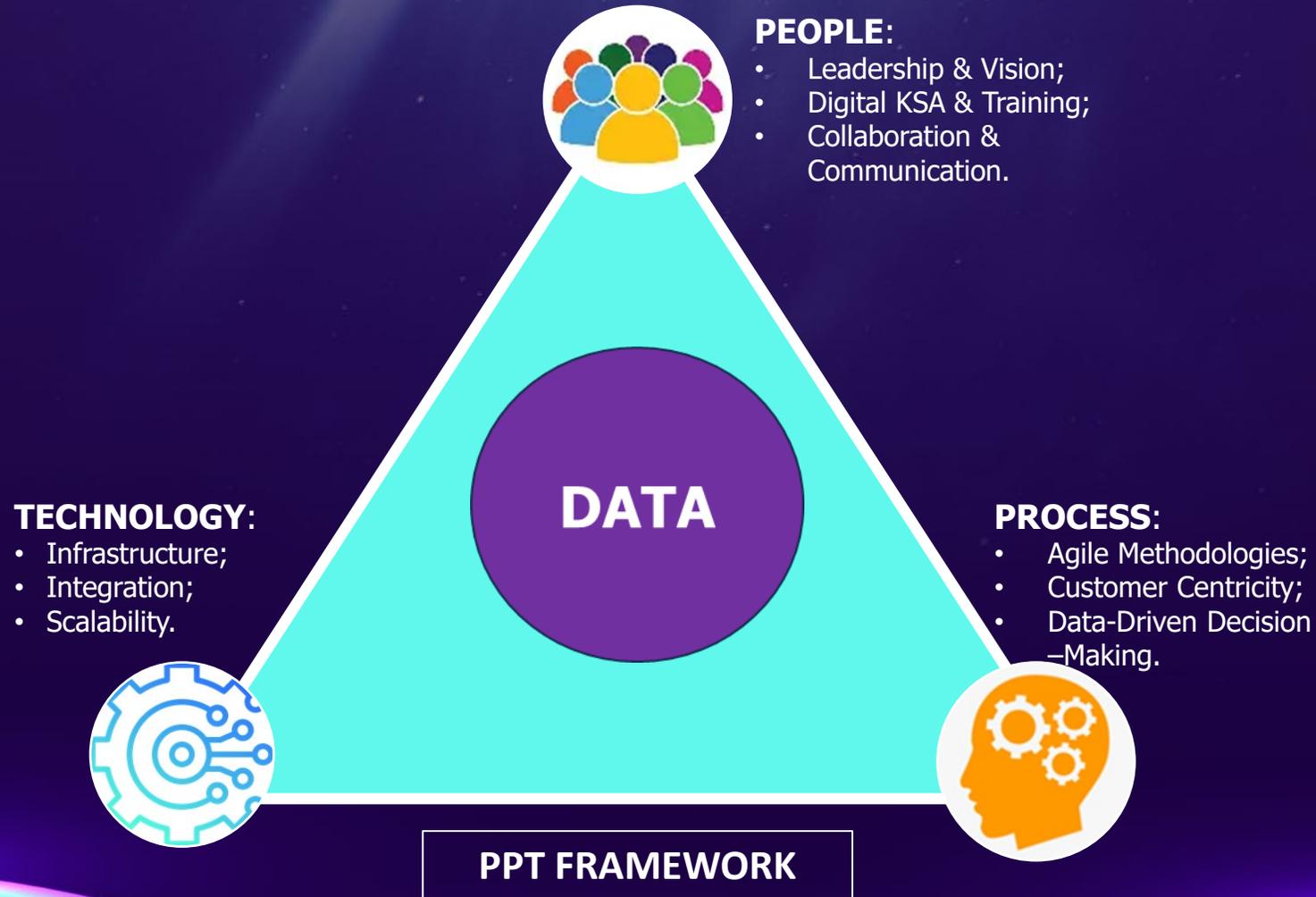
2 THE CONTEXT

3 DATA EVOLUTION

4 DATA GOVERNANCE

5 CDE and ALIM, THE ENABLERS

6 FUELING THE DIGITAL TWIN WITH DATA

THE KEY ELEMENTS TO MAKE YOUR BUSINESS EFFICIENT AND SMARTER.

PEOPLE:
- Leadership & Vision;
- Digital KSA & Training;
- Collaboration & Communication.

TECHNOLOGY:
- Infrastructure;
- Integration;
- Scalability.

DATA

PROCESS:
- Agile Methodologies;
- Customer Centricity;
- Data-Driven Decision –Making.

PPT FRAMEWORK

TRANSFORMING DATA INTO WISDOM FOR STRATEGIC IMPACT

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WISDOM
(Human Decision)

- Judgment aligned with objectives, risk and values;
- Balances performance, cost, safety and sustainability;
- Decides what should be done;
Core principle of Industry 5.0 & FM 5.0.

KNOWLEDGE
(Performance Insight)

- Patterns, trends and cause–effect relationships;
- Predictive and diagnostic understanding;
- Supports optimisation and proactive actions;
- Enables "what is happening and why".

INFORMATION
(Refined Fuel)

- Structured, cleaned and contextualised data;
- Linked to assets, location and time;
- Reduced noise and duplication;
- Ready for operational use.

DATA
(Raw Fuel)

- Sensors, drawings, documents, logs, transactions;
- High volume, high speed, low meaning;
- Must be accurate, timely and traceable;
- *Data <u>alone</u> has no decision value*.

CONTENT → MEANING → INSIGHT → DECISION MAKING

INDUSTRY EVOLUTION (5.0)
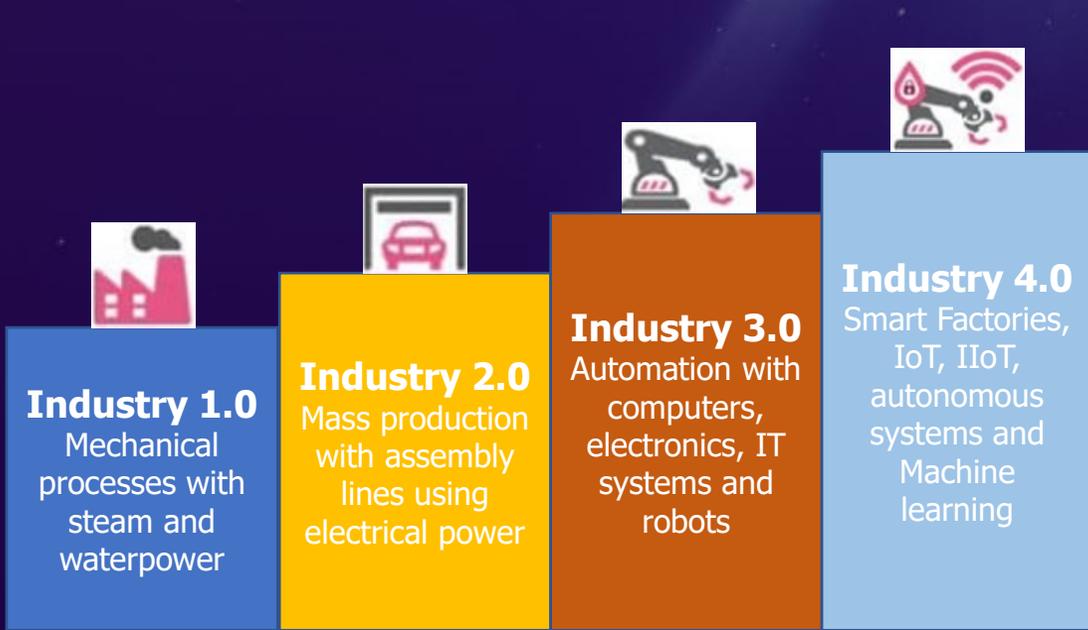
FACILITY MANAGEMENT EVOLUTION (5.0)

FM 1.0
FM 2.0
FM 3.0
FM 4.0
FM 5.0

FM 1.0 – Manual
Paper-based and reactive

FM 2.0 – Computerised
EAM, CMMS, early CAFM

FM 3.0 – Analytics
Integrated systems (ERP, BIM, workflows)

FM 4.0 – Digital
Automated, sensor-enabled, Digital Twin.

FM 5.0 – Intelligent
Human-centric, data-intelligent, predictive, resilient FM.

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DATA EVOLUTION, FROM THE ARCHIVE TO THE NEW AGE

Era	Role of Data	Nature of Data	Value Created
Industry 1.0	None / Manual	Paper, tacit	Execution
Industry 2.0	Recording	Structured logs	Control
Industry 3.0	Digital storage	Databases	Automation
Industry 4.0	Connected data	Big Data, IoT	Optimisation
Industry 5.0	Intelligent & contextual data	Trusted, semantic, lifecycle data	Decision intelligence & value co-creation

CONVENTIONAL DATA = CONVENTIONAL FUEL

Traditional FM data behaves like old fuel:

- Static (PDFs, drawings, O&M manuals);

- Siloed (each system has its own version);

- Outdated shortly after handover; and

- Difficult to reuse or trust.

It keeps FM running, but inefficiently, like gasoline in an old engine: acceptable, but limited…

FM 5.0 REQUIRES A NEW TYPE OF DATA (NEW FUEL)

In the new era, systems (machines/tools, engines) are smarter, adaptive and collaborative; they cannot run on **old fuel**.

Likewise, FM 5.0 systems require new data:

- Connected (CDE, integrations);

- Contextual (linked to assets, spaces and activities);

- Lifecycle-based (ALIM);

- Real-time or near real-time (IoT); and

- Governed and trusted (data ownership & quality).

This is Data 5.0: not more data, but smart data.

NEW DATA, FUELING APPROPRIATELY.

- Powers digital engineering technologies: BIM, Digital Twins, AI and analytics;
- Transforms static project information into living operational intelligence;
- Drives faster, smarter and explainable decisions; not just automation;
- Requires refining through governance, quality and context (like fuel processing);
- Gains value when centralised and governed via CDE;
- Sustains performance when managed across the asset lifecycle through ALIM; and
- Enables human-centric, resilient and sustainable FM 5.0 outcomes.

"Advanced FM tools without structured data are like Formula-1 engines running on regular fuel."

DATA - *NEW FUEL* - GOVERNANCE

- **Ownership & Accountability**: Clear responsibility for data creation, validation and lifecycle maintenance.

- **Standards & Structure**: Naming conventions, classification, metadata and information models, *foundation for Predictability*.

- **Centralisation** (Single Source of Truth):
  - Elimination of silos and duplicates;
  - Controlled consolidation of drawings, BIM, asset and O&M data; and
  - *Foundation for interoperability*, analytics and Digital Twins.

- **Quality & Trust**: Accuracy, completeness, consistency and fitness for decision-making.

- **Lifecycle Alignment**: Design → Construction → Operations → Strategic Decisions.

- **Security & Access Control**: The 3 Rs (Right data, Right people, Right time).

Without data governance, digital transformation accelerates chaos.
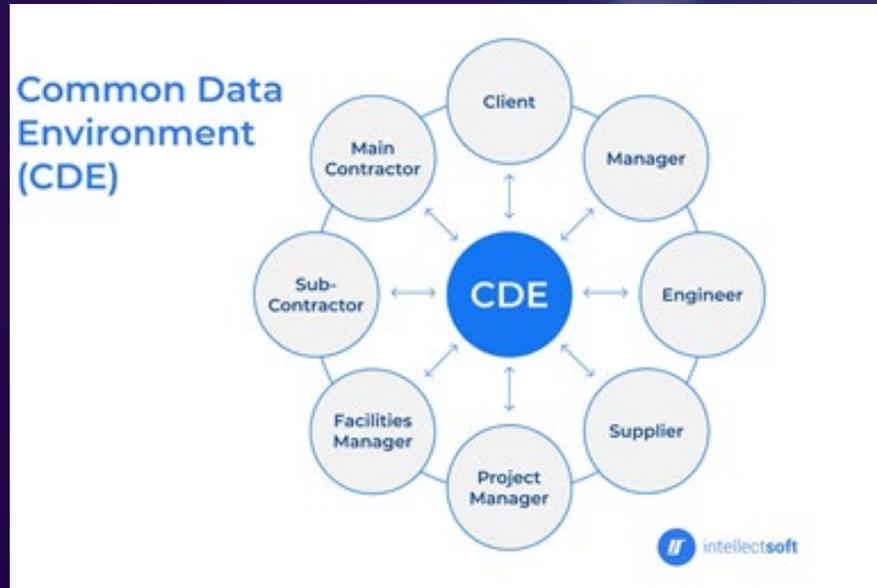*With governance, data becomes a strategic and trusted asset.*

KEY CONTROLS TO AVOID PERFORMANCE DEGRADATION

- **Quality at Source:** inaccurate data damages decisions;
- **Context First:** data must be asset and lifecycle aware;
- **Selectivity:** prioritise decision and critical data over volume;
- **Clear Ownership:** accountability cannot be automated;
- **Secure Access:** protect data without blocking usability;
- **Lifecycle Integration:** data must feed CDE & ALIM continuously; and
- **Human Judgment:** technology supports, people decide.

High-performance data fuels better decisions only when it is clean, contextualised, governed and aligned with human judgment.

DATA GOVERNANCE ENABLERS: CDE & ALIM

Common Data Environment (CDE)

Engineering Information Management through Asset LifeCycle

Source: ARC Advisory Group

Common Data Environment (CDE)
- Single, governed source of truth for all project and operational information;
- Centralises drawings, BIM models, documents and structured data;
- Enforces standards, naming conventions, version control and workflows;
- Controls access, approvals and traceability across stakeholders;
- Eliminates silos and duplication while improving collaboration and trust.

Asset Lifecycle Information Management (ALIM)
- Ensures continuity of asset information from design to operation - *(FROM THE CRADLE TO THE GRAVE)*;
- Structures data around assets, systems and functional breakdowns;
- Preserves data context, relationships and decision history;
- Transforms project data into reliable operational intelligence;
- Enables Digital Twins, predictive maintenance and FM 5.0 decisions.

DATA: THE NEW FUEL FOR SMART & EFFICIENT FM

Why It Matters

- Buildings generate massive amounts of data, but value comes from connecting, structuring and using it, not just collecting it.

- Data transforms FM from reactive to predictive, from manual to automated, from cost-centred to value creator.

What Data Enables

- Smarter operations through real-time insights;

- Predictive maintenance that reduces downtime and cost;

- Energy optimisation driven by analytics;

- Better occupant experience through responsive environments;

- Lifecycle intelligence from design → construction → operations.

Smart and Efficient FM isn't about technology — it's about Smart Data that makes buildings perform better, last longer and cost less.

Smart Data isn't a by-product. It's the new fuel.

DYNAMIC DIGITAL REPLICA OF REALITY — DIGITAL TWIN

A Digital Twin in construction and facility management
is a virtual model of a building or infrastructure that
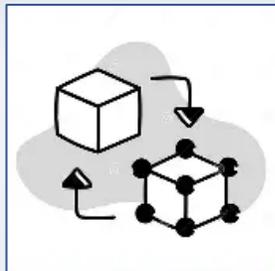*mirrors* the ***real thing in real time***.

WHAT MAKES UP A DIGITAL TWIN

A Digital Twin is not just a 3D model; it's a system of connected parts

Physical Asset
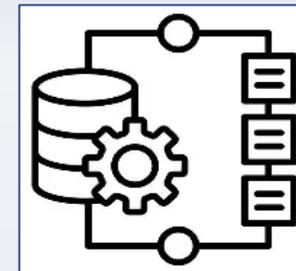The actual building, bridge, hospital, airport or facility in the real world

Digital Model
A virtual representation (often BIM-based in construction) that mirrors the physical asset structure, and/or systems.

IoT Sensors & Devices
Smart sensors embedded in the building (temperature, humidity, energy meters, occupancy sensors, vibration sensors, etc.).
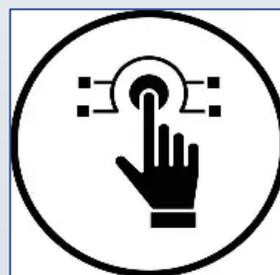
Data Integration Layer
- Middleware or platforms that connect IoT data streams to the digital model.
- Ensures the twin is always updated with live information.

Analytics & AI
- Tools that process sensor data to detect patterns, predict failures, or optimize performance.
- *Example: Predicting when an HVAC system will need maintenance.*

Visualization & User Interface
- Dashboards, 3D models, or VR/AR interfaces where facility managers, engineers, or operators can interact with the twin.
- Makes the data understandable and actionable.
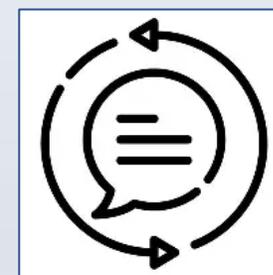
Control & Feedback Loop
- The twin doesn't just "mirror", it can also send commands back.
- *Example: Adjusting lighting or HVAC automatically based on occupancy data.*

REAL-WORLD SCENARIO FLOW – SMART AIRPORT

Physical Airport
Terminals, runways/taxiways, parking, Ancillary buildings, HVAC systems, lighting, baggage handling, security…

IoT Sensors & Devices
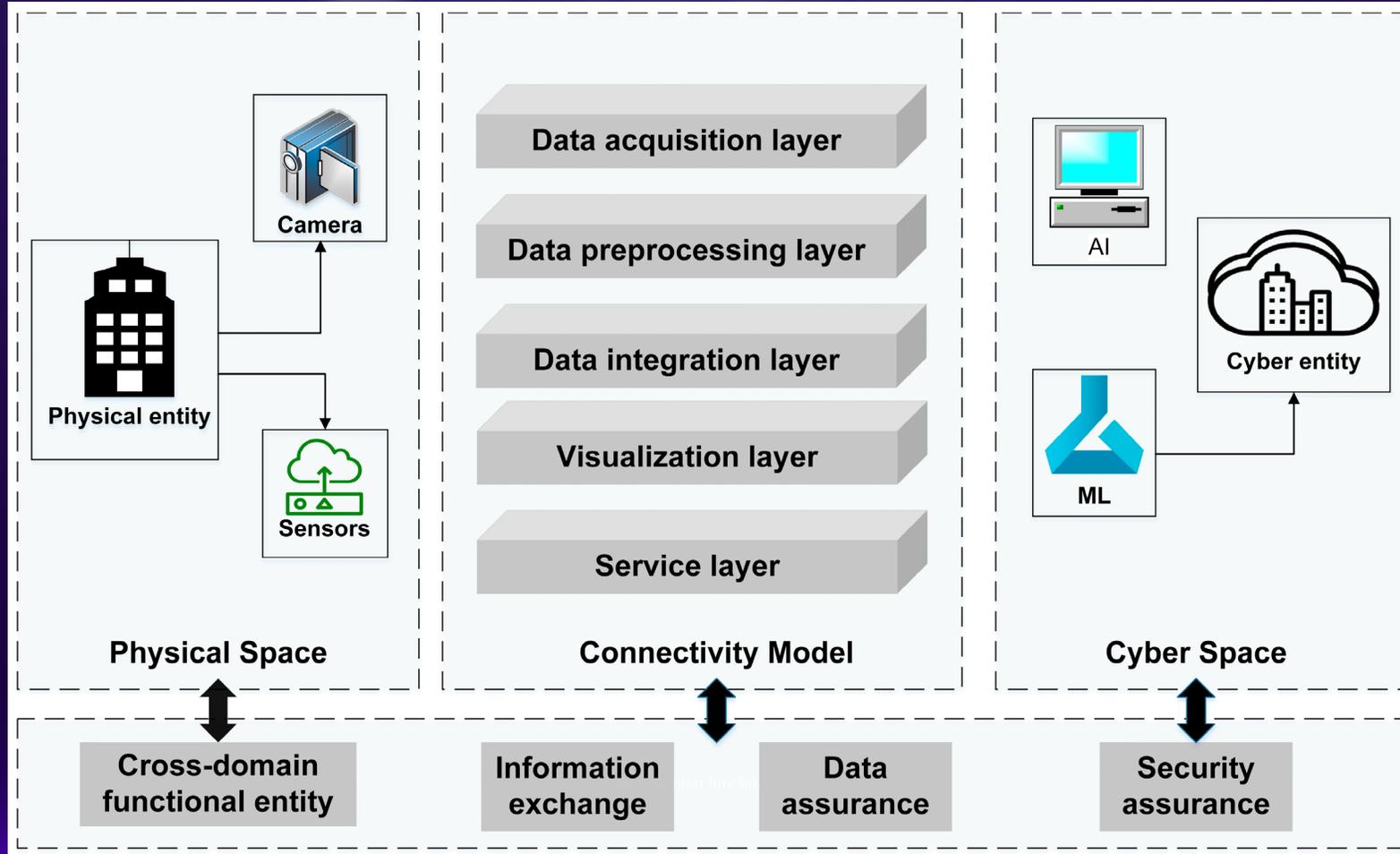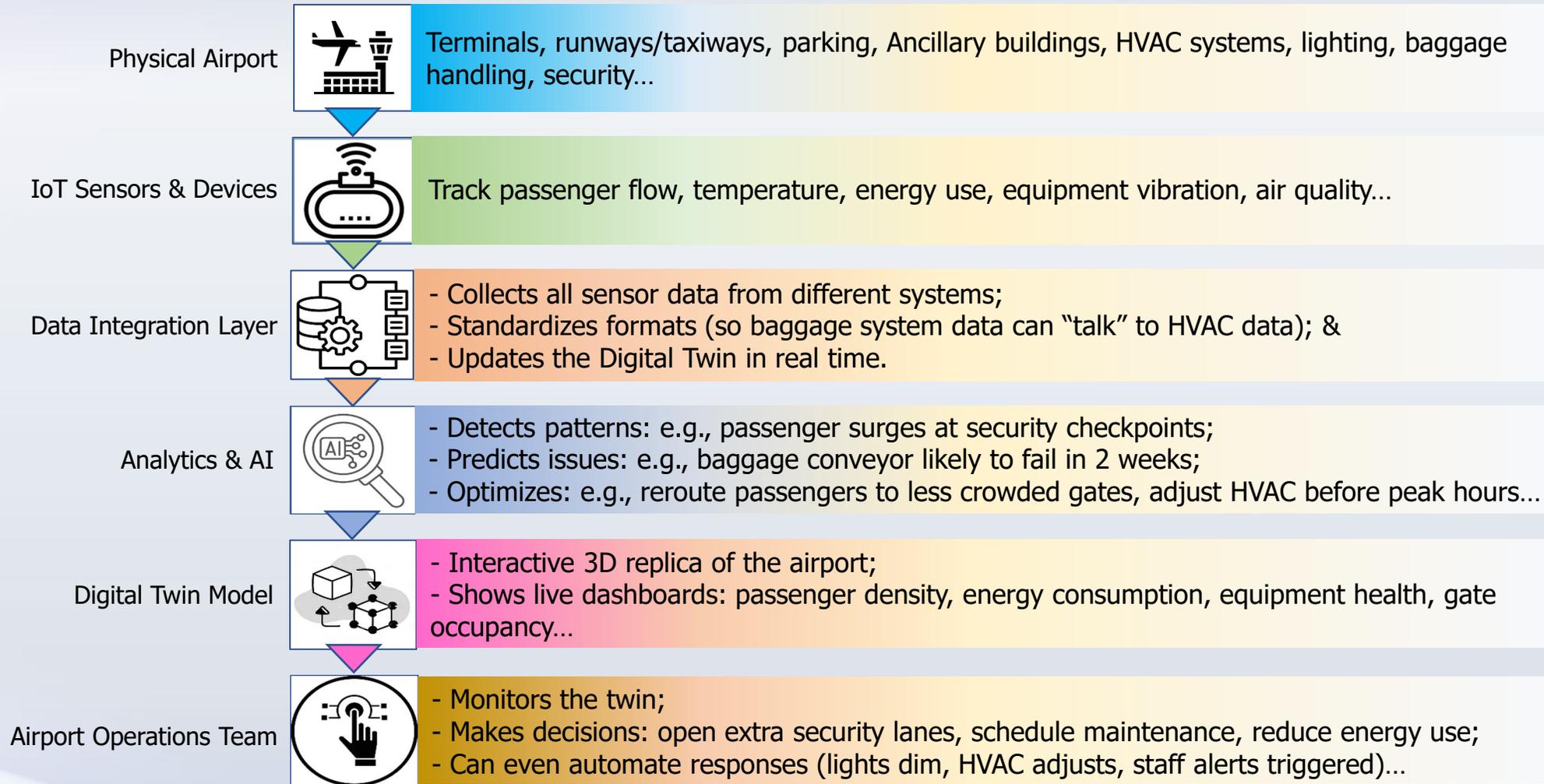Track passenger flow, temperature, energy use, equipment vibration, air quality…

Data Integration Layer
- Collects all sensor data from different systems;
- Standardizes formats (so baggage system data can "talk" to HVAC data); &
- Updates the Digital Twin in real time.

Analytics & AI
- Detects patterns: e.g., passenger surges at security checkpoints;
- Predicts issues: e.g., baggage conveyor likely to fail in 2 weeks;
- Optimizes: e.g., reroute passengers to less crowded gates, adjust HVAC before peak hours…

Digital Twin Model
- Interactive 3D replica of the airport;
- Shows live dashboards: passenger density, energy consumption, equipment health, gate occupancy…

Airport Operations Team
- Monitors the twin;
- Makes decisions: open extra security lanes, schedule maintenance, reduce energy use;
- Can even automate responses (lights dim, HVAC adjusts, staff alerts triggered)…

FUELLING DIGITAL TWIN : DATA 5.0, THE NEW FUEL

DATA 5.0
Human-centric, interoperable, **real-time data** powering intelligent decisions.

DIGITAL TWIN
Live digital replica enabling prediction, simulation and FM optimisation.

FM 5.0
Predictive, automated, user-focused FM driven by **smart data** and twins.

"Nowadays, Digital Twin stands as the flagship use case for digitalising facility management processes, enabling more efficient and smarter O&M in the era of FM 5.0."

HOW A DIGITAL TWIN GETS FED WITH DATA?

A Digital Twin needs **structured, reliable information** to stay useful. Data comes from two main sources:

1. **Static Data (Design & Construction Phase)**

•   This is the "foundation" of the twin;

•   Includes design models (BIM), asset registers, equipment specs and documentation; and

•   Standards like **COBie (Construction Operations Building Information Exchange)** are crucial here.

    o   COBie organises building information (rooms, equipment, systems, maintenance schedules) into a structured spreadsheet/database format.

    o   It ensures that all the essential facility data is captured during design/construction and handed over cleanly to operations.

2. **Dynamic Data (Operational Phase)**

•   This is the "live fuel" that keeps the twin updated.

•   Comes from IoT sensors, building management systems (BMS), energy meters, occupancy trackers, etc.

•   Provides real-time performance data (temperature, energy use, vibration, air quality, etc.).

WHY BUILDING DIGITAL TWINS NEED A NEW DATA (NEW FUEL) MINDSET

Traditional engineering data describes how a system should be; digital twin data continuously negotiates how the system actually is.

#	Aspect	Traditional Engineering Data	Digital Twin Data
01	Time	Static / snapshot-based	Continuous, real-time
02	Context	Implicit or document-based	Explicit semantic context
03	Reality alignment	Validated once	Continuously reconciled
04	Data sources	Single source of truth	Multiple, conflicting sources
05	Consumers	Human engineers	Machines & algorithms
06	System interaction	Open-loop	Closed-loop feedback
07	Lifecycle	Phase-specific	Full lifecycle continuity
08	Scale & performance	Batch, offline	Streaming, low-latency
09	Uncertainty	Mostly ignored	Explicitly modeled
10	Data purpose	Documentation	Decision & optimization driven

DIGITAL TWIN + AI: FROM DATA (NEW FUEL) TO SMART ACTION

Sensors & BMS / IoT Devices → Real-Time Data Streams → Digital Twin (Static + Dynamic + Context) → Semantic & Time-Series Models → AI / ML (Prediction, Optimisation, Anomaly detection) → Intelligent Actions (HVAC control, energy saving, alerts…)

The combination of rich twin data + AI transforms a building from passive infrastructure into a smart, learning and adaptive system.

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THANK YOU!

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