

BIM: Improving building performance

ATIC 26/09/19

BIM DEFINITION

Building Information Modelling (BIM) is:

Integrated **process** built on *coordinated, reliable* information used to:

- Create coordinated, digital design information & documentation;
- Predict performance, appearance, and cost;
- Deliver the project faster, more economically, and with reduced environmental impact.
- The fundamental definition of BIM: there is always a single source of the truth.

Source: Building Research Establishment (UK)

BIM DEFINITION

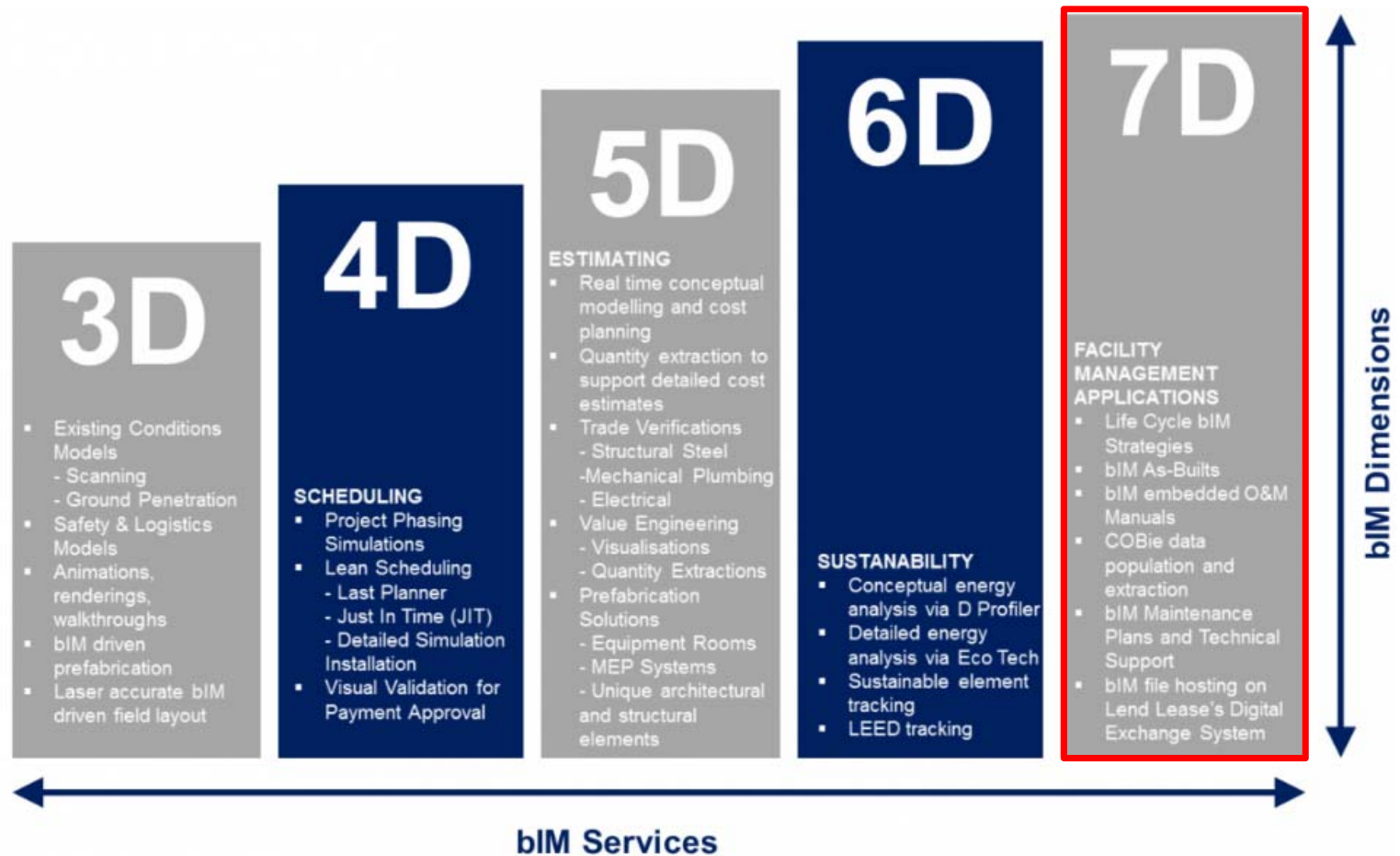
Building Information Modelling (BIM) is:

- **not** just 3D CAD
- **not** just a new technology application
- **not** next generation, it is here and now!

“BIM is essentially **value creating collaboration** through the entire life-cycle of an asset, underpinned by the **creation, collation and exchange of shared 3D models** and **intelligent, structured data** attached to them.”

Source: BRE

BIM LEVELS



THE BIM MODEL:

A tool that maps the future of buildings

41%

of people involved in the European construction industry have been using BIM for between 3 and 5 years, compared with 9% 11 years ago

2022

Year by which the French State and the construction industry in France have committed to achieving widespread use of BIM*

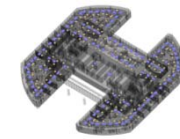
97%

of French companies are reporting a positive return on investment with BIM, between 10 and 25%

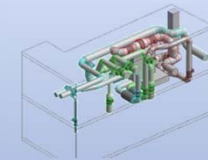
THE BIM MODEL

From 3D data to a “journal” of the building

A standardised and contextualised database of all the asset and technical characteristics of the building



Geometrical representation and 3D visualisation (LOD)



Technical and functional equipment data (LOI)

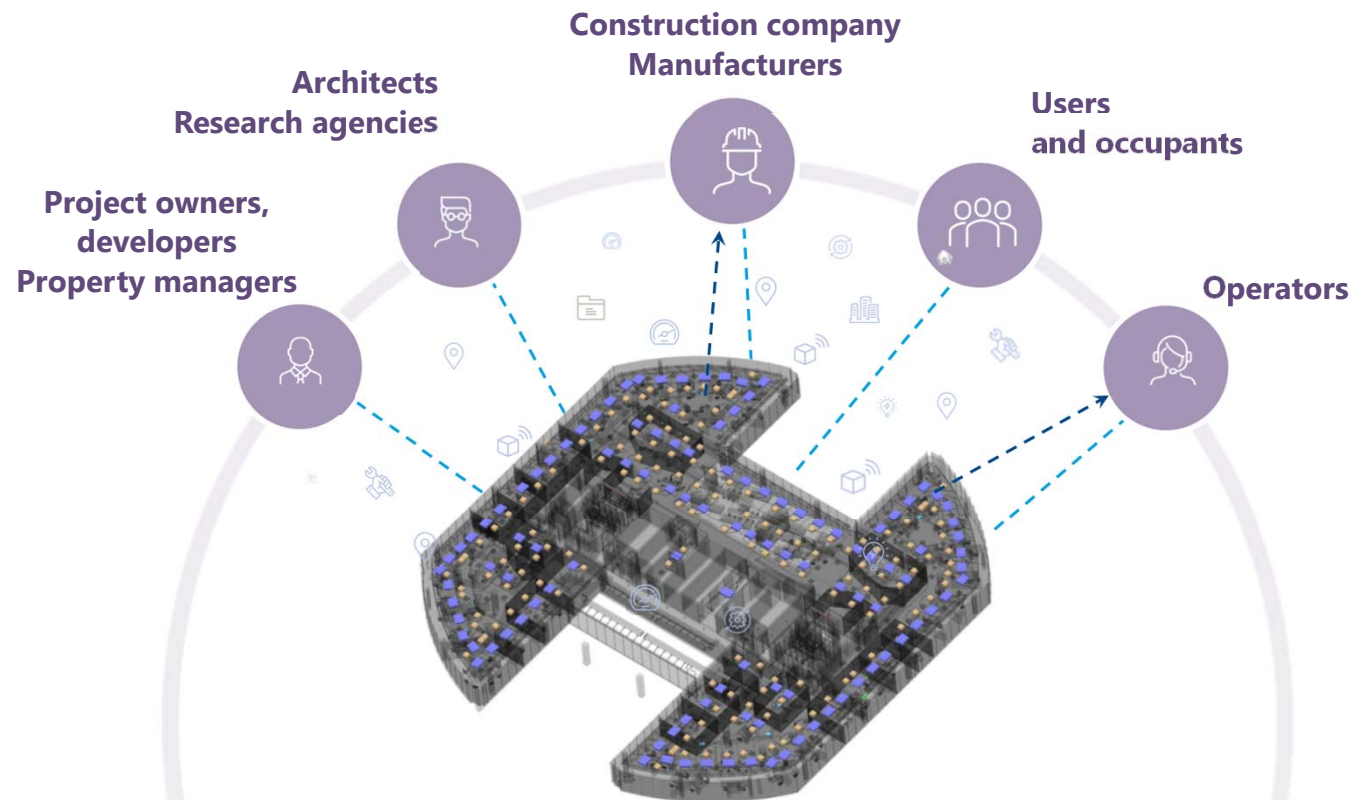
BIM model

(LOD): Level Of Details
(LOI): Level Of Information

THE BIM MODEL: DATA SHARED

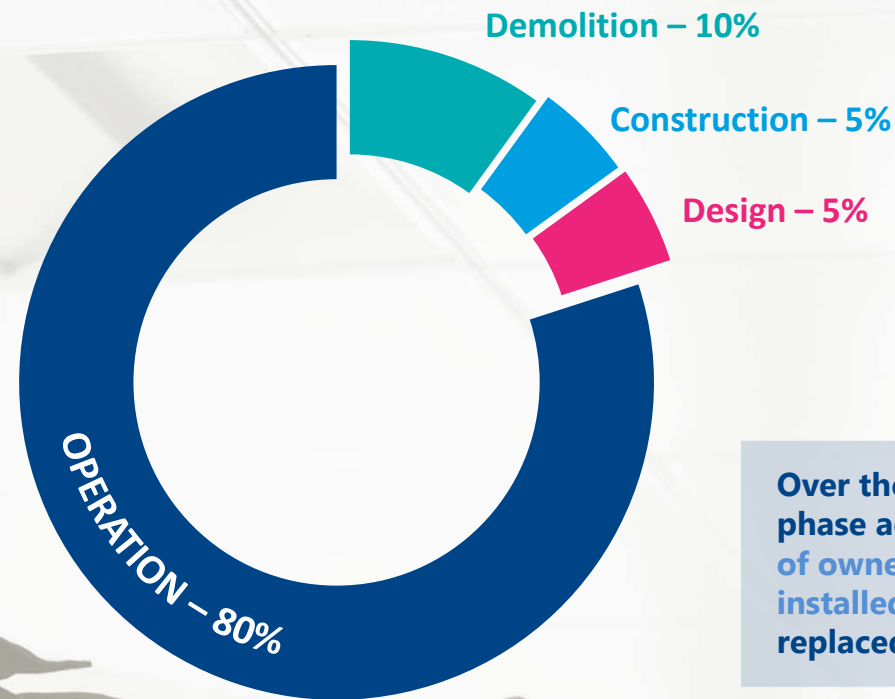
Throughout the entire building lifecycle

A single, shared database supplemented by everyone involved throughout the building lifecycle



USING BIM IN THE OPERATION PHASE

For long-term building optimisation

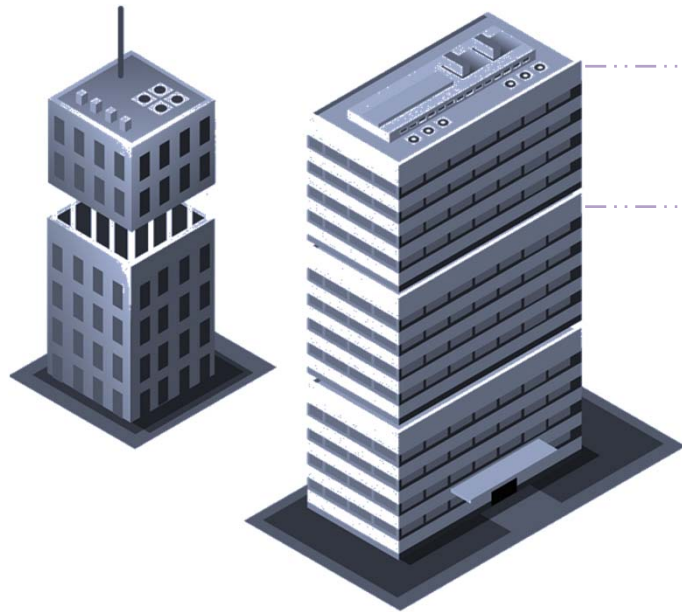


Over the building lifecycle, the operation phase accounts for 80% of the total cost of ownership, and 75% of components installed during construction will be replaced at least once.

ADVANTAGES OF USING BIM DURING THE OPERATION PHASE

From visualising data to overall building optimisation

For a “communicating” building



Static data

Asset data
Technical data

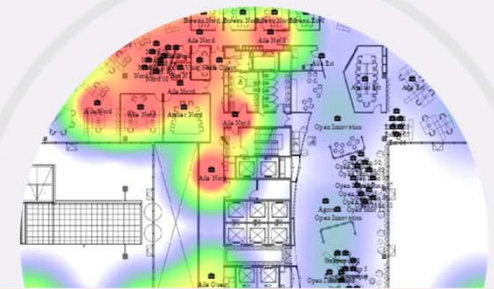
Dynamic data

CMMS
BMS
CMS
IoT/Sensors

Optimisation of building
maintenance

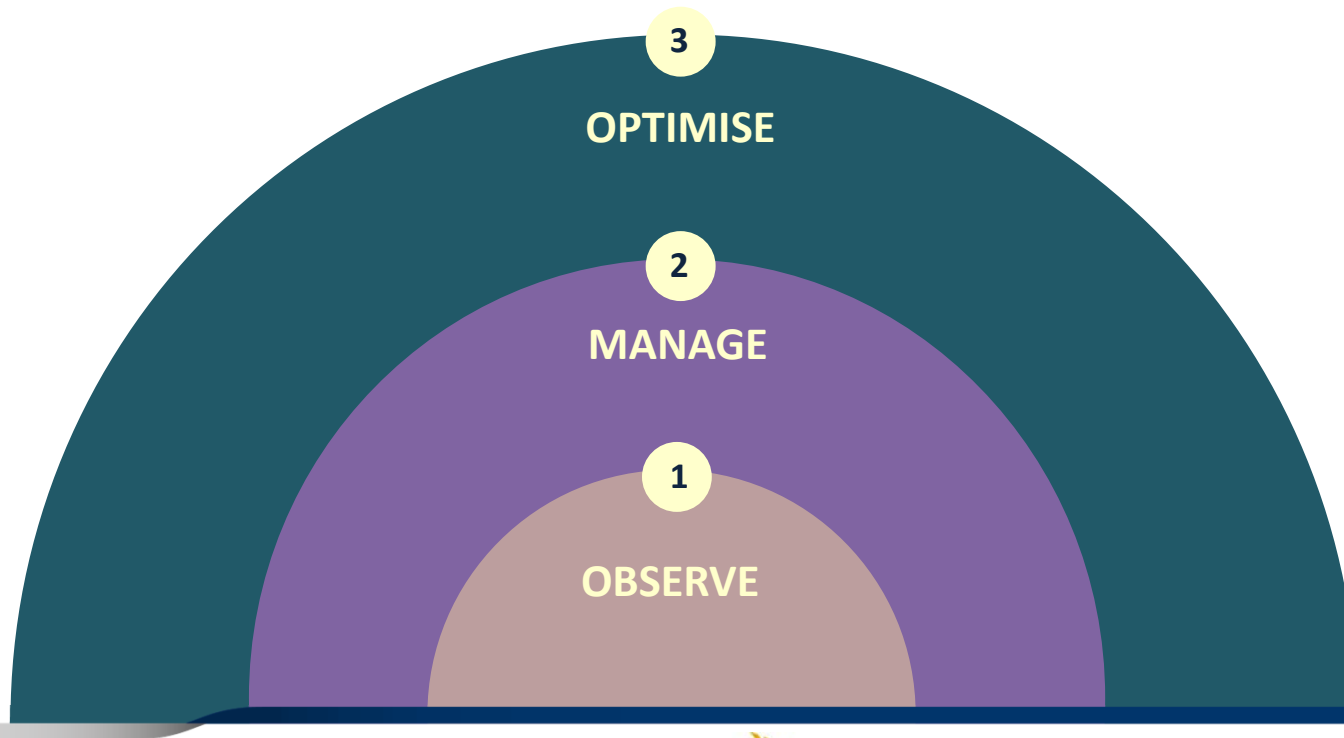
&

Optimisation of services
through greater
understanding
of building uses



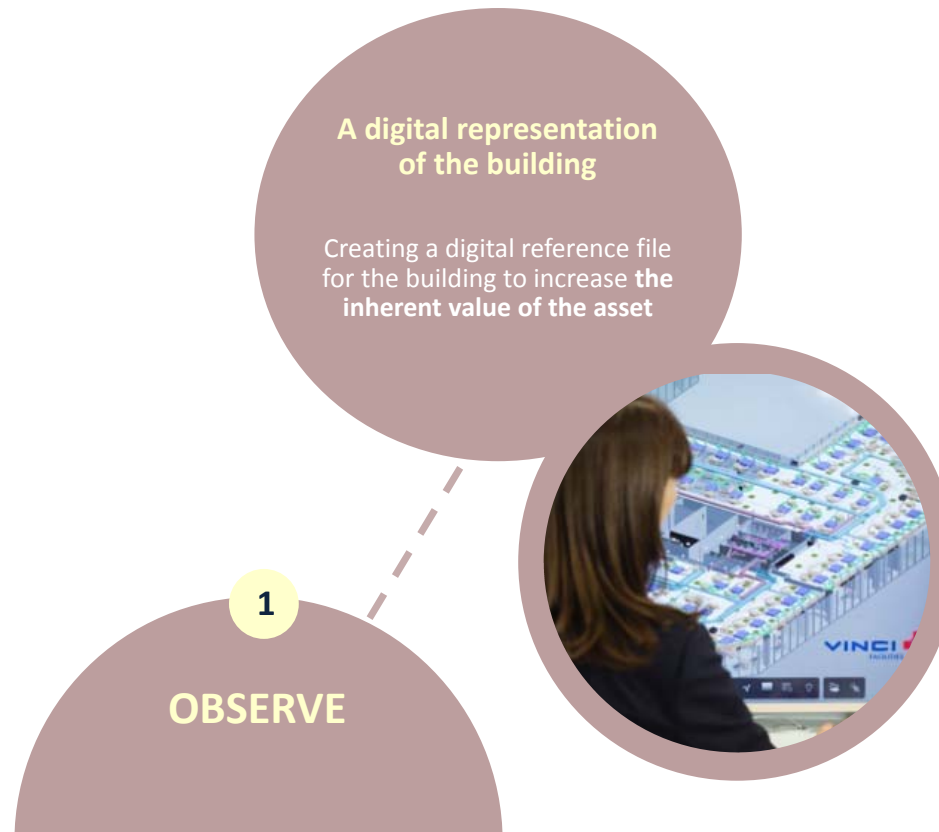
3 LEVELS OF BIM USAGE IN THE OPERATION PHASE

From 3D drawings to the dynamic operation model



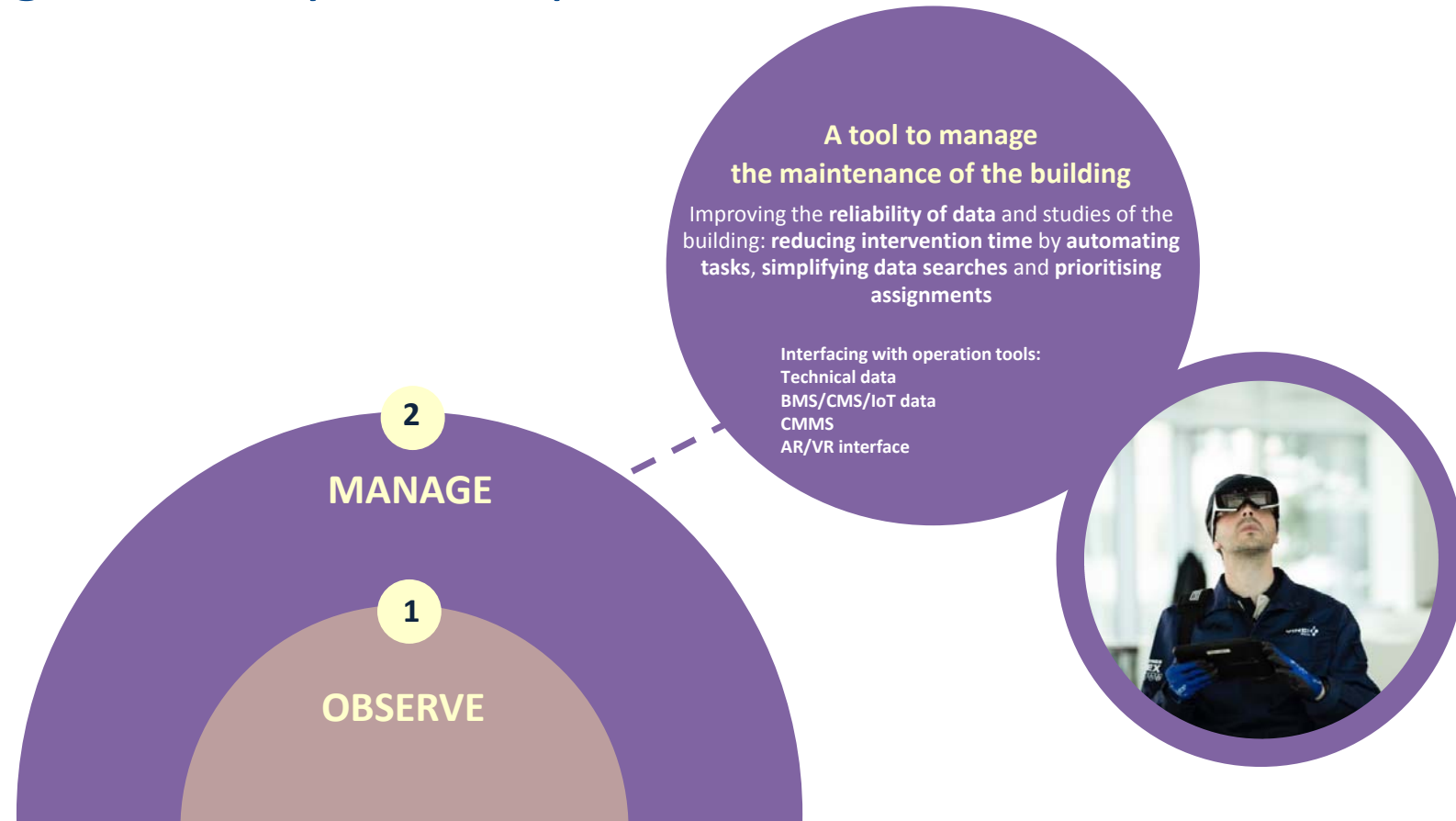
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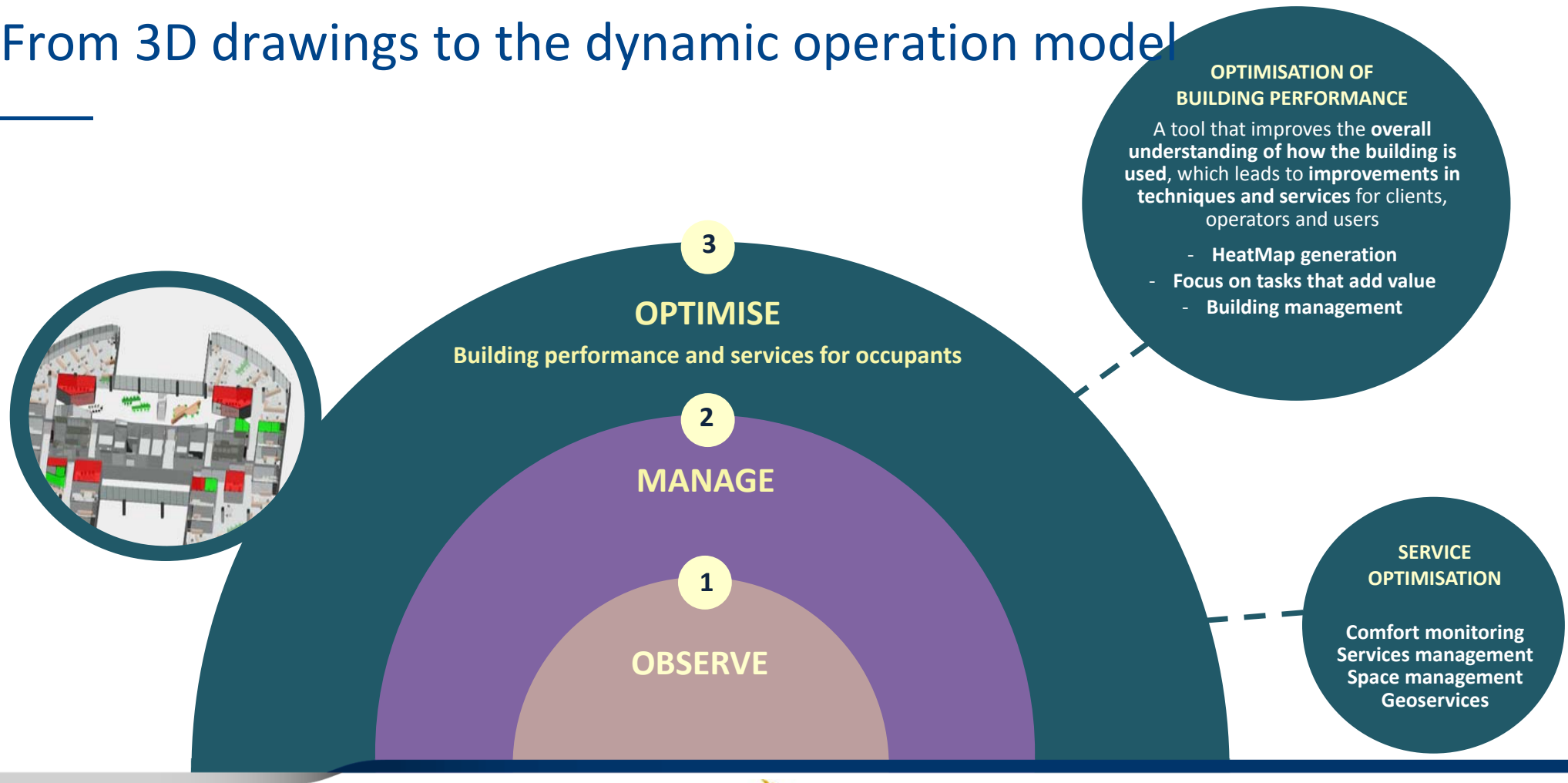
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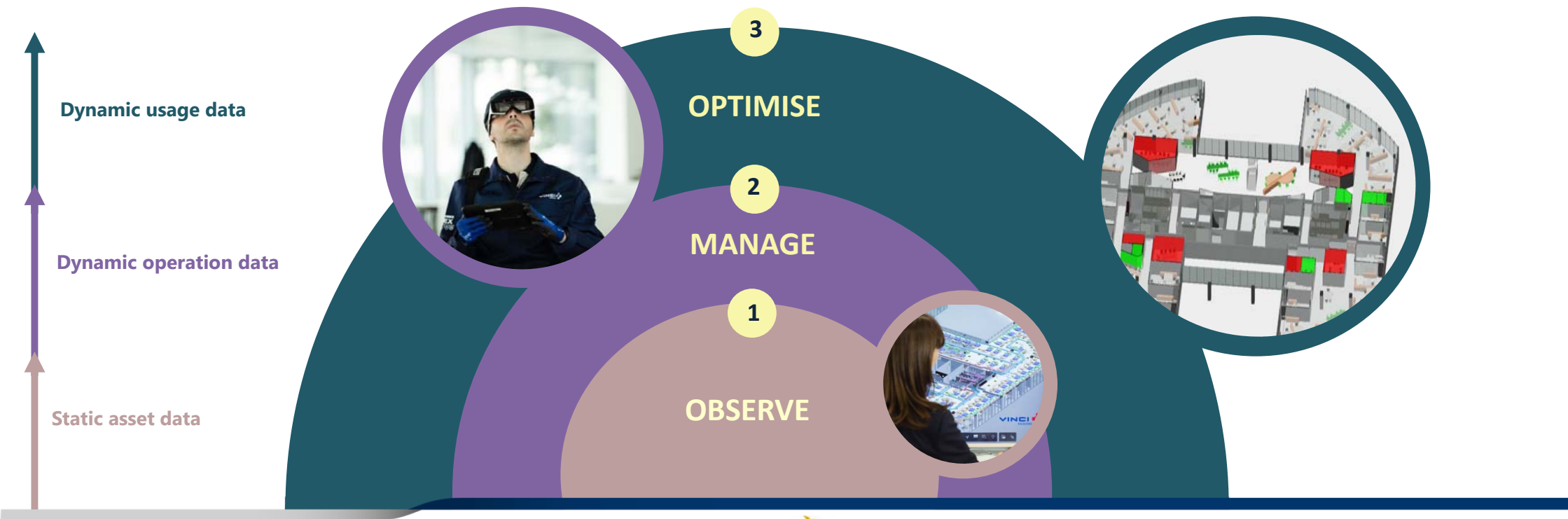
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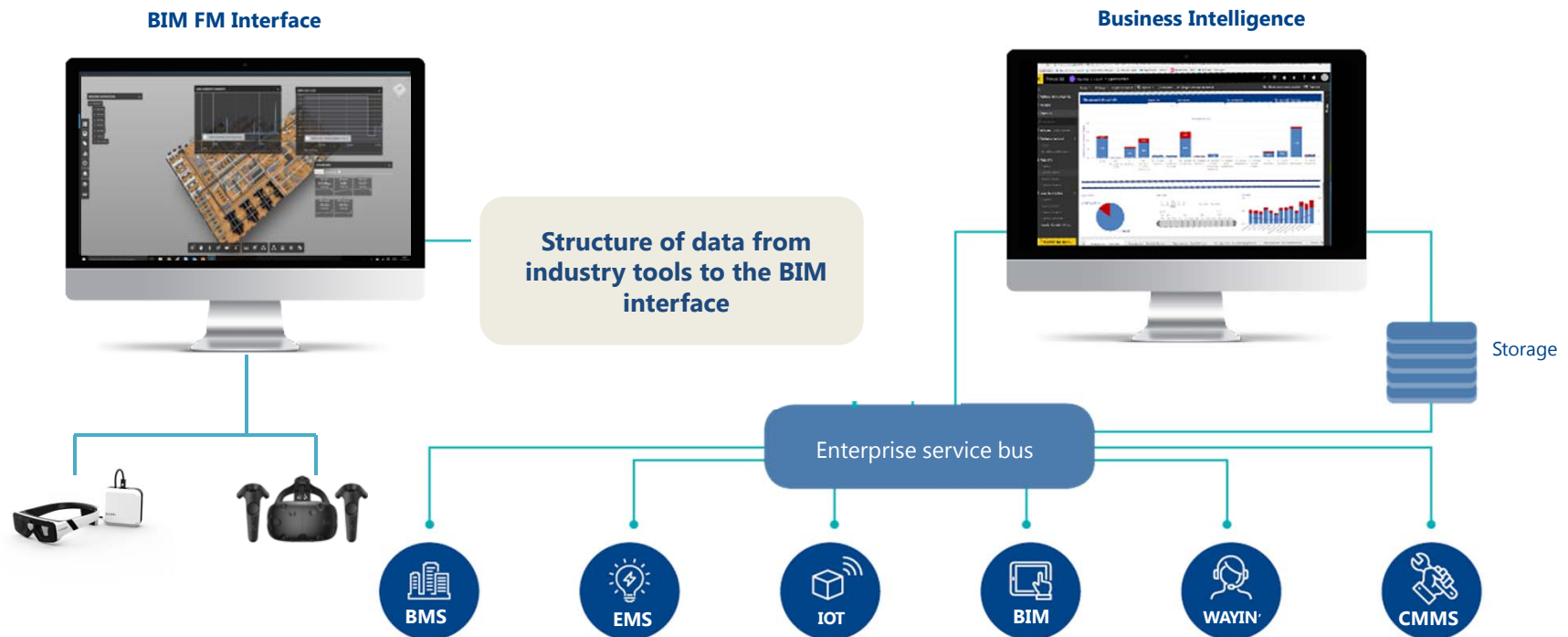
3 LEVELS OF BIM DATA IN THE OPERATION PHASE

From 3D drawings to the dynamic operation model



BIM – DATA MANAGEMENT ARCHITECTURE

To enable spaces dynamic operation



NEW FUNCTIONS

New BIM FM functions appear

// BIM FM Manager

- Secures the integrity of data and model
- Generates value with the BIM for the FM team, the tenant and the owner

// BIM FM Modeler

- Keeps the 3D model updated
- Makes sure that the data base is up to date

// BIM FM Consultant

- Helps teams integrate BIM in their operational practices
- Brings BIM FM guidance in design and construction



NEW SERVICES

In BIM Operation

CREATING AND SUPPLEMENTING THE BIM MODEL

- Standards Consultant and Project Manager
- Receipt and approval of the BIM As-Built Drawings

KEEPING THE BIM MODEL UPDATED

- Updating the 3D model and data in accordance with changes at the facility
- Additional data input

MAKING THE MOST OF THE BIM MODEL

- Using the BIM model and available data to the advantage of the various uses and areas of improvement (space, assets, comfort, energy, well-being) and the many beneficiaries
- Managing access rights, BIM platform, client export

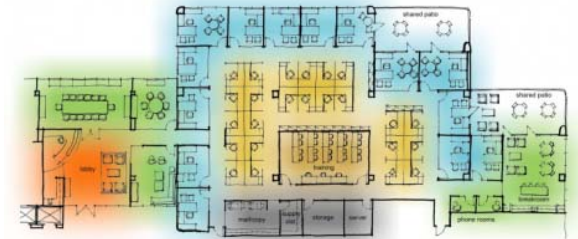
WHAT CHANGES WITH BIM FM ?

- // The requirement to have a accurate BIM delivered on time
 - *The BIM becomes a real tool that needs to be handed over with a warrantee*
- // Important transformation of operational processes and responsibilities
 - *A contribution to the future of FM*
- // A regular update of the BIM becomes an operational requirement
 - *A tool for FM, the tenant and the owner*



NEW CASES IN BIM FM

- // Integration for space management
- // Immersive approaches to space planning and project works
- // Technical asset management supported by BIM
- // Dynamic thermal simulation for energy performance in building operation
- // Geolocation for technicians and end-user
- // Continued development of augmented reality



USER EXPERIENCE

BIM FM USE CASES

Augmented maintenance

- // Improvement of the transfer between construction and FM (soft-landing)
- // Better access to technical information required for O&M
- // Setup of functional links for HVAC and plumbing
- // Research through key-words
- // Connection between CMMS and BIM
- // Better preparation of technical WO
- // Tests with augmented reality



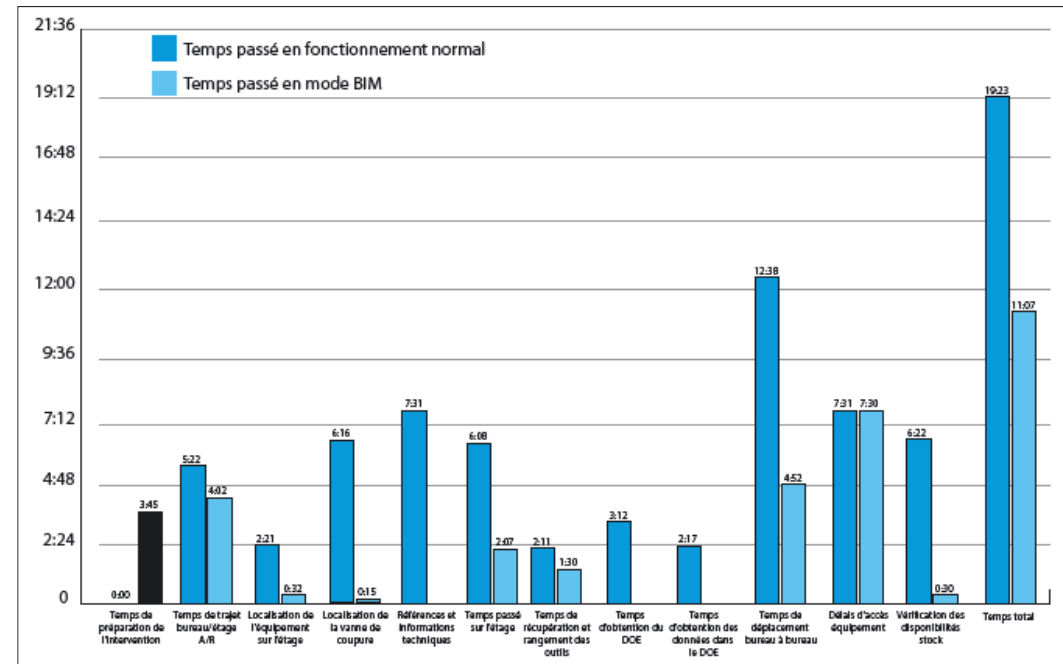
BIM FM USE CASES – FIRST RESULTS

Quantitative

- // Reduction of the time spent on technical interventions
- // Reduced disturbance for the end-user

Qualitative

- // Technicians are more autonomous
- // Pricing of services or project works is more accurate
- // Better follow up of technical installations



BIM OPERATION:

In existing buildings

Programming a BIM FM digitalisation project for existing buildings

1. **Identify the needs and uses** for the various stakeholders (owner, tenants, occupants, operators)
2. **Assess the data available** (Drawings, CMMS, As-Built Drawings, etc.) and accuracy in relation to the existing building
3. **Create the BIM FM 3D model (digitalisation)** either using existing drawings or a 3D scan
4. **Keep the 3D model up to date** throughout operation and maintenance



ADVANTAGES OF BIM

For the different stakeholders



Owner/Developer /Asset manager

FINANCIAL:

Easy access to the level of technical development of the building supplemented by VF (asset data, record of work)

Anticipation and optimisation of costs and investments (through improved understanding of the way clients use their assets)

Reduced timeframes to set up data rooms (inventory of input and output data)

Increased building value (e.g.: rental value)

Quantitative control of the Bill of Materials/Multi-year facility plan/Monitoring of total cost of ownership

INSURANCE:

Reduction in insurance premiums for the building

LEGAL:

Simplified contract transfer between maintenance/operating companies



Facility Manager

TECHNICAL:

Improved contract management: financial tracking (more accurate estimations)/analytics

Reduced intervention time for technicians, improved quality and response time through better communication of alerts

Refocusing on higher added-value actions and implementation of new services

FINANCIAL:

Reduced financial costs due to lower risks of regulatory non-compliance

Comprehensive quantitative estimate adjusted to the equipment installed

Anticipation of the building's energy requirements



Users/Tenants

PRODUCTIVITY AND WELL-BEING:

Increased productivity and comfort of occupants, leading to productivity gains

Employees benefit from new services and greater well-being

Less disruption to occupants during interventions

TECHNICAL:

Greater flexibility and capability to optimise spaces

LEGAL:

Building compliance guarantees in real time in relation to the standards set by the HSE

THE END

An illustration of a hand holding a black signpost. The hand is light-skinned and is wearing a blue long-sleeved shirt with a white button visible at the cuff.

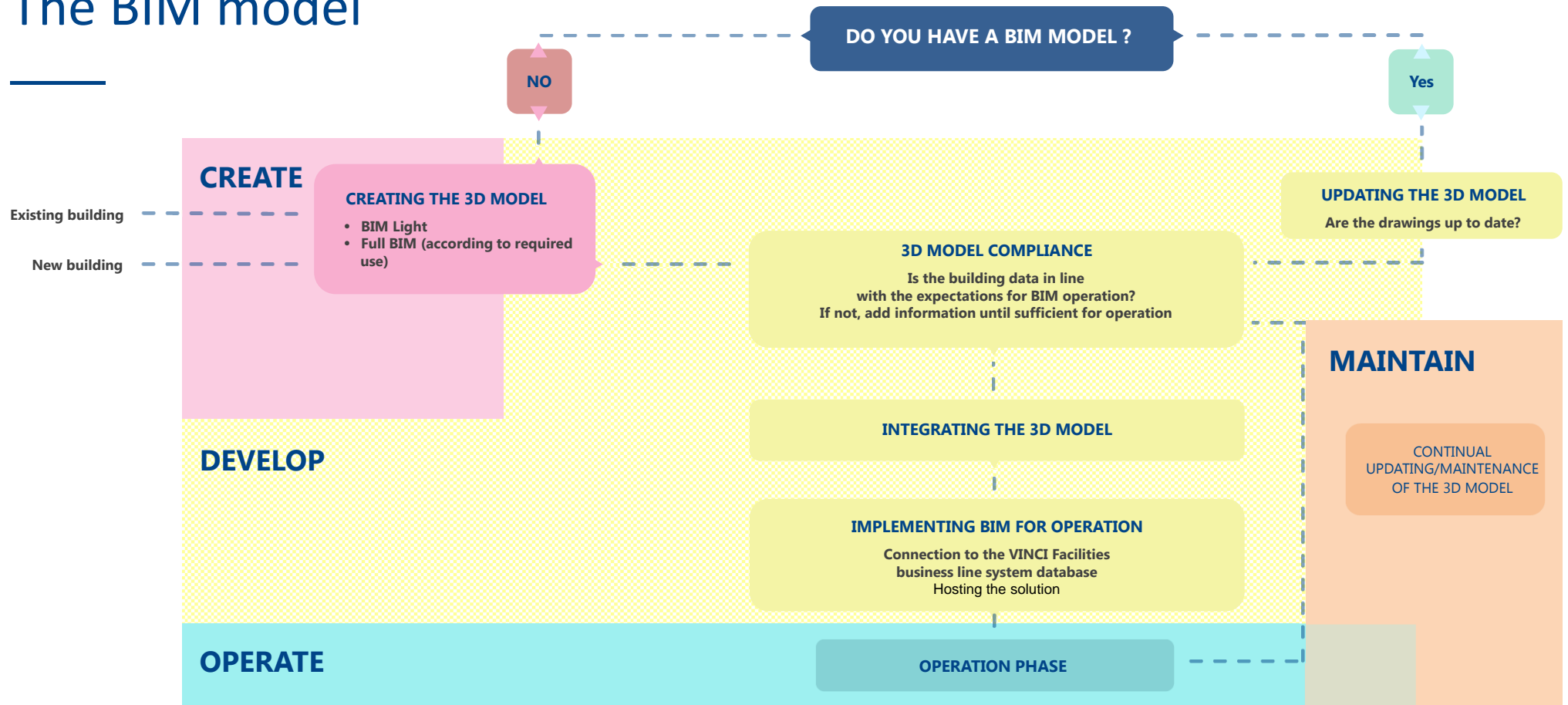
ANY QUESTIONS ?

An illustration of a hand holding a black signpost. The hand is light-skinned and is wearing a red long-sleeved shirt with a white button visible at the cuff.

THANK YOU FOR YOUR
ATTENTION

Appendices

PROCESS OF CREATING The BIM model



DATA OWNERSHIP: ALLOCATION OF RIGHTS

Between construction stakeholders



Owner/Developer

OWNS THE 3D MODEL

- 3D model including a record of maintenance and interventions (corrective, preventive and regulatory)
 - Optional: record of alerts and failures of the BMS and building energy performance monitoring
- Access at all times to the 3D model and the information contained within, independently of any company involved, as well as the level of technological development of the building and all records



Facility Manager

OWNS THEIR OWN OPERATIONAL DATA GENERATED FROM FACILITY MANAGEMENT OPERATIONS

- Operational data from their teams, including schedules and data from people working on site
- Level of maintenance of each item of equipment (record compiled for the owner)
- Record of spare parts
- List of contacts and suppliers contracted to the facility in question
- Supplementary data in the 3D model for all maintenance needs, without financial input from the owner: possibility of providing it to the client free of charge or for a fee



Users/Tenants

OWN THE INFORMATION RESULTING FROM TENANT WORKS AND DATA ON THE LIFE AND USE OF THE BUILDING

- Development modelling
- Production tool modelling
- Living space modelling
- Data generated by space management systems:
 - Use of work areas and relevant directories
 - Occupation data for indoor geolocation or IoT
 - Data on comfort settings and access control