CIPA 2019 AVILA 27th International Symposium
CIPA Heritage Documentation

"DIGITAL TWIN:

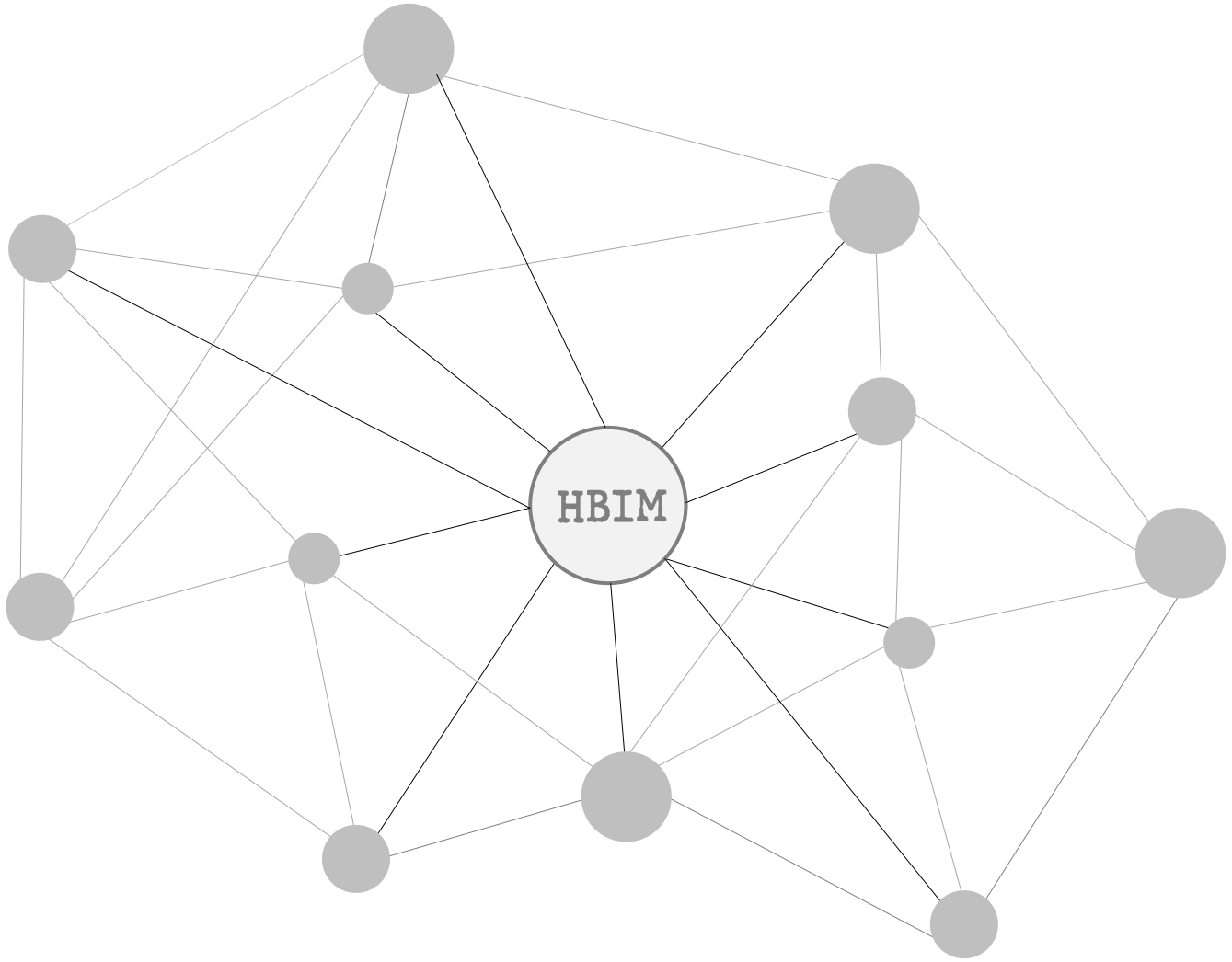
A HBIM-BASED METHODOLOGY TO SUPPORT PREVENTIVE CONSERVATION OF HISTORIC ASSETS THROUGH HERITAGE SIGNIFICANCE AWARENESS" _

PIERRE JOUAN & PIERRE HALLOT

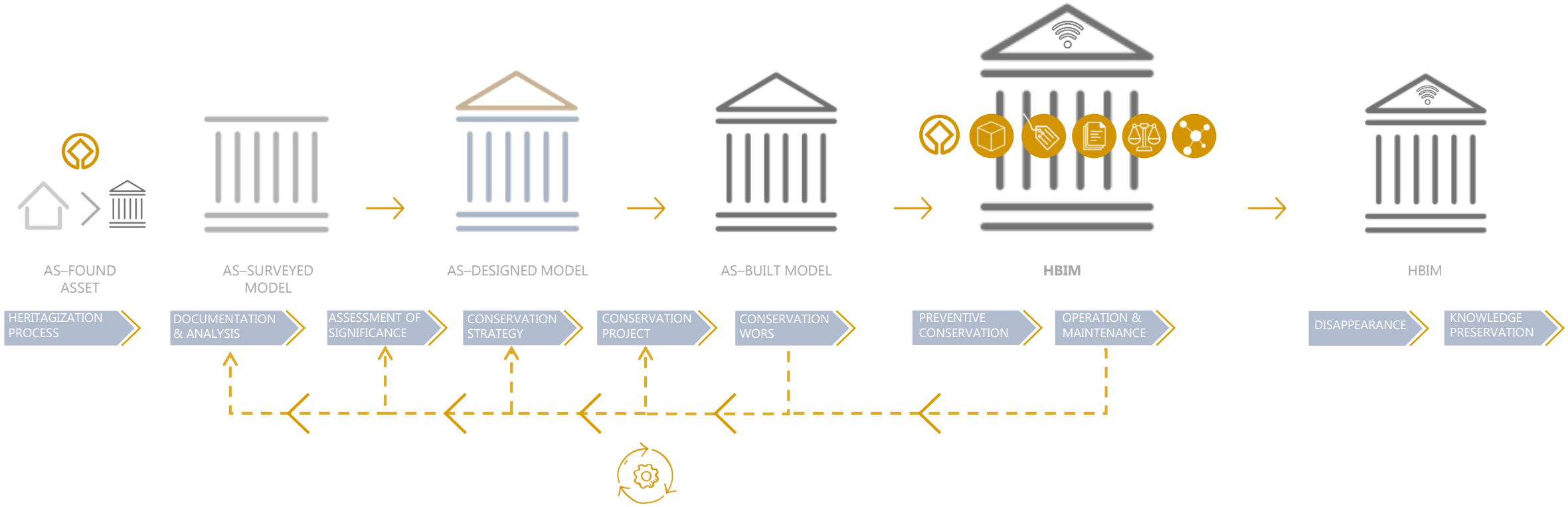
(Oral presentation @CIPA 27th Internationnal Symposium, in Ávila, Spain, september 5th 2019)

LIÈGE université

- University of Liège, Belgium, Dept. of Architecture, LNA-DIVA research labs -



Data centralization & collaborative management in HBIM_



HBIM & documentation along Heritage Conservation process_

Appropriate skills? ⟶ Data obsolescence - loss?

Objectives of the methodology:

- Keep data "alive" and up-to-date to avoid its loss
- Provide site managers' with tailored information for the preservation of their assets

HBIM models & facility managers_

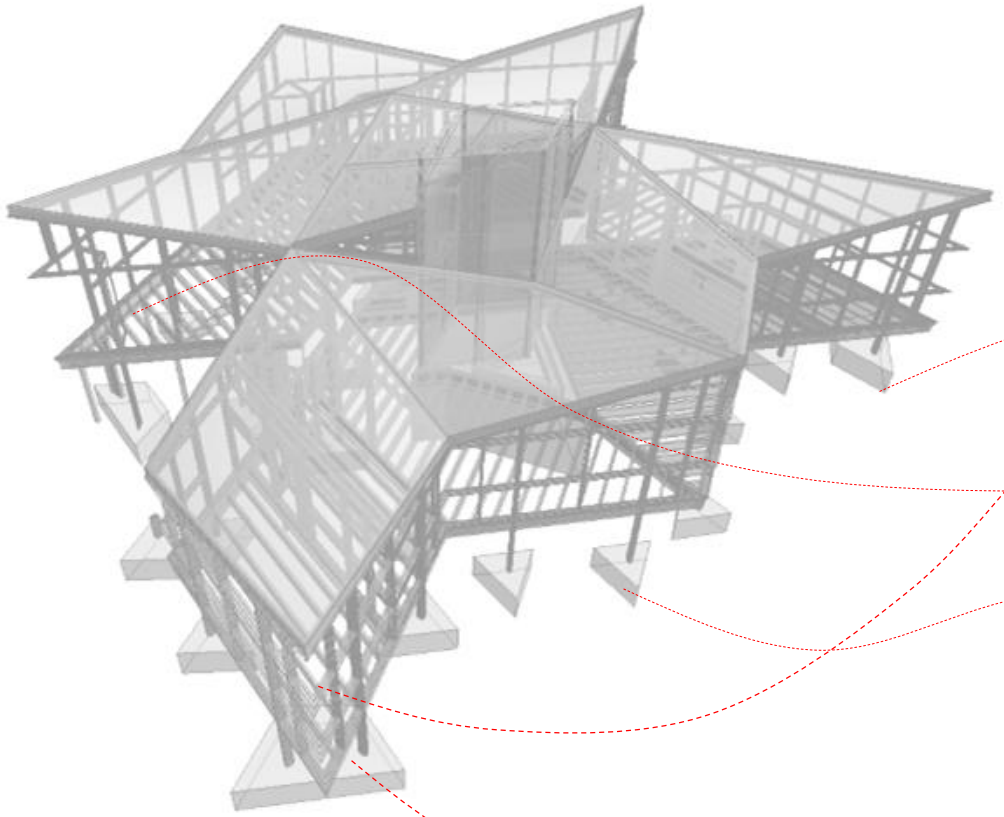
Digital Twin?_

MONITORING

Observation | Simulation | Analysis

Real-time data

Sensing devices



Digital replica

DIGITAL WORLD

IoT

Physical object

REAL-WORLD

HERITAGE SIGNIFICANCE-BASED HBIM PROCESS

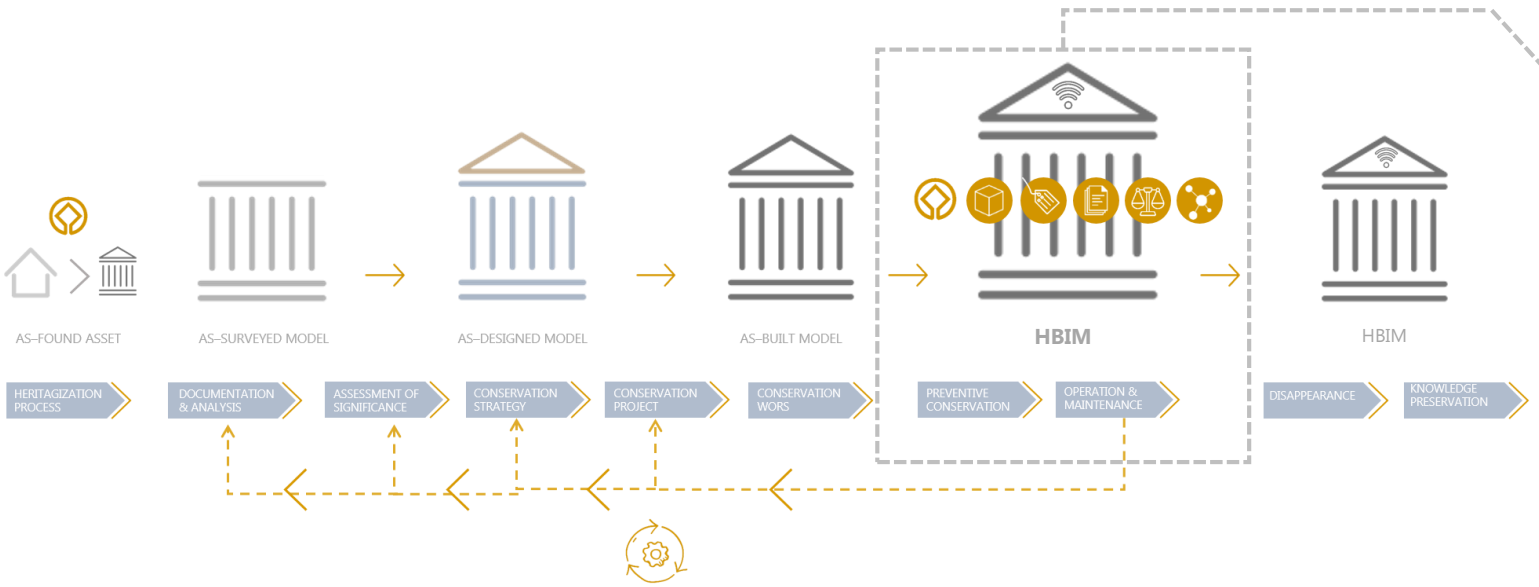
DIGITAL WORLD

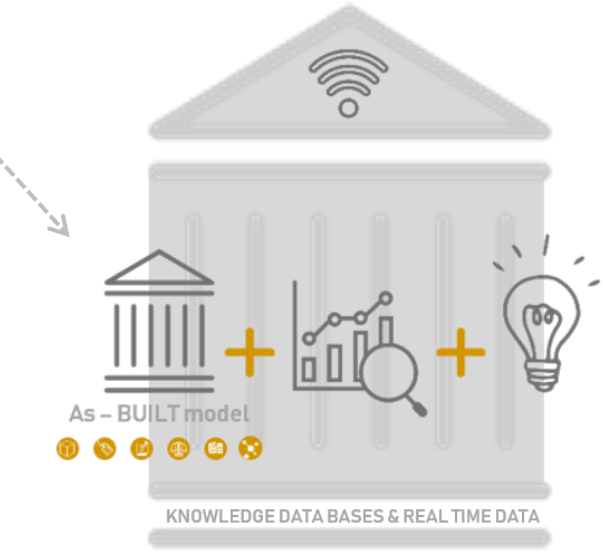
DIGITAL TWIN

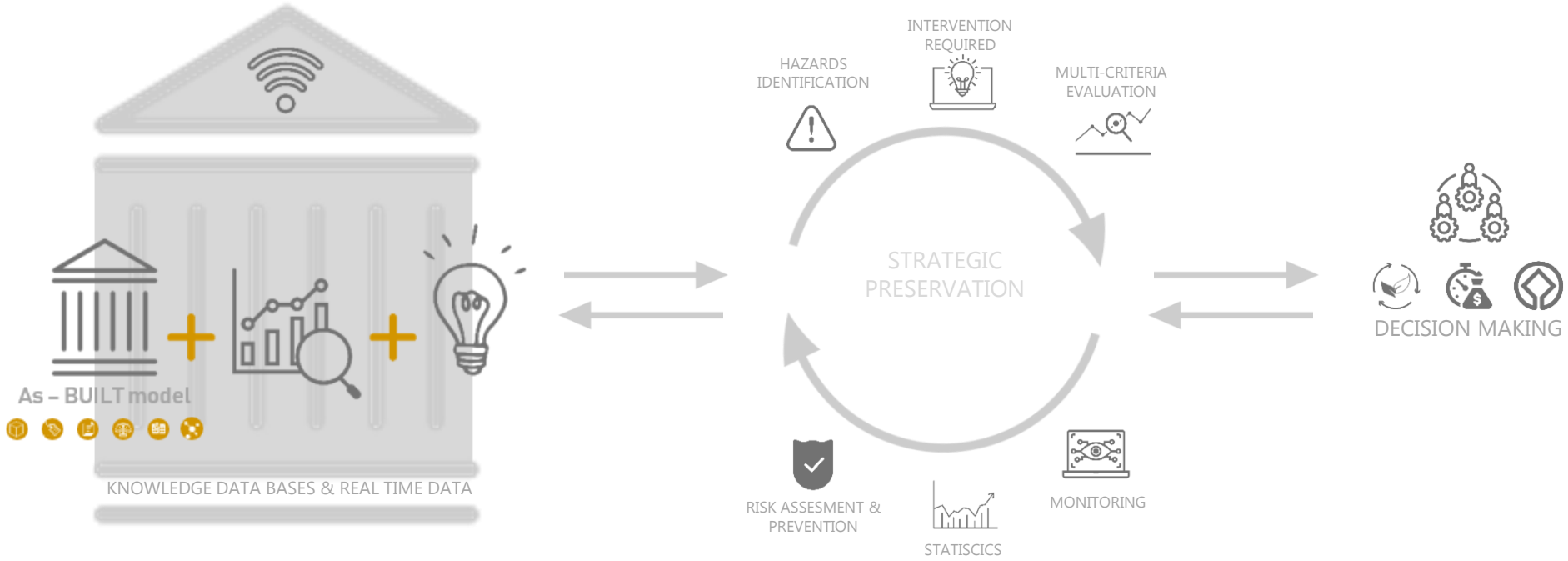
DIGITAL + PHYSICAL WORLD

INTEROPERABLE STRUCTURED DATA

DATA MANAGEMENT PROCESS







Digital Twin & preventive Conservation_

HERITAGE SIGNIFICANCE-BASED HBIM PROCESS

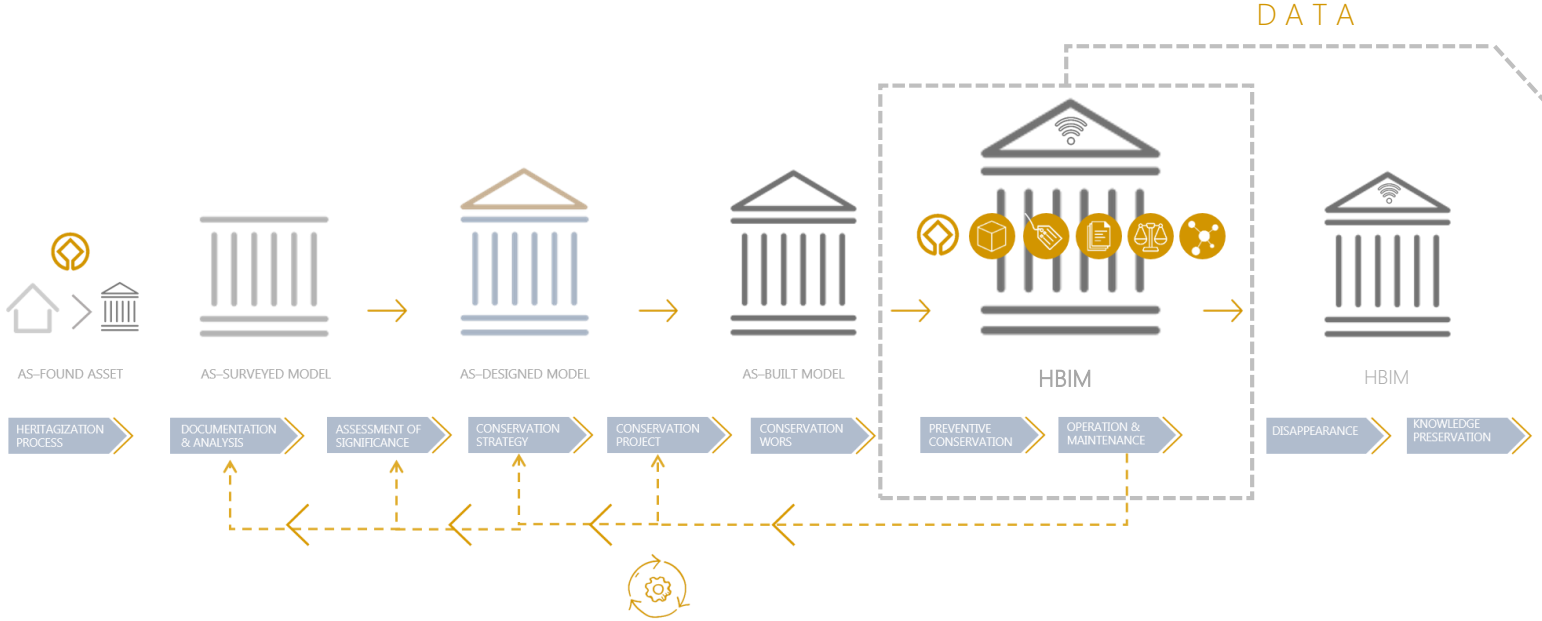
DIGITAL WORLD

DIGITAL TWIN

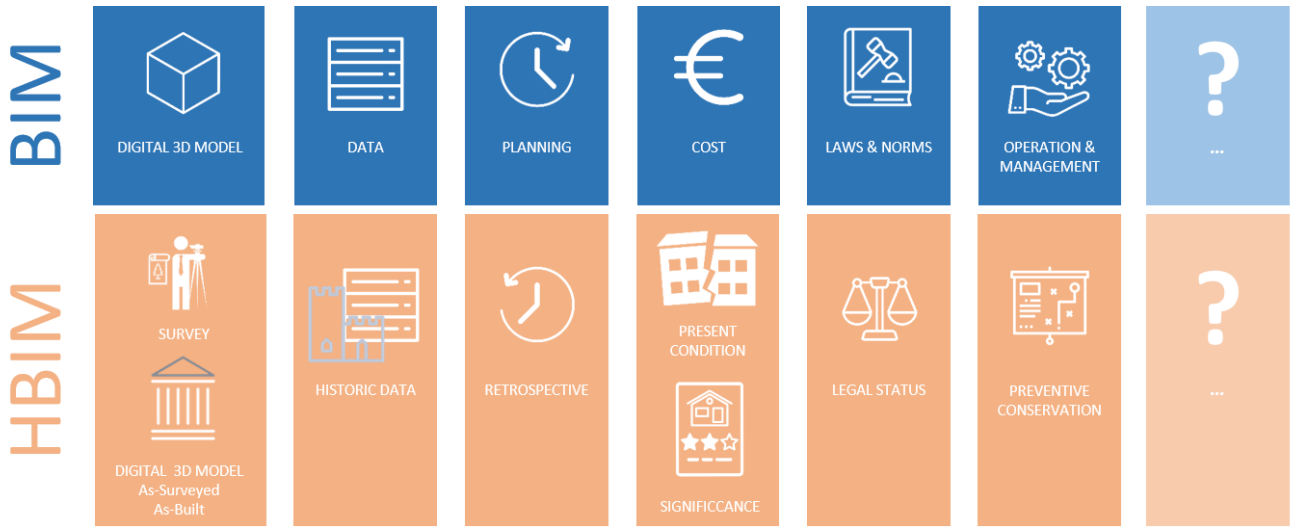
DIGITAL + PHYSICAL WORLD

INTEROPERABLE STRUCTURED DATA

DATA MANAGEMENT PROCESS



DIGITAL INFORMATION MODEL



DIGITAL INFORMATION MODEL

Data structuration in HBIM models _

DIGITAL INFORMATION MODEL

BIM

HBIM

Data structuration in HBIM models _

VALUES TYPOLOGIES

Fredheim and Khalaf's (2016) **critical review** and
proposal of a new framework for value assessment

Values typologies "*often **fail** to prompt the necessary questions **to develop satisfactorily detailed understandings of heritage significance**, resulting in decisions being based on **implicit, rather than explicit**, value assessments in practice*".

"To summarise, a value typology should be short, yet inclusive, use accessible language, minimize overlap between values and provide a mechanism for **reviewing and integrating past assessments of significance.** "

Heritage significance & value typologies?_

WHAT?

Identification and description of *features of significance*:

Forms
(tangible & measurable)

Relationships
(identity, memories, spirituality, sense of the place,…)

Practices
(traditions, activities, events)

…

WHY?

In what sense are the identified features valuable?
(Aspects of value)

Associative
(people, events, places, traditions, …)

Sensory
(sensory pleasure)

Evidentiary
(provides evidence for smth)

Functionnal
(Heritage in use)

…

HOW?

How valuable are the identified features?
(Qualifiers of value)

Authenticity
(people, events, places, traditions, …)

Rarity
(sensory pleasure)

condition
(provides evidence for something)

…

New framework for identification of the interpretations of Heritage "site"_

- Fredheim and Khalaf's proposal to be used as **model for prototyping data structuration in HBIM model**

- **TAXONOMY in HBIM models:** Definition of categories, sub categories => Inclusive, from specific to general to ensure adaptability of such process regardless of time-space context

- **Multi-scale process** to provide a complete understanding of the interpretations of Heritage assets

Heritage significance & quantitative data_

HERITAGE SIGNIFICANCE-BASED HBIM PROCESS

DIGITAL WORLD

DIGITAL TWIN

DIGITAL + PHYSICAL WORLD

INTEROPERABLE STRUCTURED DATA

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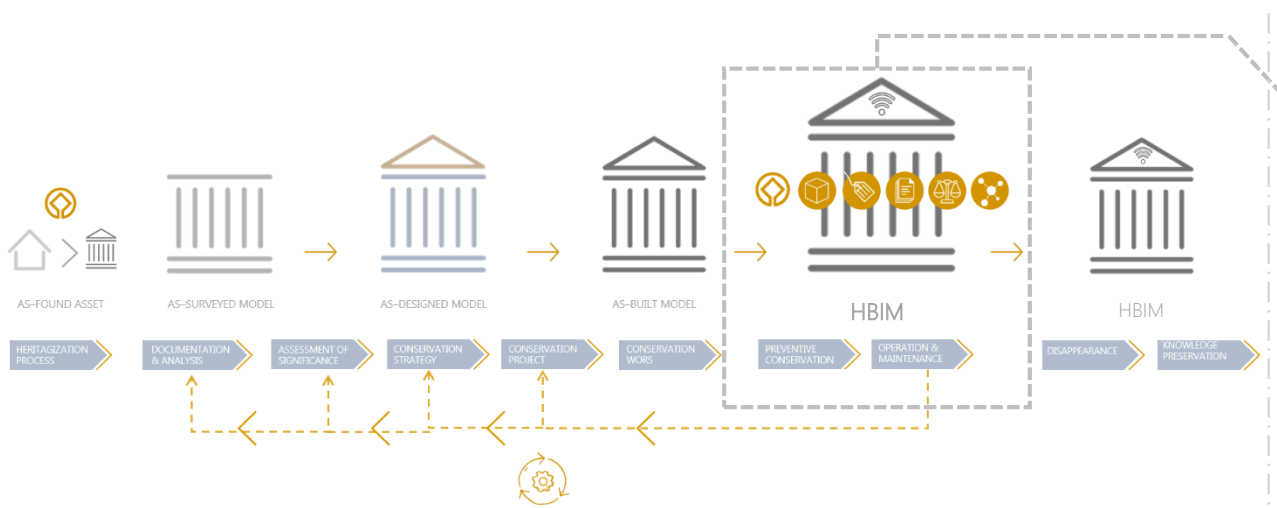

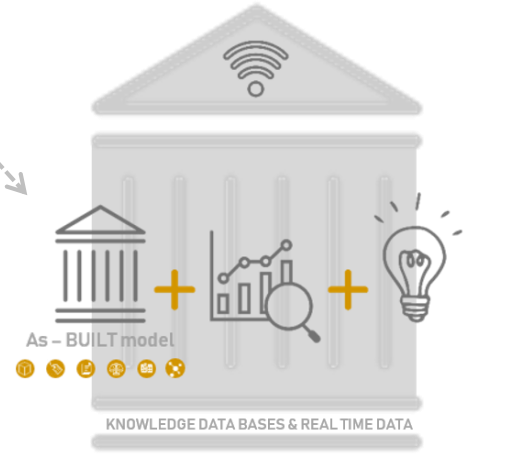

DIGITAL INFORMATION MODEL

HERITAGE SIGNIFICANCE-BASED HBIM PROCESS

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DIGITAL TWIN

DIGITAL + PHYSICAL WORLD

INTEROPERABLE STRUCTURED DATA

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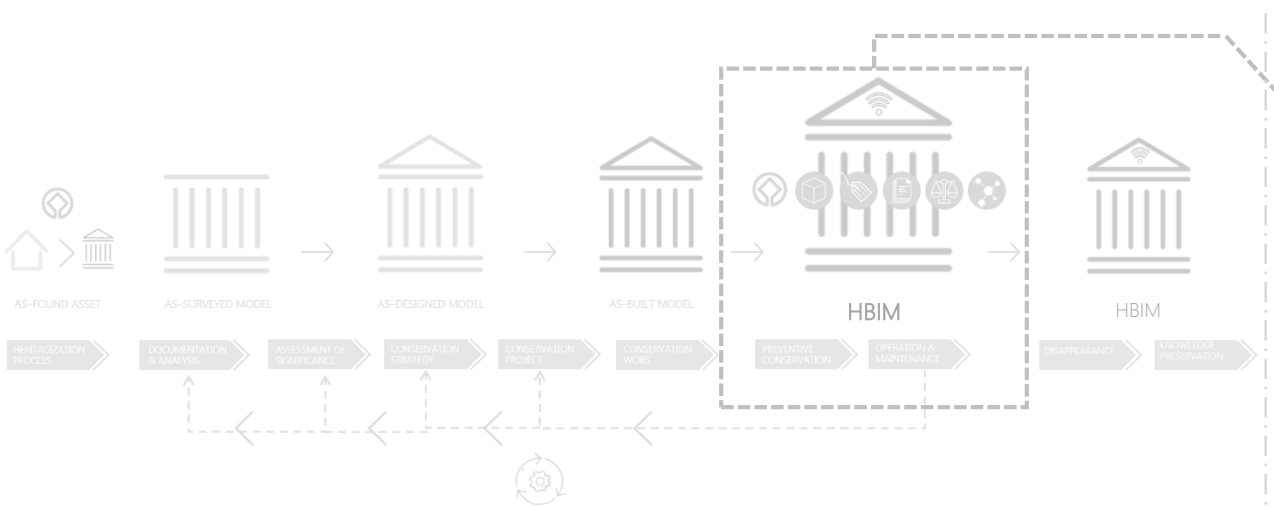
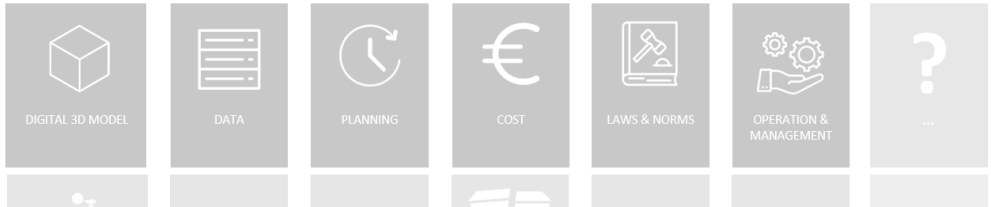
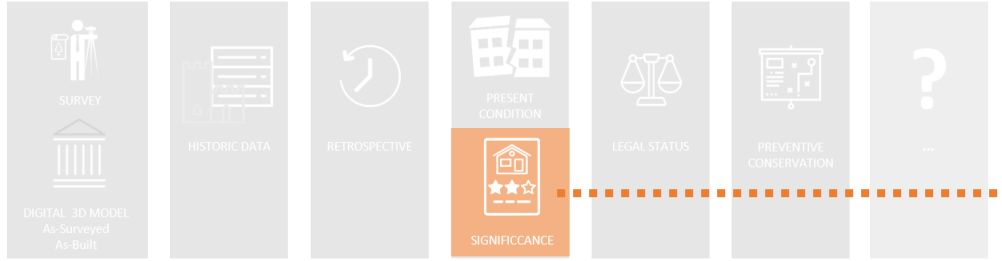


DIGITAL INFORMATION MODEL

BIM



HBIM



HERITAGE SIGNIFICANCE-BASED HBIM PROCESS

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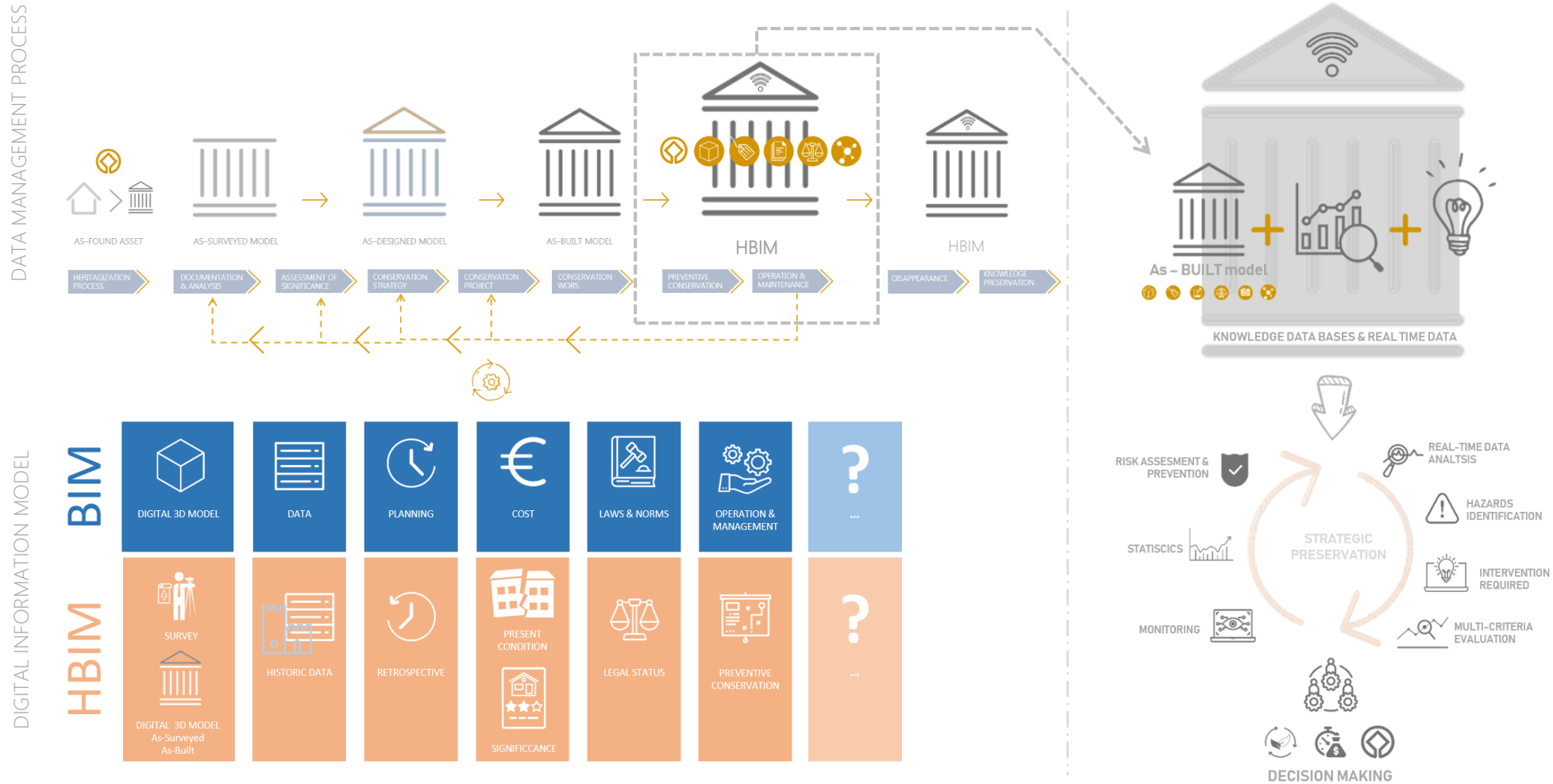

Conclusions_

- Data structuration model for heritage significance
- Multi-criteria evaluation process in digital twin environment
- Interoperability Digital Twin - HBIM

Further steps - challenges?_

AGILE

"LIVING LAB"_

Pierre Jouan | pjouan@uliege.be

Pierre Hallot | p.hallot@uliege.be

- University of Liège, Belgium, Dept. of Architecture, LNA-DIVA research labs -