

Data Templates and Digital Building Logbooks boosting Digital Twin in Construction

LUXEMBOURG



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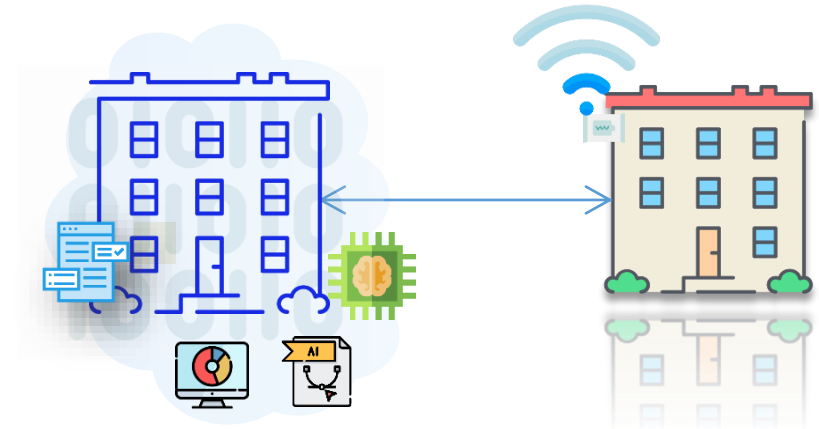
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Outline

- Concepts
- Motivation
- Methodology
- Results and Discussions
- Conceptual Framework
- Conclusions

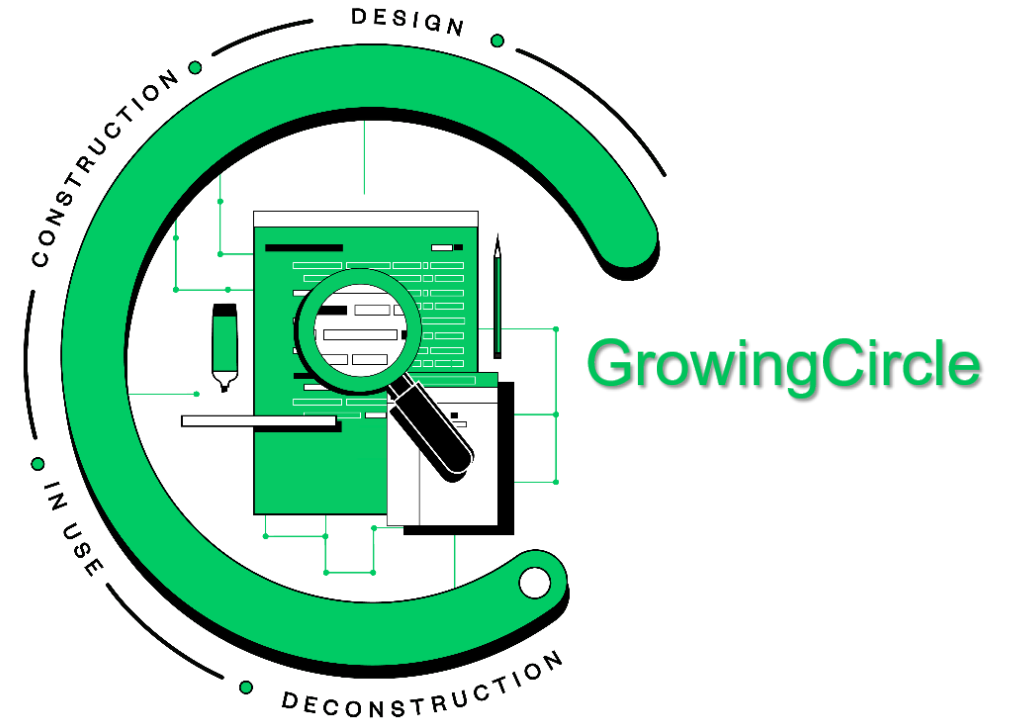


Motivation

Awareness and Education of Construction Industry stakeholders for the **relevance and role of Data Templates** on the construction process and as tool to foster efficiency and circularity.

Development of technical and scientific literature and tools on the topic.

Development of case studies to prove the **added-value** of using **Data Templates**, seeking outcomes at **construction process**, **information management** and **circularity levels**.



Concepts

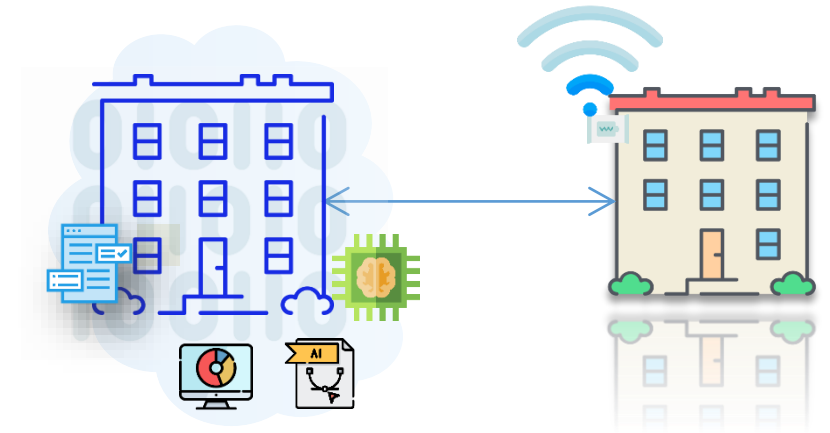


ISO 23387

**Digital
Data
Template**



**Digital
Building
Logbook**



**Digital Twin
Construction**

Concepts



Data Templates are standardised, interoperable metadata structures used to describe the characteristics of construction objects. [ISO 23387](#)

“Data templates will enable construction project stakeholders to exchange information about construction objects through an asset life cycle, using the same data structure, terminology and globally unique identifiers to enable machine-readability.” [ISO 23387](#)



ISO 23387

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Data
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Concepts

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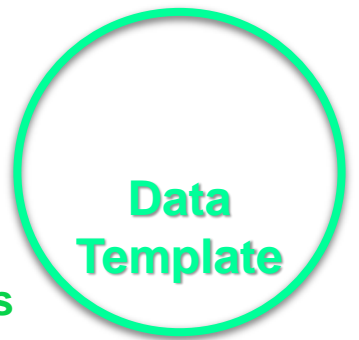
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Structures

Machine-readable

Data

Properties



Construction Objects Characteristics

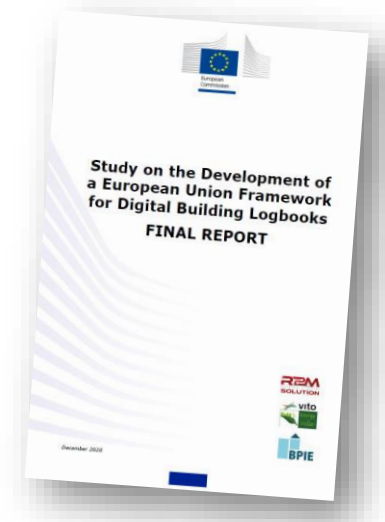
ISO 23387

Digital
Data
Template

Concepts



Digital building logbook is a common repository for **all relevant building data**. It facilitates information sharing within the construction sector. A digital building logbook is **a dynamic tool that allows a variety of data**, information and documents to be recorded, accessed, enriched and organised under specific categories. It represents a record of major events and changes over a building's lifecycle, such as change of ownership, tenure or use, maintenance, refurbishment and other interventions.



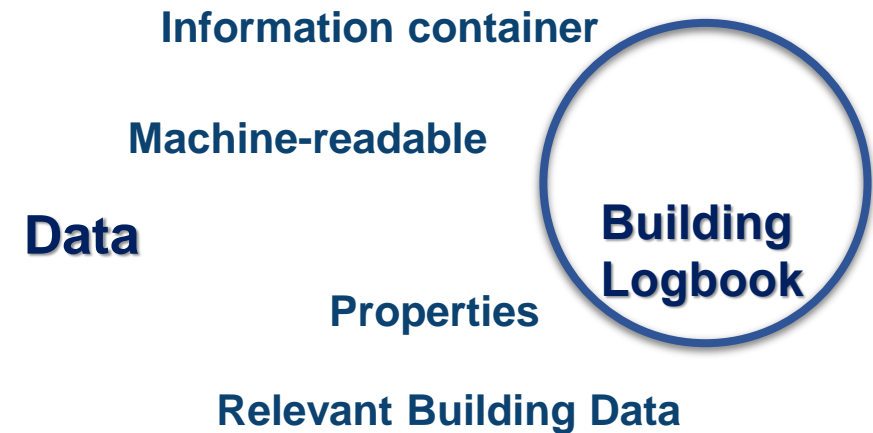
Digital Building Logbook

Concepts



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Information container

Machine-readable

Data

Properties

Relevant Building Data



**Building
Logbook**

Concepts



Digital Twin Construction

Digital Twin is an ecosystem aimed to interconnect sensors in physical assets to cyberspace, fostering the collection, processing and analysis of data.

Digital twin construction (DTC) is a new mode for managing production in construction that leverages the data streaming. DTC applies Building Information Modeling technology and processes, lean construction thinking, the Digital Twin Concept, and AI to formulate a data-centric mode of construction management.”



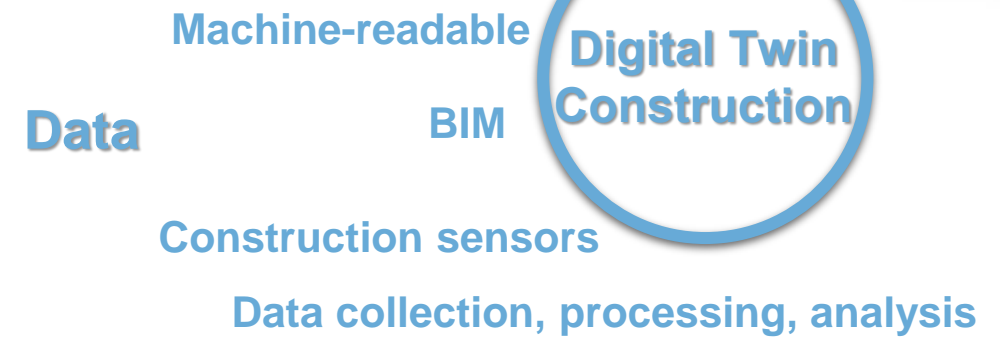
Concepts



Digital Twin Construction

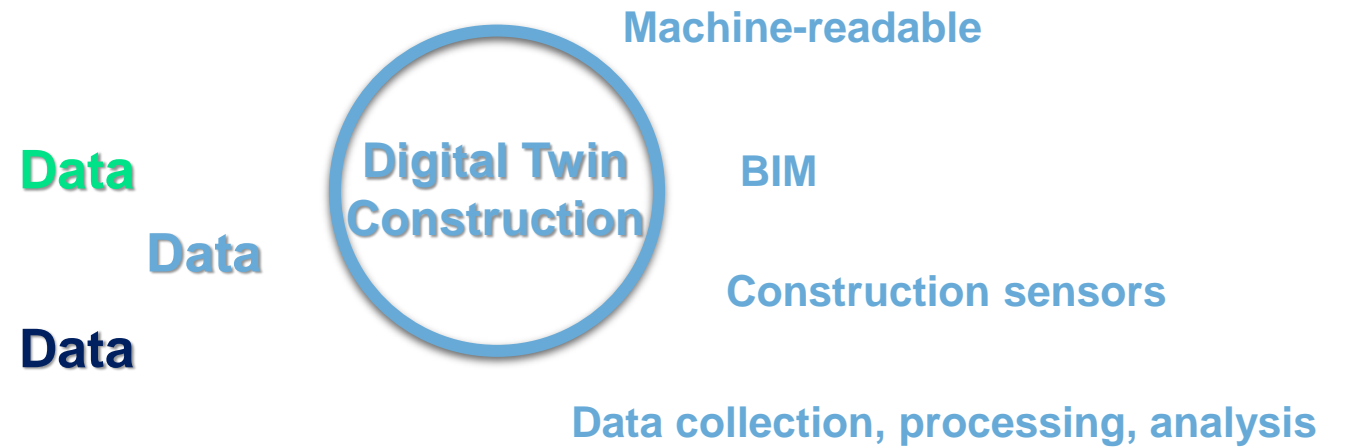
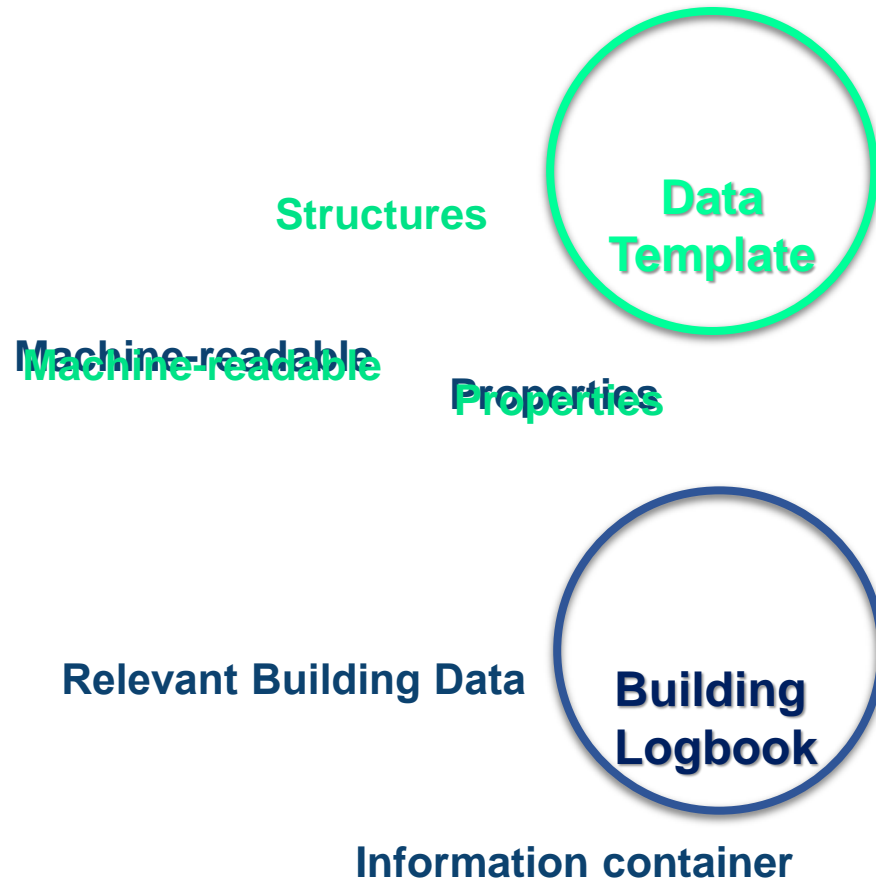
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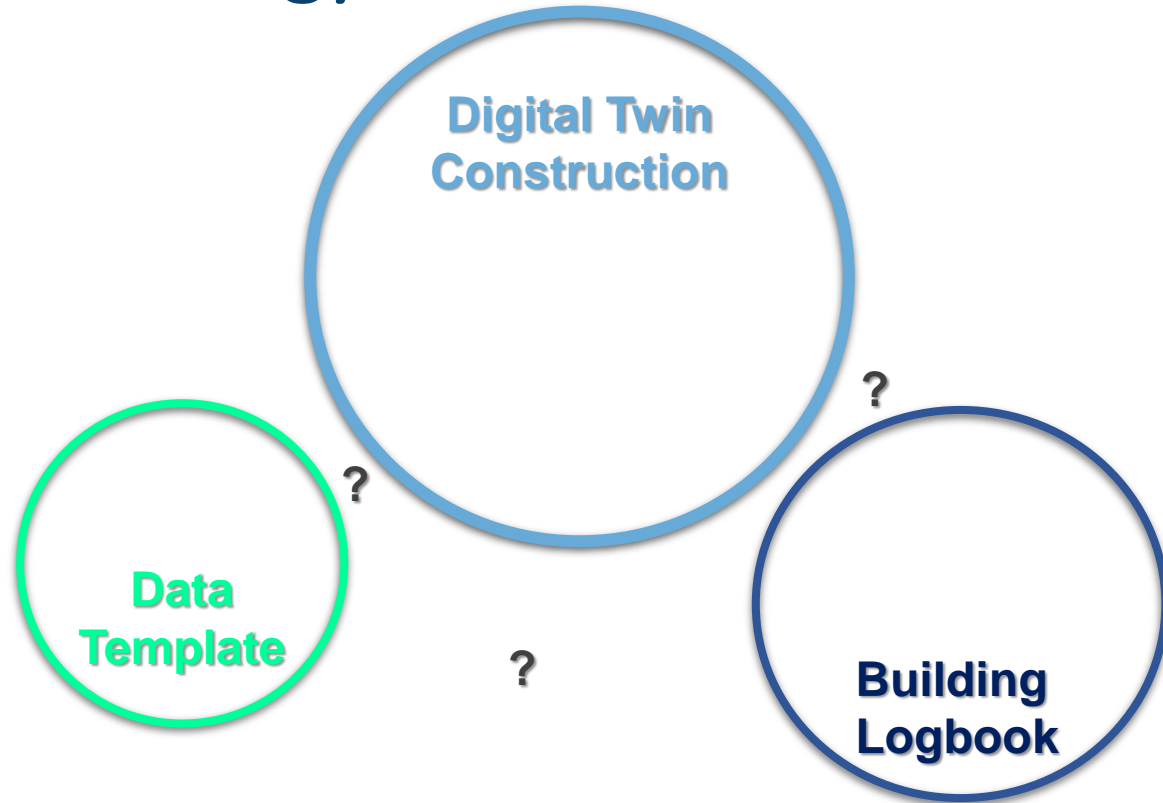


Motivation

Construction Objects Characteristics

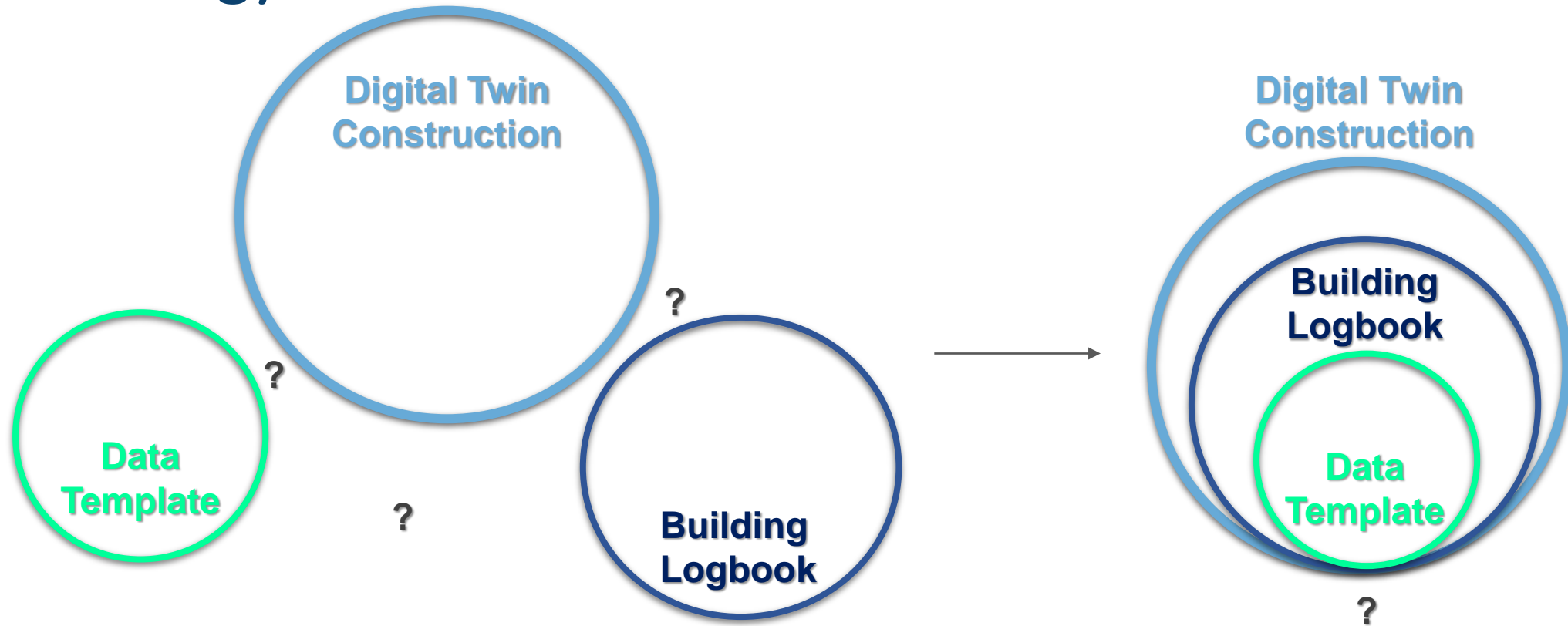


Methodology



Research question seeking the touch points and overlaps between these concepts
Discussion on the results where concepts clarity provide synergies to boost innovation in digit. and sustainability

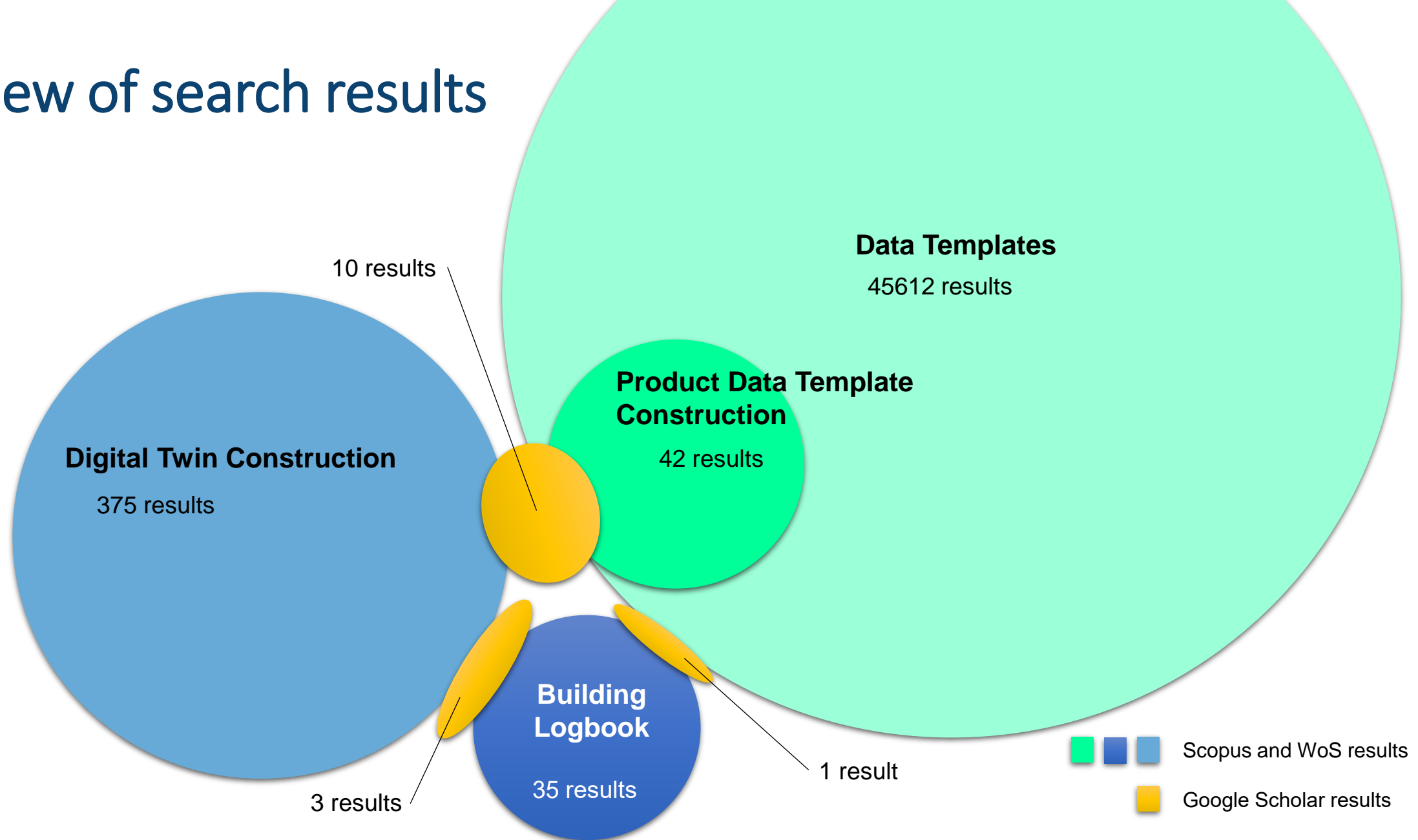
Methodology



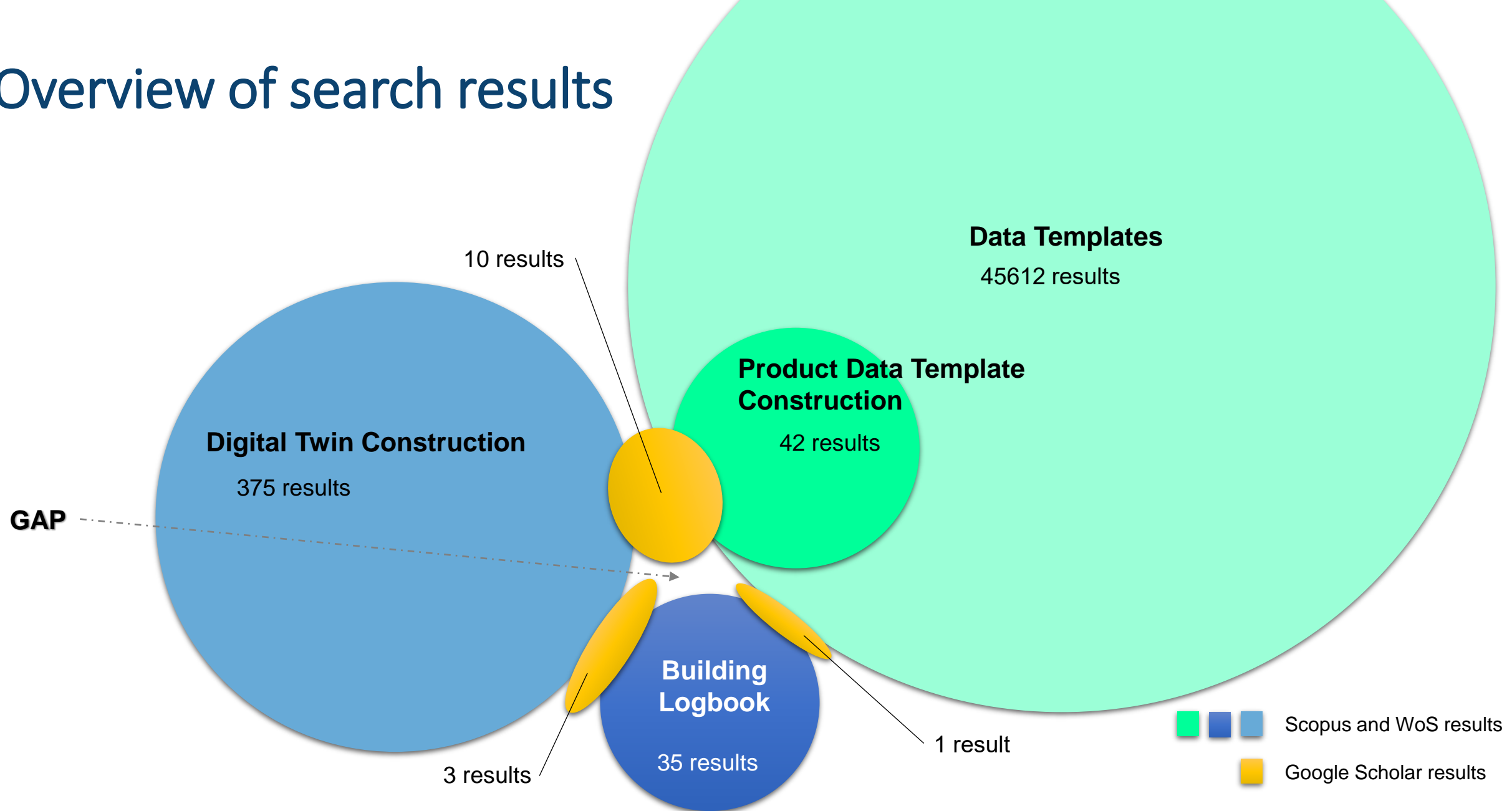
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Overview of search results



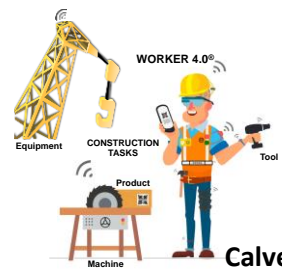
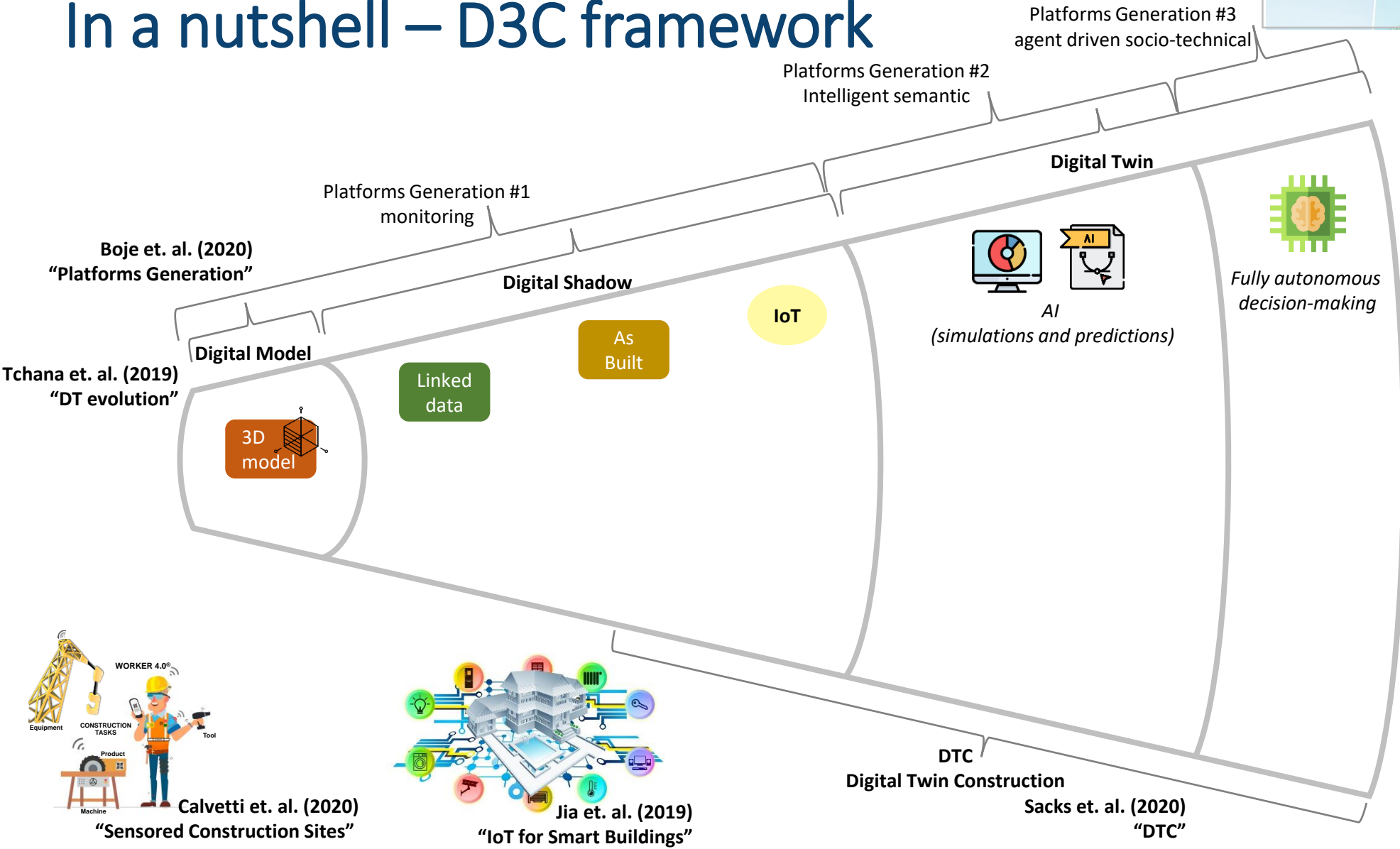
Overview of search results



Search results in detail

Concepts	Output Title	Year	Author
DBL and PDT	Research on Bridging the Information Gap of BIM of interoperability and integration in Facilities Management	2020	Kutaiba, A. et. al.
DT and PDT	The Post-Occupancy Digital Twin: A Quantitative Report on Data Standardisation and Dynamic Building Performance Evaluation	2020	Kirwan, B.
	Urban Semantics in BIM & GIS	2018	Xue, F.
	A framework for product recall in the construction industry	2019	Watson, R.
	Towards a BIM-Based Decision Support System for Integrating Whole Life Cost Estimation into Design Development	2020	Zanni, M.
	Evaluating the Roadmap of 5G Technology Implementation for Smart Building and Facilities Management in Singapore	2020	Chew, MYL.
	Network FOUntain a CDBB network: For ONTologies and information maNagement in digital built Britain	2019	Demian, P.
	A platform for change: How identifying and aligning technology building blocks provides a digital platform of change in the construction industry	2020	Glancy, B.
	Efficient use of digital EPD via ILCD+ EPD+	2019	Erlandsson, M.
	Future Cities in the Making: overcoming barriers to information modelling in socially responsible cities	2019	Sielker, F.
	Facility Management 4.0: BIM und IoT	2018	Jaritz, P.
DT and DBL	An openBIM Approach to IoT Integration with Incomplete As-Built Data	2020	Moretti, N. et. al.
	BIM-based end-of-lifecycle decision making and digital deconstruction: Literature review	2020	Akbarieh, A.
	Total facility management	2021	Atkin, B.

In a nutshell – D3C framework



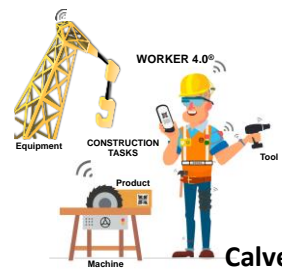
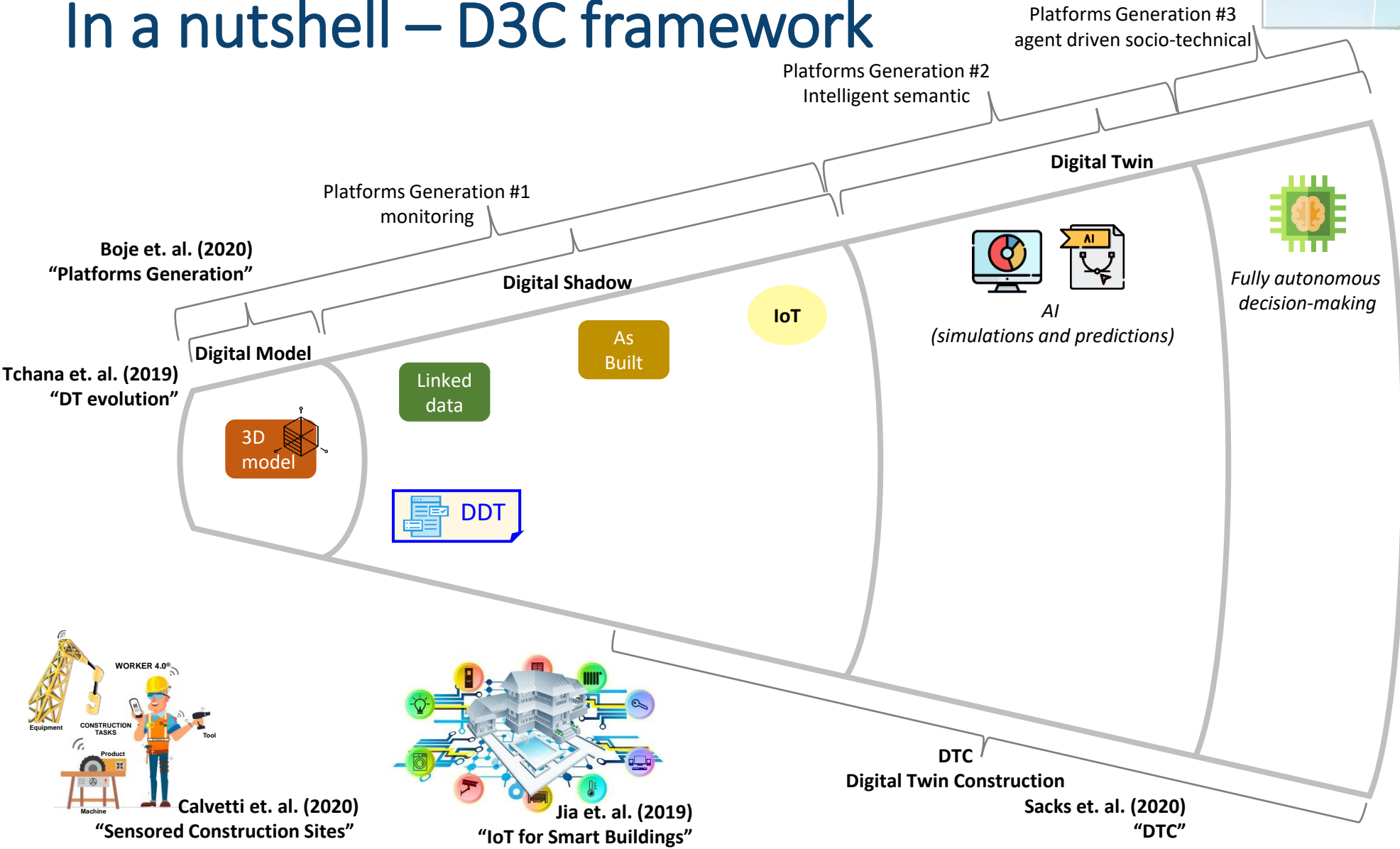
Calvetti et. al. (2020)
"Sensored Construction Sites"



Jia et. al. (2019)
"IoT for Smart Buildings"

DTC
Digital Twin Construction
Sacks et. al. (2020)
"DTC"

In a nutshell – D3C framework

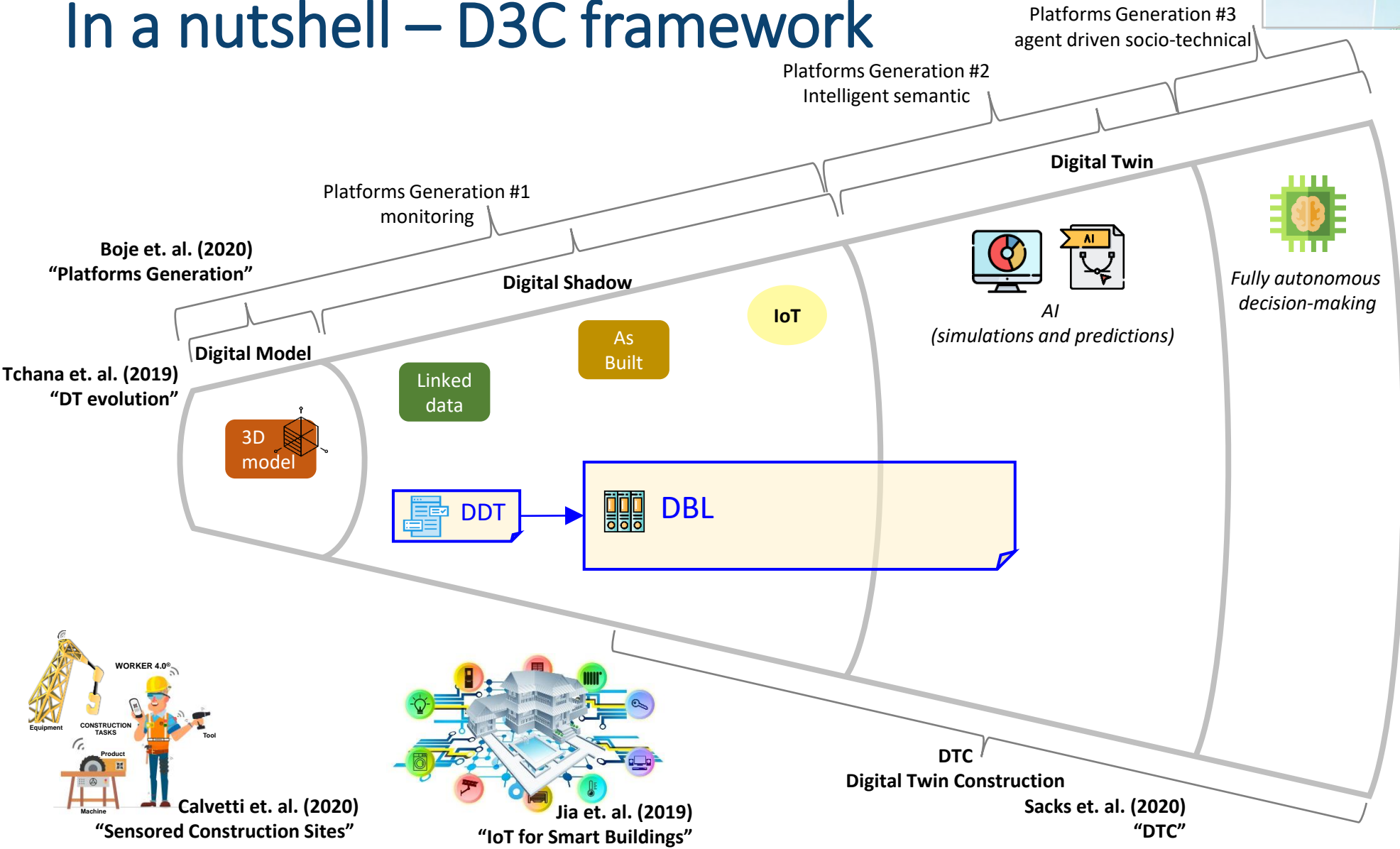


Calvetti et. al. (2020)
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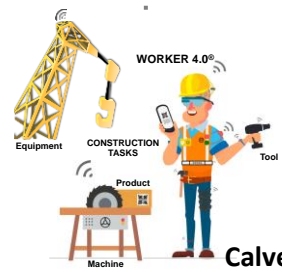
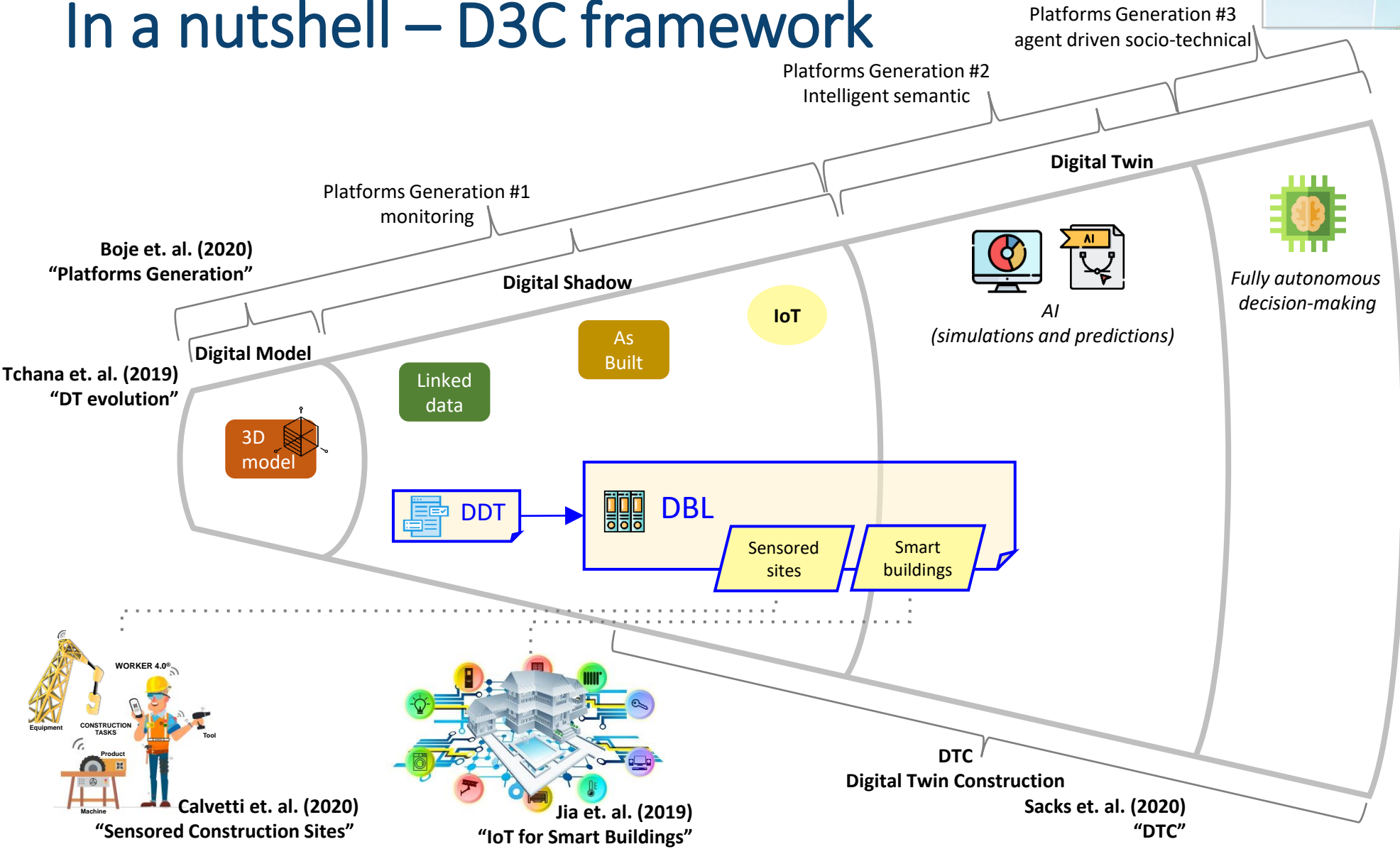


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In a nutshell – D3C framework



In a nutshell – D3C framework

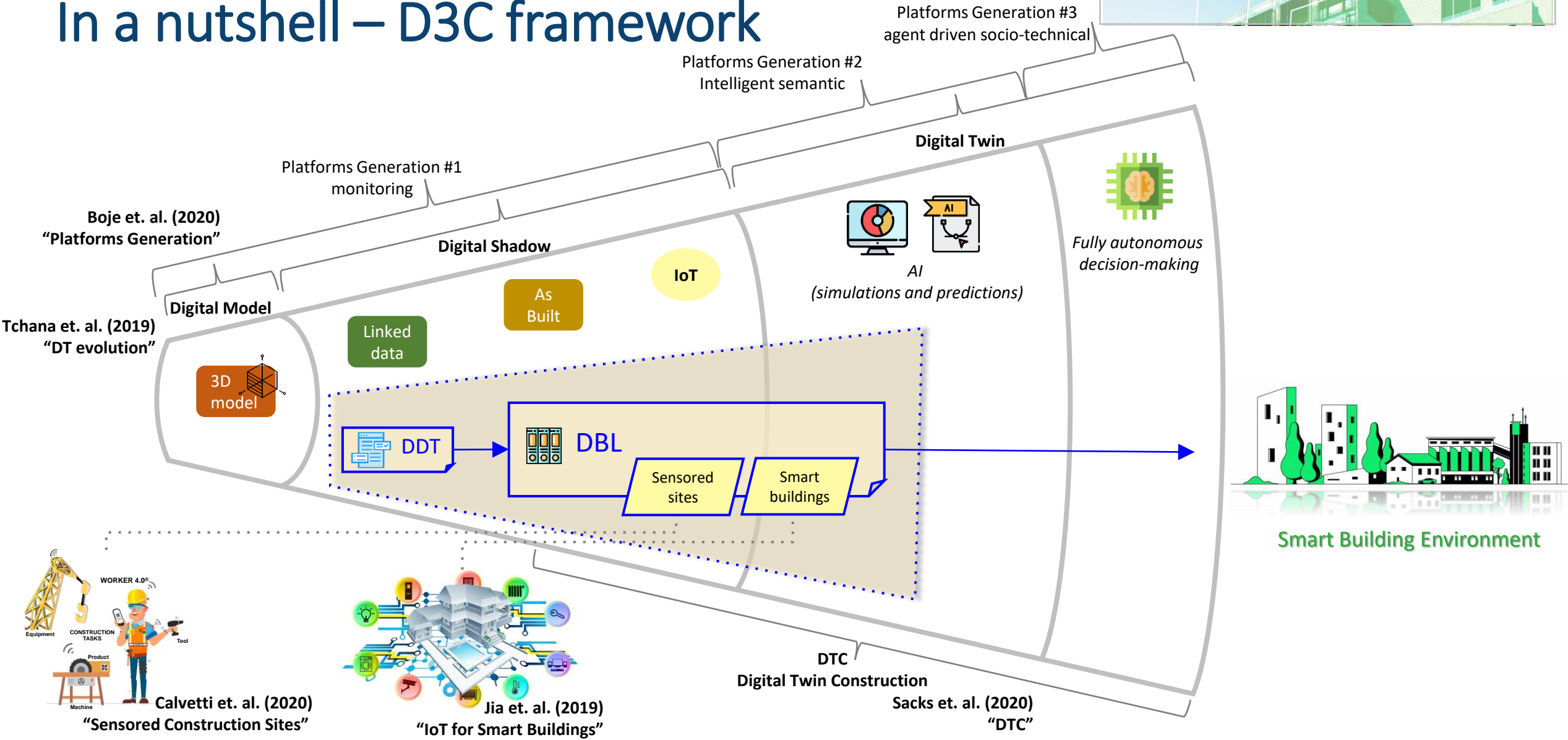


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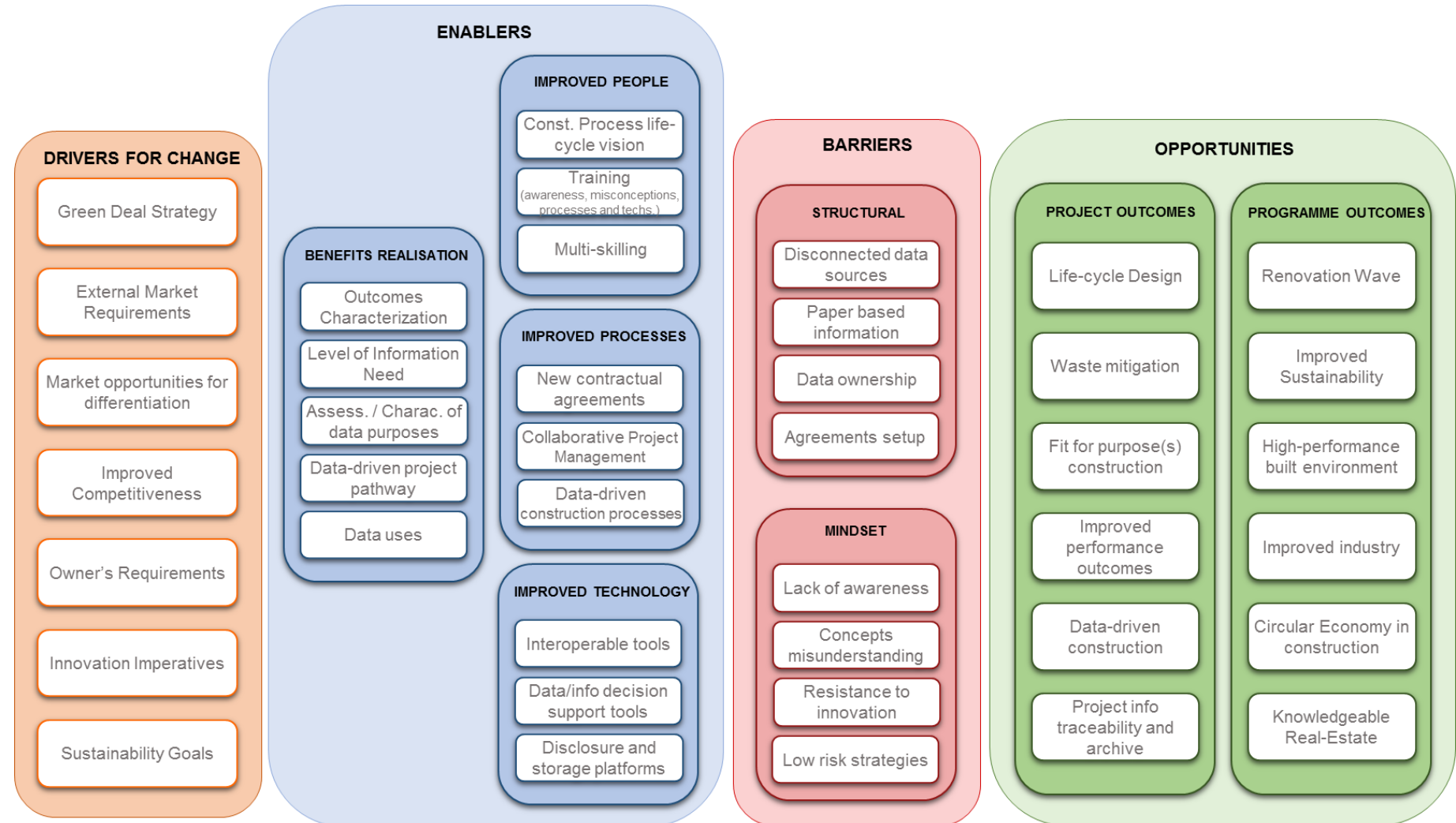


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In a nutshell – D3C framework



IDD (DDT+DBL+DTC)



Conclusion: main contributions

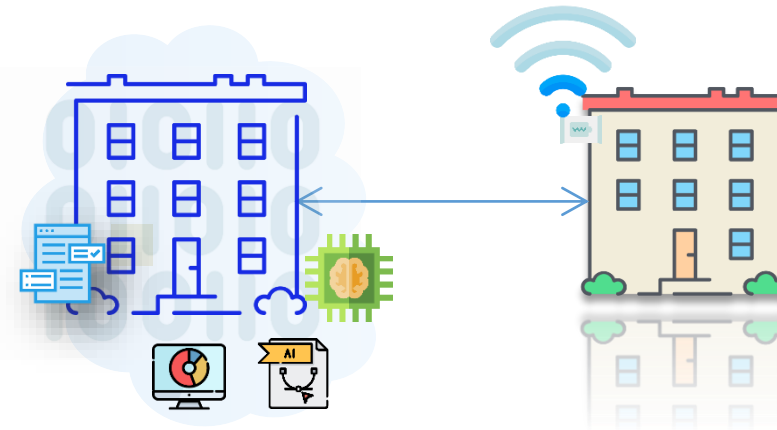
- Start a **journey of clarity** regarding the range of these concepts
- Identification of potential **synergies** and **data overlaps**
- Deliver a **Digital Data Driven Construction (D3C)** conceptual framework aligning the concepts and how do they contribute to achieve Digital Twins

Conclusion: future work

- Data templates **full potential realization**
- DBL framework, **data environment** and supporting features
- Case studies to identify the **data overlaps and its quantification**
- **Improve** the conceptual framework in terms of the DTC **maturity/platform borders**

That's it!

Questions?



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Acknowledgements

The authors would like to make the following acknowledgements namely in terms of the funding opportunity to continue developing this research topic and the base support of the Research Unit:

1. Project GrowingCircle-Integrated Data for Efficient and Sustainable Construction, funded by the European Economic Area (EEA) Financial Mechanism 2014-2021, Environment, Climate Change and Low Carbon Economy Programme.
2. Base Funding - UIDB/04708/2020 of the CONSTRUCT - Instituto de I&D em Estruturas e Construções - funded by national funds through the FCT/MCTES (PIDDAC).