SUSTAINABLE PLACES 2024

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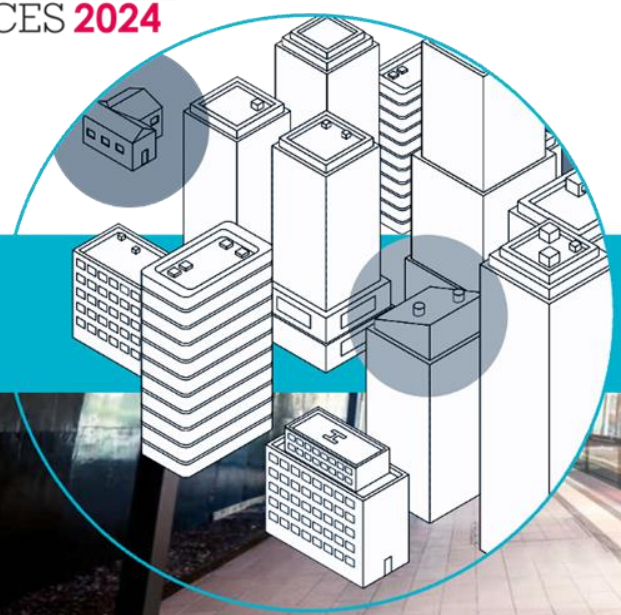

DIGITAL BUILDING LOGBOOK
WORKSHOP

Creating Efficient and Impactful Digital Building Logbooks

23-25 September 2024 - Luxembourg

LEGOFIT

Demo Blog

openDBL

CHRONICLE

BUILDCHAIN

www.sustainableplaces.eu

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Agenda

- **Workshop Opening by DemoBLog | TuDelft (5 mins)** ***Henk Visscher***
  - Overview of the workshop objectives and expected outcomes

- **Pitches from Contributing Projects (10 mins each project x 6 projects)**
  openDBL: Zenon Foltynowicz
  BUILDCHAIN - Celina Solari (RINA)
  CHRONICLE - Alessandra cuneo (RINA)
  LegoFit - Angela Araldi (R2M)
  DRF - Judith Fauth (University of cambridge)
  Demo BLog - Sun Ah Hwang (TU DELFT)
  - Presentation of each project's objectives, key innovations, and value propositions
  - Highlighting one or two potential challenges for discussion with other projects

- **Q&A / Networking, Moderated by DemoBLog | R2M (20 mins)**
  - Facilitated exchange of ideas among workshop contributors
  - Establishing synergies and collaborative opportunities

- **Closing Remarks by DemoBLog | TuDelft (5 mins)**

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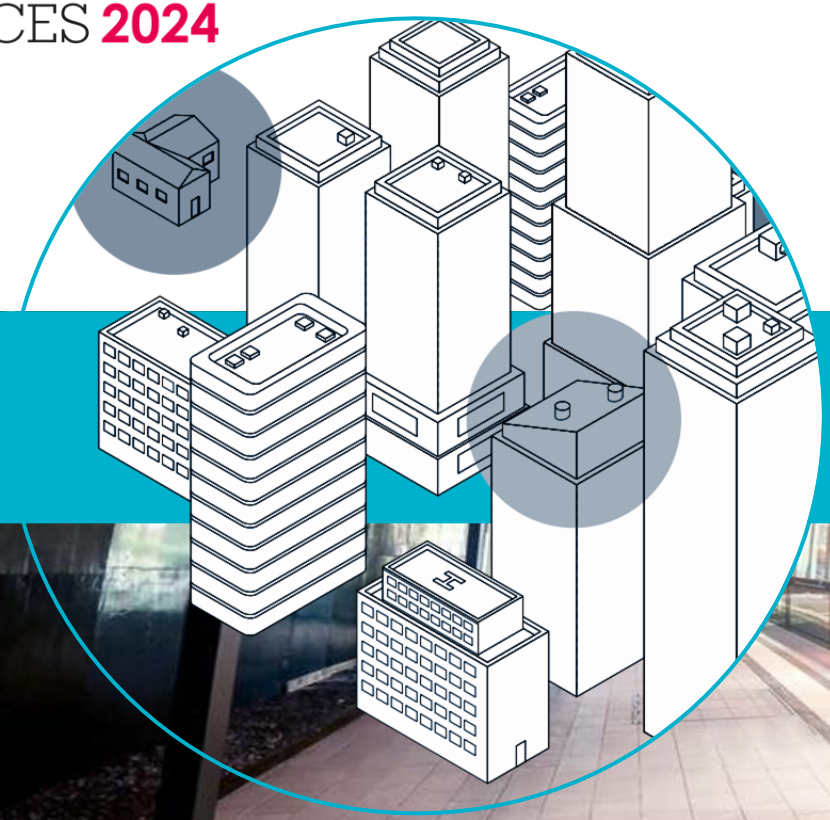
R2M RESEARCH TO MARKET SOLUTION



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BUILDCHAIN

Funded by
the European Union

BUILDCHAIN: BUILDing knowledge book in the blockCHAIN distributed ledger

Trustworthy building life-cycle knowledge graph for sustainability and energy efficiency

Creating Efficient and Impactful Digital Building Logbooks

Sustainable Places 2024, 24 September 2024

SUSTAINABLE PLACES 2024

Celina Solari, Engineer Project Manager
RINA Consulting SpA

BUILDCHAIN - The Project

BUILDCHAIN

BUILDCHAIN

12 PARTNERS

5 Case Studies

36 MONTHS

From 1 January 2023 to December 2025

5 COUNTRIES

Italy, Spain, Slovenia, Serbia, Hungary

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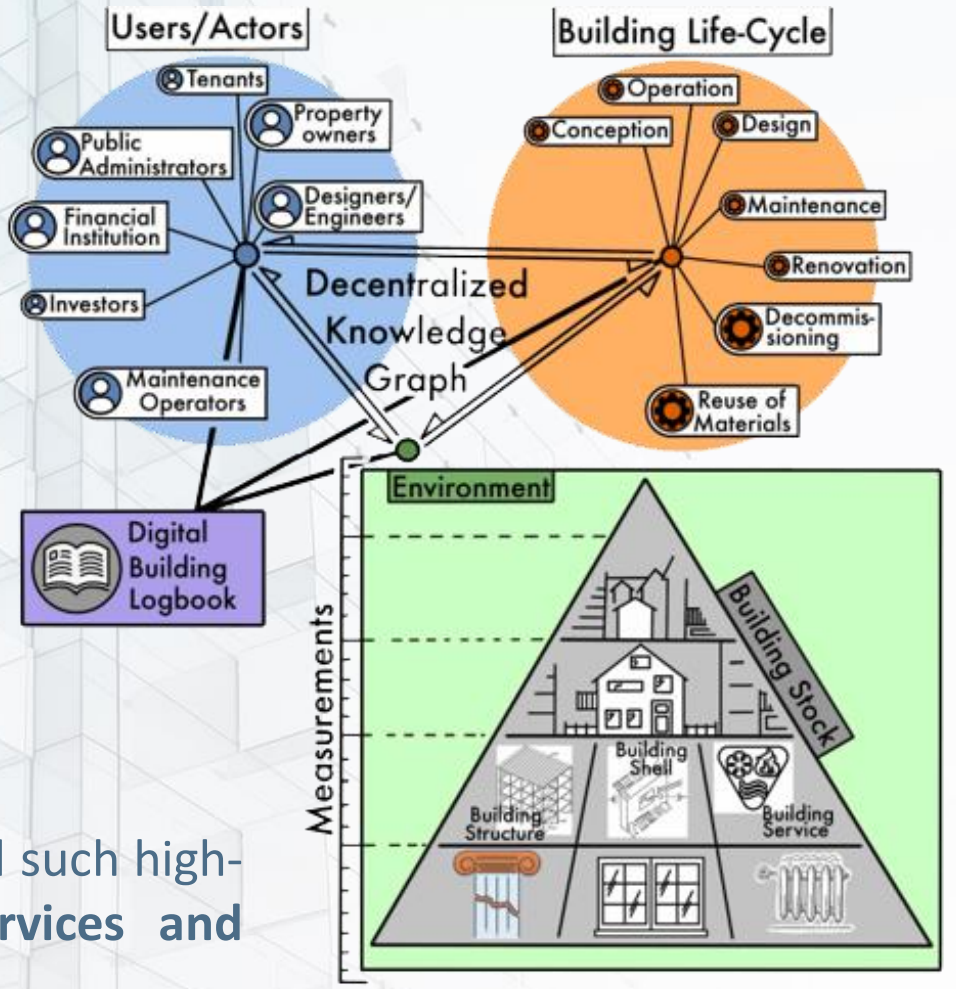
BUILDCHAIN

BUILDCHAIN - The core idea

BUILDCHAIN targets to **exploit the potential of using Digital Building Logbooks (DBLs)** for a smarter and more sustainable built environment of the European Union.

Build a **BIM-based decentralized knowledge platform to** that can be used to trace all activities related to the overall life-cycle of buildings.

- **Integration** of trusted, traceable, and transparent data
- **Marketplace**, where various actors can share their offers, including their quality certificates and credentials, and where it would be possible to log and trace every information, activity, and change, and use the knowledge to improve sustainability.



The creation of a **trusted data ecosystem economy** around such high-quality data will significantly **improve the offered services and products in the Building Life-Cycle sector**.

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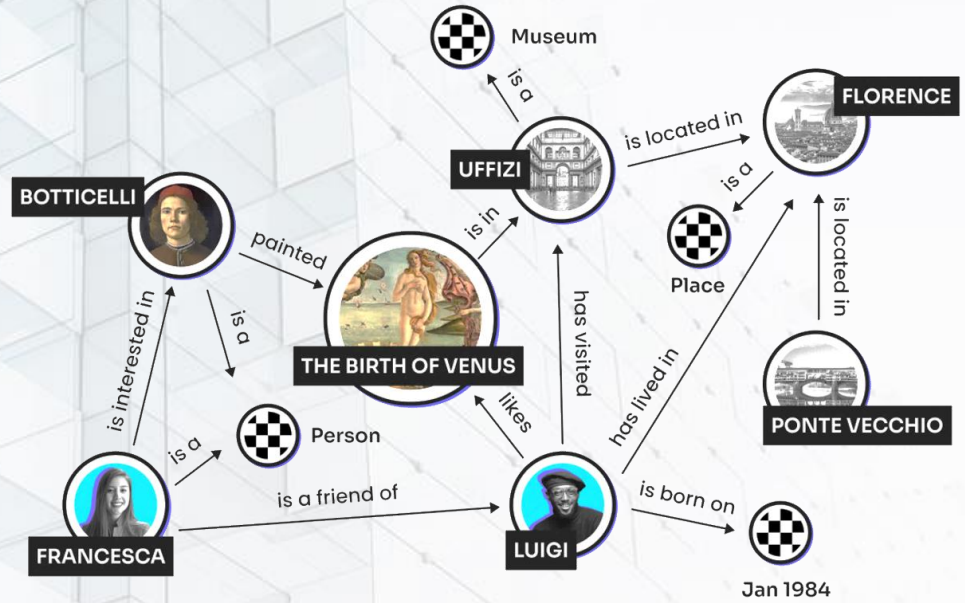
BUILDCHAIN - The core idea

BUILDCHAIN

BUILDCHAIN will extend a **Digital Building LogBook (DBL),** used by the municipality of Florence, for the management and administration of its huge set of buildings, with several available and **novel data, tools, and functionalities, with the help of a Decentralized Knowledge Graph (DKG),** an open source blockchain-based solution.



DKG platform will include specific **building-related ontologies**, so that the whole knowledge base about the life-cycle of the building can be logged and by that **continuously updated**, providing mechanisms and interfaces for the relevant stakeholders, to **publish, trace, share, tokenize**, end even **trade** models in a market economy.

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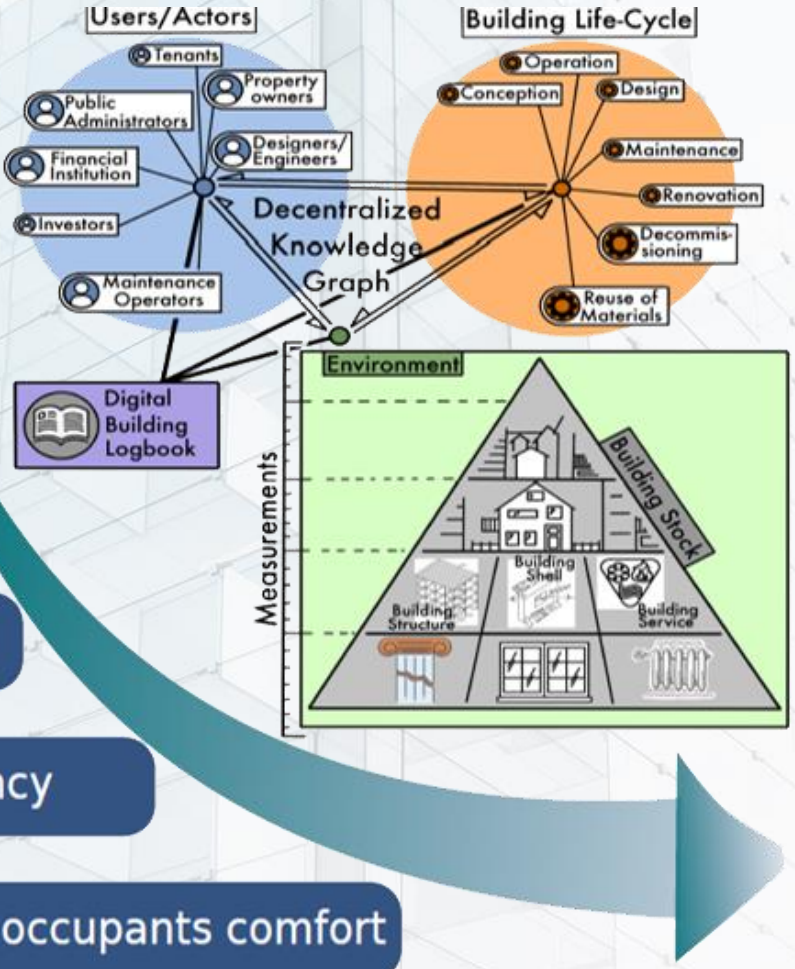
BUILDCHAIN - The core idea

BUILDCHAIN

- Interconnectivity
- Data and AI fusion
- New collaboration & services
- New technologies & innovation
- Data & knowledge market place
- Sustainability & energy efficiency
- Improved safety, health, occupants comfort



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BUILDCHAIN - Consortium

BUILDCHAIN

Participant	Partner name	Short Name	Country
1 (Coordinator)	University of Pisa	UNIPI	Italy
2	Számítástechnikai es Automatizálási Kutatóintézet	SZTAKI	Hungary
3	University of Granada	UGR	Spain
4	Zavod za Gradbenistvo Slovenije	ZAG	Slovenia
5	Unversity of Ljubliana	UL	Slovenia
6	Athens Economics and Business University	AUEB-RC	Greece
7	Prospeh, poslovne storitve in digitalne resitve	TRACE	Slovenia / Serbia
8	RINA Consulting	RINA-C	Italy
9	CLIO S.r.l.	CLIO	Italy
10	Municipality of Florence	FLORE	Italy
11	Protim Ržišnik Perc	PRP	Slovenia
12	BEXEL Consulting	BEXEL	Serbia

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BUILDCHAIN - Test Sites

BUILDCHAIN

- Demonstrate the capabilities of BUILDCHAIN acting as a self-adaptive expert system for *proactive maintenance* of cultural heritage buildings
- Serve today as UGR's Headquarters.
- The most critical deterioration processes will be identified and modelled using data from existing and new monitoring system

- Apply the methodology and concept of PBoQ (priced bill of quantities) standardisation to a new hospital building in Ljubljana (Slovenia).
- Represent the integrated design of a new hospital in a BIM environment, developed. from conceptual design to detailed design and for the needs of the construction itself.

- Test the project tools on a relevant, heritage, and strategic 18th century building
- Serve today as the headquarters of the local police.
- Equipped with devices and sensors to monitor environmental indoor and outdoor parameters, structural parameters, traffic-induced vibrations and energy-efficient operation.

- Demonstrate the use of the BUILDCHAIN platform to improve the earthquake resilience and the carbon footprint of buildings.
- Data from a large set of school buildings belonging to the Municipality of Florence will be logged in BUILDCHAIN.

BUILDCHAIN

- **Validate the DBL-BIM integration and the hybrid digital twin API developed, and the demonstration of its use.**
- **Forced vibration test results of three tall timber buildings located in UK and Norway, made of cross-laminated panels, will be registered in the BUILDCHAIN platform**

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BUILDCHAIN - Objectives

BUILDCHAIN

- **Objective 1**: *Improved linkages of existing databases, tools, and sources, new technologies to collect data*
- **Objective 2**: *Enhance energy efficiency, cost-effectiveness, circularity, and climate resilience*
- **Objective 3**: *Improve safety and health and occupant comfort in buildings*
- **Objective 4**: *Improved management and renovation of large building stocks*
- **Objective 5**: *Trustworthiness, transparency, and traceability of the Logbook data including their verification, certification, and the use of application-level proofs*
- **Objective 6**: *Enhance collaboration, and quality of services by a new economy built around the DBL*

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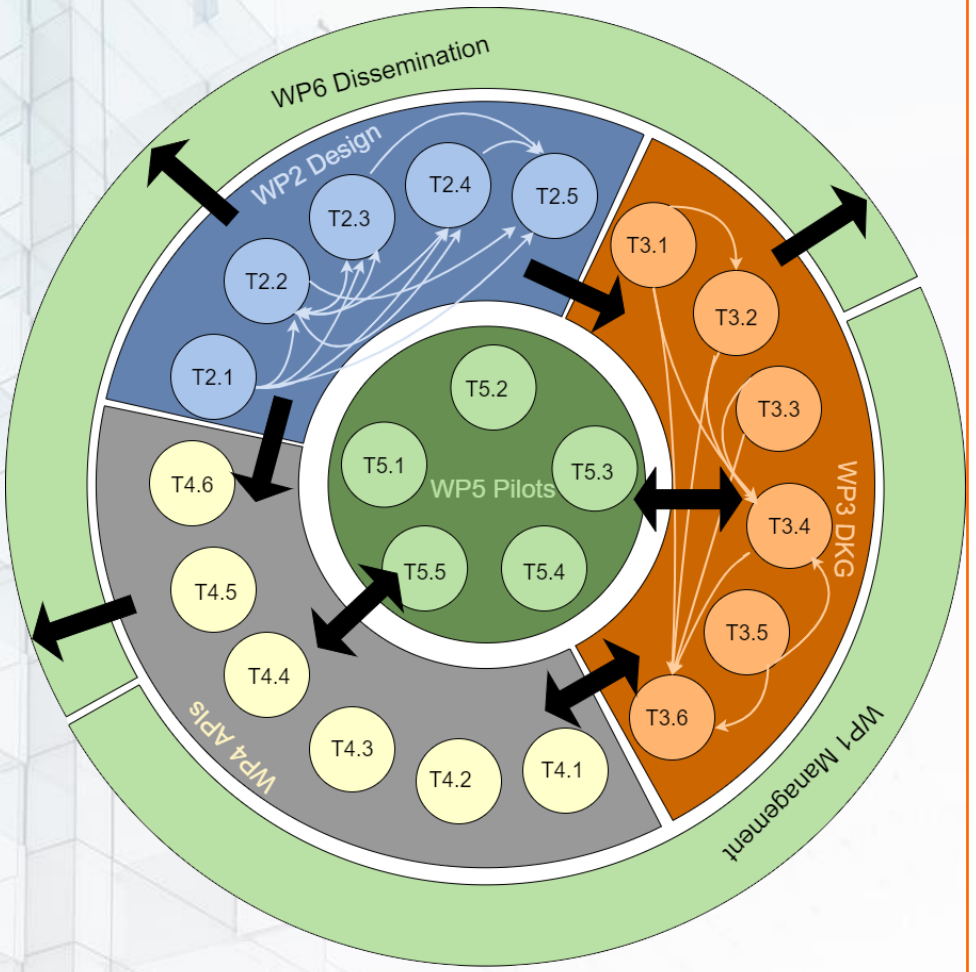
BUILDCHAIN - Project structure

BUILDCHAIN

- **WP1 Project management and coordination**
- **WP2 Logbook design** (stakeholder needs, novel use cases, schematic flow of use cases, establishment of common data environment)
- **WP3 DKG Logbook implementation** (solution for off-chain and on-chain data management of the project, DKG integrated with blockchain, smart contracts, interaction among entities)
- **WP4 Tools/APIs of DBLs** (development of new features and tools, make use cases feasible)
- **WP5 Built environment Ecosystem Pilots** (test and validate tools, collect and update data of buildings, improving resource efficiency, decarbonization, safety, intervention and maintenance strategies)
- **WP6 Dissemination and exploitation**



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BUILDCHAIN - Where we are

BUILDCHAIN

- Phase I: **Preparation**
- Phase II: **Design and Use Cases**
- Phase III: **Development and Data Collection**
- Phase IV: **Integration**
- Phases V: **Deployment, testing & validation**

DX.X Deliverable
Task duration
MX.X Milestone

No.	Phase I: Preparation				Phase II: Design									Phase III: Development/Data Collection											Phase IV: Integration			Phase V: Deployment & testing									
	Year 1													Year 2											Year 3													
WP1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
T1.1																																				
T1.2			D1.1 M1.1			D1.2						D1.3	M1.4											D1.4	M1.6					D1.5						D1.7 M1.7
T1.3			M1.2			M1.3												M1.5												D1.6						
WP2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
T2.1												D2.1																								
T2.2				M2.1								M2.3																								
T2.3								M2.2				D2.1 M2.3			D2.2																					
T2.4												M2.3																								
T2.5															D2.3																					
WP3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
T3.1																					M3.1								D3.1							
T3.2																																				
T3.3																																				
T3.4																								M3.2					D3.2							
T3.5																																				
T3.6																																		D3.3		
WP4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
T4.1																															D4.1					
T4.2																															D4.2					
T4.3														M4.1										M4.2							D4.3					
T4.4																															D4.4					
T4.5																															D4.5					
T4.6																															D4.6					
WP5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
T5.1																																				
T5.2				M5.1				M5.2						M5.3										M5.4												D5.1 D5.2
T5.3																																				
T5.4																																				
T5.5																																				
WP6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
T6.1			D6.1			M6.1												M6.2																		D6.2
T6.2																		M6.3																		D6.3
T6.3																																				D6.4
T6.4																																				

M21: WE ARE HERE!

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BUILDCHAIN - Use Cases and Tools

BUILDCHAIN

USE CASES

- U1 LCA and carbon footprint computation
- U2 Management of building stock
- U3 SHM, reliability, anomaly detect
- U4 Earthquake and climate proof
- U5 SHM, tools for cultural heritage
- U6 Improvement of design process
- U7 Control of local flooding
- U8 Self attentive sensing
- U9 Post-catastrophic interventions
- U10 Construction economics
- U11 Management of deep renovation
- U12 Operational energy and efficiency

Use cases deployed on small scale demonstrators:

Use cases for which the tools are useful

New tools and applications

Management of Deep Renovation	Multiscale Approach for BIM HBIM	Integration of APIs for BIM based tools	Operational Energy and Energy efficiency	Data driven and hybrid modelling	Environmental impacts over lifetime
AP1 (T4.1)	AP2 (T4.2)	AP3 (T4.3)	AP4 (T4.4)	AP5 (T4.5)	AP6 (T4.6)

Deployed Use cases

Deployed APIs

Large Scale Demonstrators


Pilot 1 (T5.1)


Pilot 2 (T5.2)


Pilot 3 (T5.3)


Pilot 4 (T5.4)


Pilot 5 (T5.5)

- Proactive maintenance cultural heritage
- Integrated design of a hospital in BIM environment
- Management of heritage and strategic building
- Improve earthquake resilience and carbon footprint
- Structural design concept improvement

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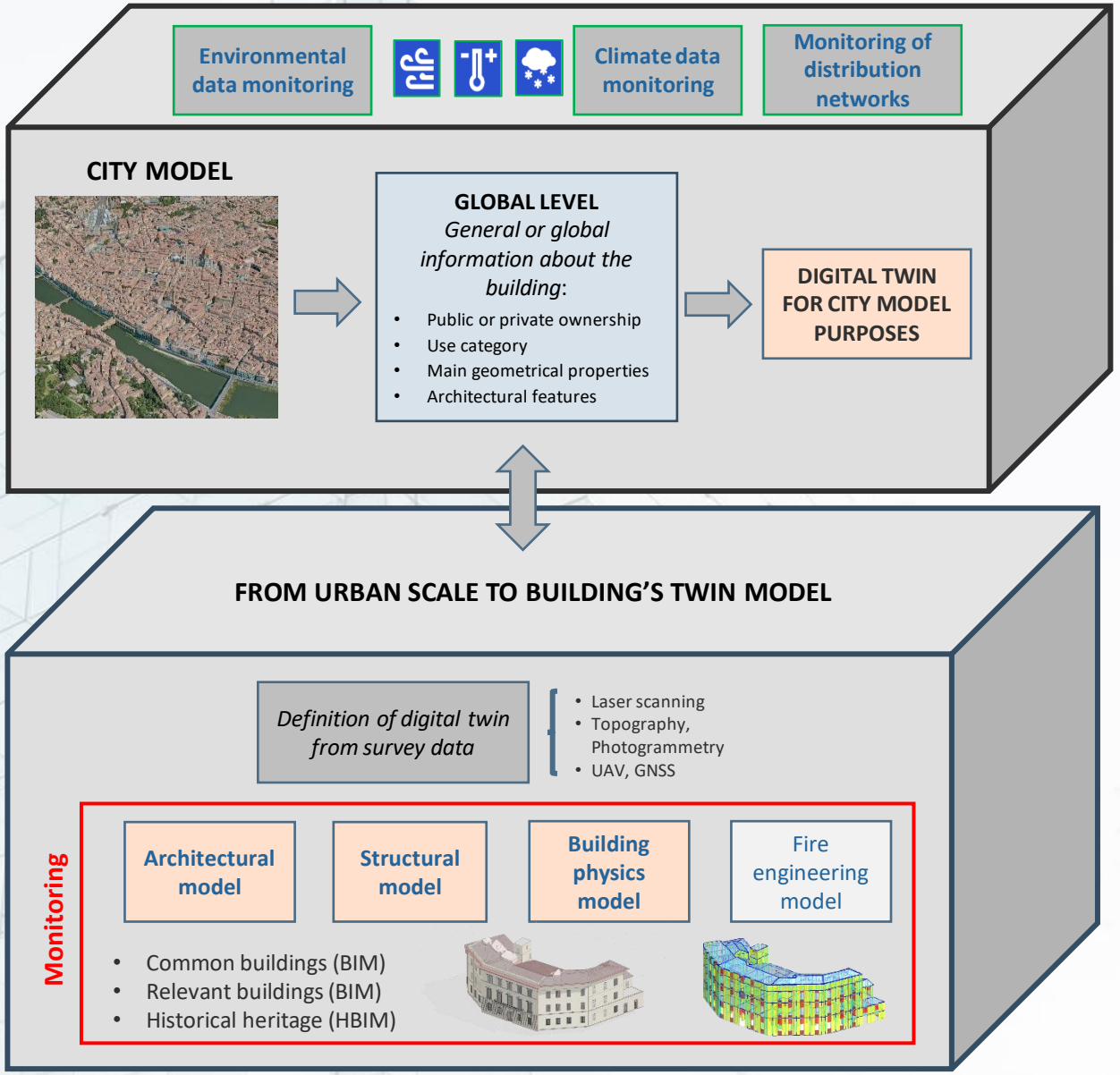
BUILDCHAIN Scalability

BUILDCHAIN

Multiscale approach of managing building stock, planning renovations and preserving cultural heritage



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BUILDCHAIN - Expected impact

BUILDCHAIN

- **Economical:**

  Increase productivity, innovation capacity, resilience, sustainability, and global competitiveness

  Global standardization of DBL data resulting in enhanced interoperability and increased competitiveness in the European building sector

- **Societal**

  Acceleration of the twin green and digital transition of the construction sector

  A more resilient European society, prepared and responsive to threats and disasters

- **Scientific**

  Increment of innovation capacity through follow-up procedures

BUILDCHAIN will contribute to several EU initiatives:

- **European transition to climate neutrality**
- **European Bauhaus initiative**
- **European Renovation Wave**
- **EU Strategy on Adaptation to Climate Change**
- **Built4People**

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BUILDCHAIN

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Thank you all!

Celina Solari, RINA Consulting SpA

Celina.solari@rina.org

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Introduction to the CHRONICLE Project

Alessandra Cuneo – RINA Consulting

Sustainable Places

24/09/2024

Funded by
the European Union

CHRONICLE is an EU-funded research and innovation project developing building performance digitalisation and dynamic logbooks for future value-driven services

Funded by
the European Union

Overview

Project Name: CHRONICLE

Grant Agreement: No 101069722

Duration: 42 months

Dates: 01.07.2022 – 31.01.2026

Budget: ca. €6 mill. (ca. 75% EC funded)

Project Coordinator: CIRCE

Funded by
the European Union

Partners

Partners: 18

Countries:

- Spain
- Greece
- Italy
- Ireland
- Denmark
- Norway
- Lithuania
- Switzerland

Funded by
the European Union

Objectives

Goal 1. To deliver a **holistic and dynamic Energy Performance Assessment Framework** addressing **all phases of the building Lifecycle**

Goal 2. Introduce **Strong Human Centric (comfort, well-being) & Social Aspects (S-LCA)**

Goal 3. Standards Based and Interoperable Building Performance Framework

Goal 4. To identify stakeholder incentives and drivers and deliver user friendly and insightful building performance information that will trigger future business models

Goal 5. To design **compound (energy & non-energy) service offerings and business models based on flexible performance triggered SLAs**

Goal 6. To validate the **expected impact of the CHRONICLE solution in real-life conditions and maximise replication potential**

Funded by the European Union

Pilot Sites

Pilot Sites: 5

Denmark

Herning Social Housing

Greece

Aspra Spitia Settlement

Switzerland

La Sosta Retirement Home

Ireland

Ó Cualann Affordable Homes

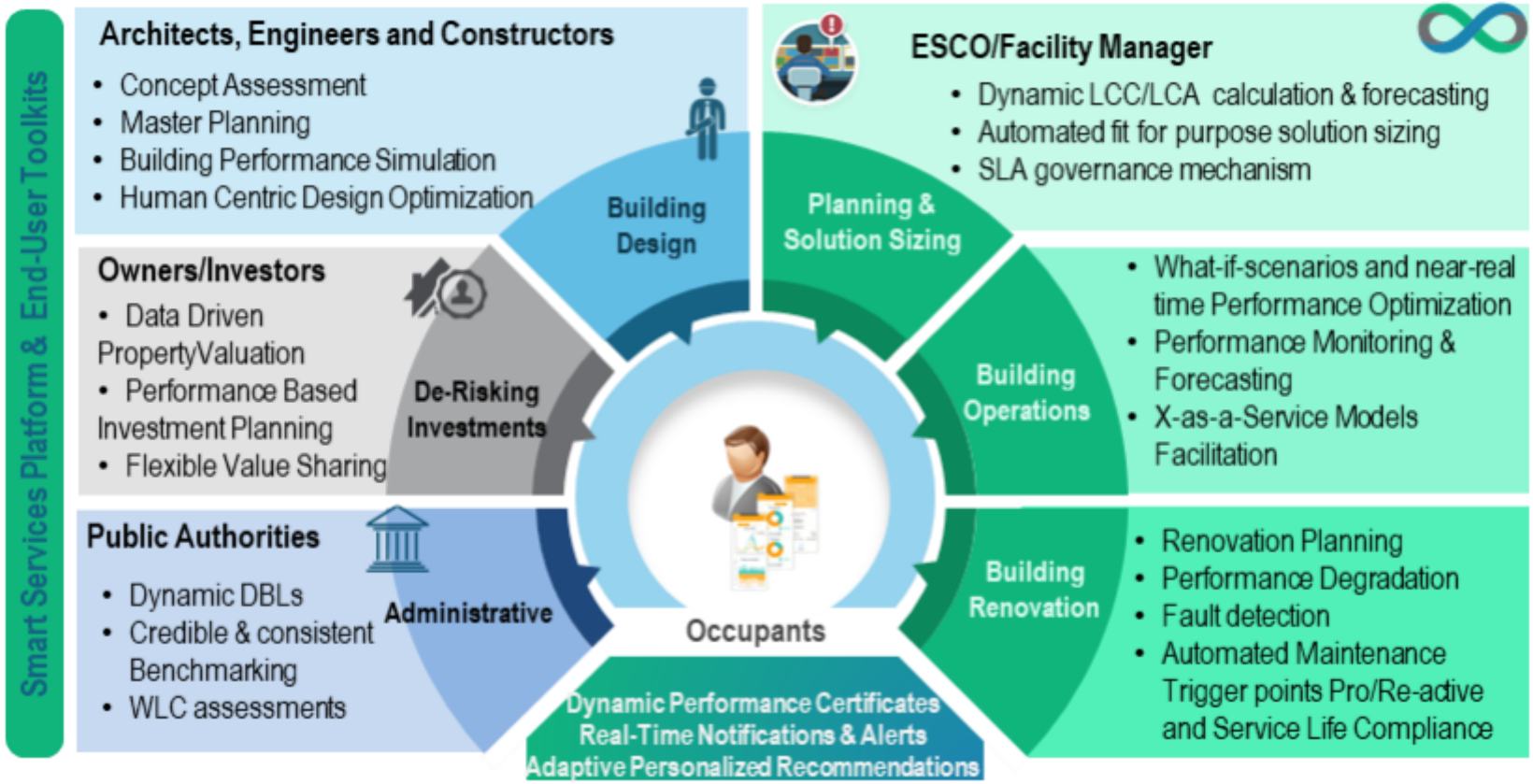
Spain

Ecce Homo Social Housing

Funded by the European Union

Methodology

Full building design, construction and renovation spectrum, encompassing supply chain of stakeholders and activities involved in both new buildings as well as existing building upgrades:



Funded by the European Union

End-Users & Stakeholders

The CHRONICLE solutions are for:

- ESCO: Energy Service Companies
- AEC: Architecture, Engineering, Construction
- FM: Facility Managers
- RES: Residents
- Building Owners & Investors

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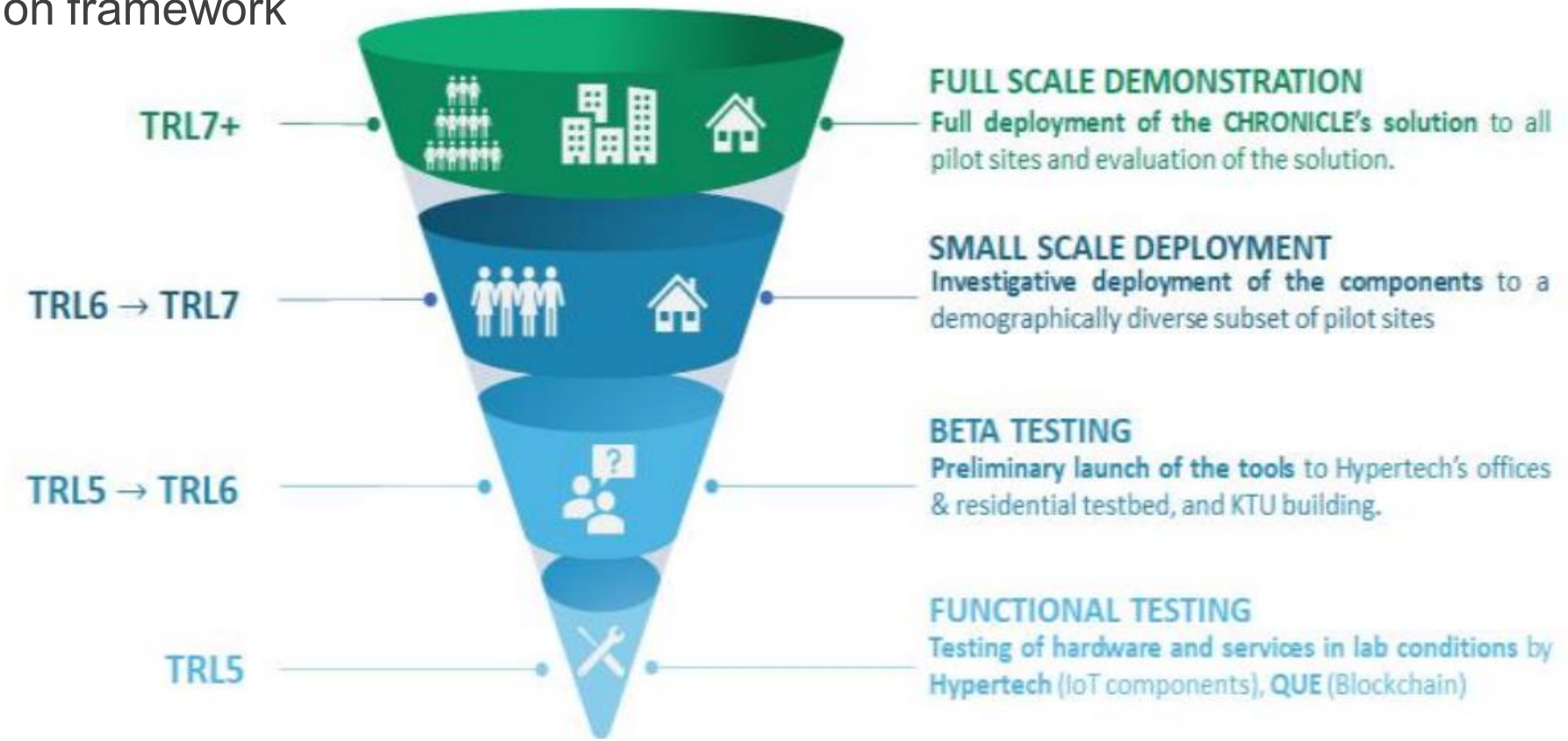
Demonstration and Validation

Pilot site evaluation framework



After validation testing and small-scale testing the demonstration activity will be applied on a large scale and include more than 220 families.

Funded by the European Union

CHRONICLE

Our hope is that soon all buildings will be well equipped to communicate with us on their needs towards a more sustainable future!

Funded by the European Union

Results achieved so far

In the first 18 months of project, CHRONICLE achieved:

- Detailed architecture and detailed requirements for each component have been completed including all the practical considerations of data flows and interoperability and interconnection of components
- KPIs have been defined for the assessment of digital outputs and data from the demonstrators
- Stakeholder information has been gathered through surveys, ranging from end users living in and operating within the demonstrators to industry-side stakeholders such as AECs, ESCOs, and FMs
- Pilot site preparation is well under way with procurement or installation of physical monitoring equipment in progress or completed in all demonstrators
- Chronicle and SmartLivingEPC are leading the development of a European standard for dynamic (operational) energy performance assessment of buildings, as continuation of a previous project, D^2EPC

Funded by
the European Union

Thank you for your attention!

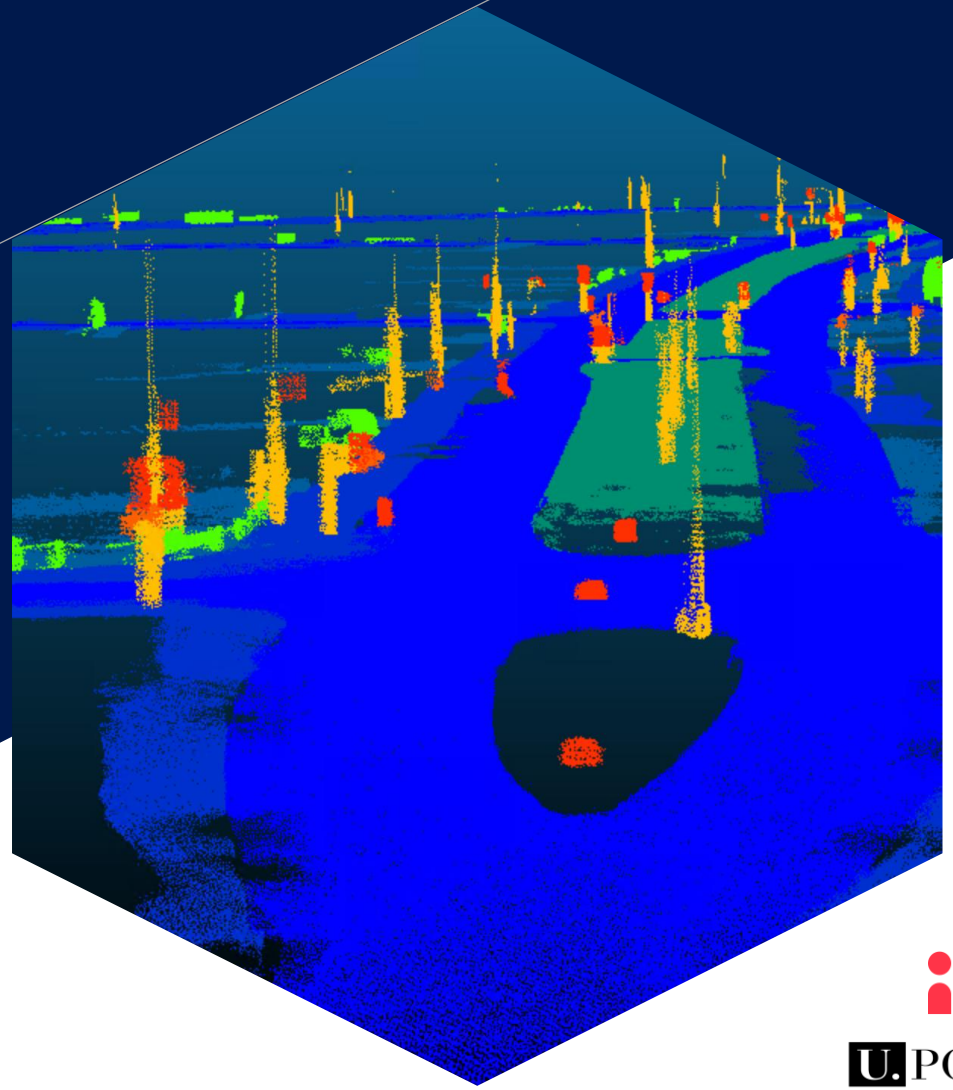
Contact: Leon Nielsen

lnielsen@fcirce.es

Website

LinkedIn

chronicle-project.eu



When DBL and meets DBP

Judith Fauth and Pedro Meda

24th September 2024

Intution

Digital building permit

Digital building logbook

Literature DBP

Table 1. DBP review systematisation, highlighting main contributions and notes on DBL.

Title	Contribution	Type	Ref.	Is DBL mentioned?
Taxonomy for building permit system-organising knowledge for building permit digitalisation	Taxonomy supporting a wide range of procedures, moments, and compliance checks in different countries, placed into a common framework.	Journal	(Fauth *et al.*, 2024)	implicit
Process model for international building permit benchmarking and a validation example using the Israeli building permit process	As-is building permit process in Israel to understand the singularities and the commonalities with other countries. A process model framework providing insights regarding the core problems.	Journal	(Fauth *et al.*, 2023)	No
Ontology for building permit authorities (OBPA) for advanced building permit processes	Ontology for the assignment process in digital building permits using tacit knowledge, data sets and a sample case study (implementation and test).	Journal	(Fauth and Seiß, 2023)	No
Digital Transformation of Building Permits: Current Status, Maturity, and Future Prospects	Evaluation of innovations, namely using advanced digital technologies for some "pocket" processes, while manual processes remain. Leveraging permits to streamline the entire process.	Journal	(Ataide *et al.*, 2023)	implicit
The unbalanced research on digitalisation and automation of the building permitting process	Fundamental research and individual investigation of the sub-processes involved in a building permit hindering digital adoption. Detailed mapping of the sub-processes supporting filling the gap.	Journal	(Bloch and Fauth, 2023)	No
Understanding processes on digital building permits - a case study in South Tyrol	BIM-oriented building permit review using qualitative expert interviews from a specific location to define the classification of the information needed and compare it with other realities.	Journal	(Fauth and Malacarne, 2023)	implicit
Conceptual Framework for Building Permit Process Modeling: Lessons Learned from a Comparison between Germany and the United States regarding the As-Is Building Permit Processes	By-right and non-by-right cases of building permits are compared using Germany and the USA as cases to obtain knowledge and an overview of lessons learned that can be widespread.	Journal	(Fauth and Soibelman, 2022)	No
Unveiling the actual progress of Digital Building Permit: Getting awareness through a critical state of the art review	State-of-the-art regarding digital building permits using critical analysis of the literature and an overview of the main aspects discussed and their relevance for future adoption.	Journal	(Noardo *et al.*, 2022)	implicit
The BIM-Based Building Permit Process: Factors Affecting Adoption	Identifying enablers and challenges respecting the BIM-based building permit process and guiding stakeholders in adopting BIM-related processes aligned with permitting.	Journal	(Ullah *et al.*, 2022)	implicit

Literature DBL

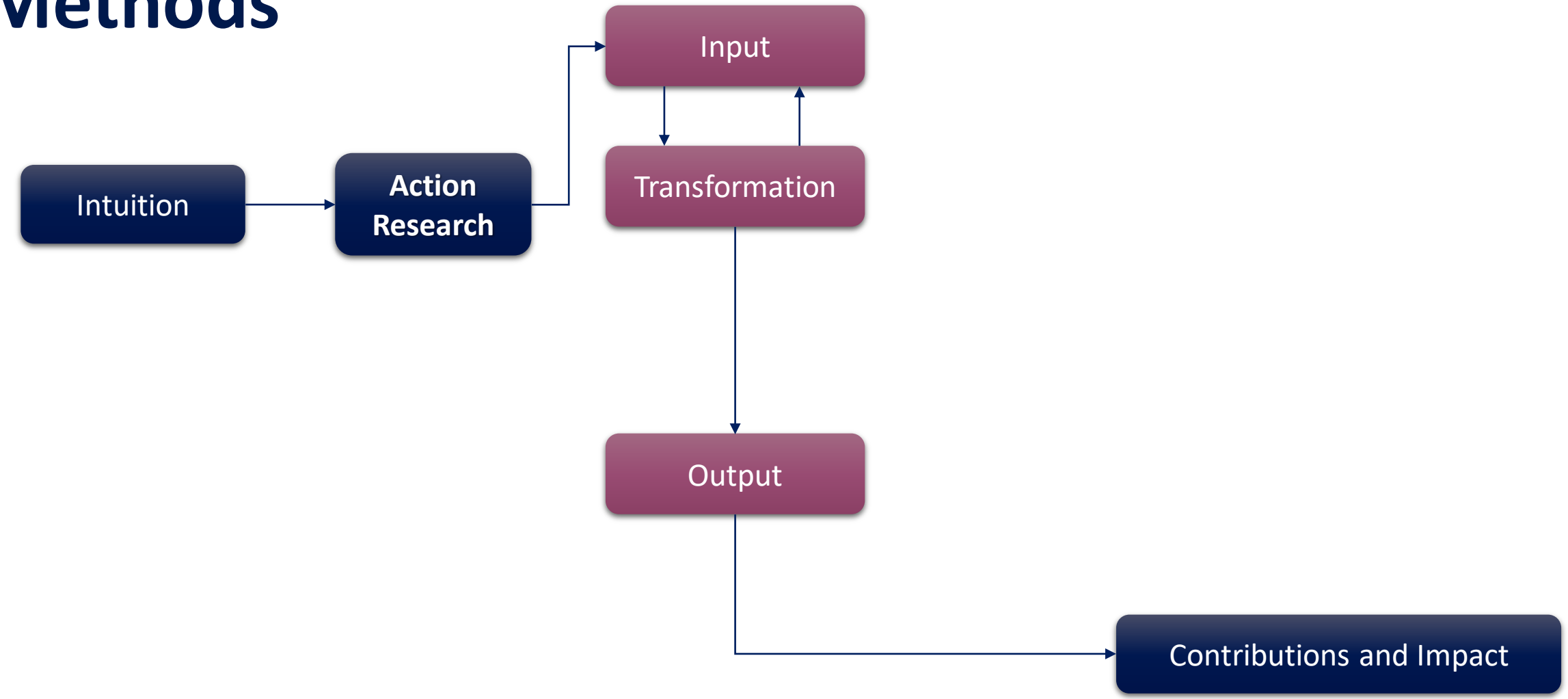
Table 2. DBL review systematisation, highlighting main contributions.

Title	Contribution	Type	Ref.	Is DBP mentioned?
Towards the definition of a European Digital Building Logbook: A survey	Identifying features and data sources to be considered when developing DBL based on review and survey.	Journal	(Alonso *et al.*, 2023)	Yes, in general
A Data Structure for Digital Building Logbooks: Achieving Energy Efficiency, Sustainability, and Smartness in Buildings across the EU	DBL data structure definition under the EUB SuperHub project, focused on energy performance, sustainability, and smartness.	Journal	(Malinovec Puček *et al.*, 2023)	Yes, datasets
Libro del Edificio Electrónico (LdE-e): Advancing towards a Comprehensive Tool for the Management and Renovation of Multifamily Buildings in Spain	Framework for a tool for Spain incorporating an energy led DBL and a renovation passport. Holistic, cloud-based and blockchain supported.	Journal	(Espinoza-Zambrano *et al.*, 2023)	Yes, datasets
European building passports: developments, challenges and future roles	Awareness of building passports focusing on main functions, milestones, information management, and relation with other concepts and initiatives.	Journal	(Buchholz and Lützkendorf, 2023)	No
Digital Twins as Enabler for Long Term Data Management Using Building Logbooks	Enabling DBL and Digital Twins using a multi-model-container (MMC) approach - building inspections as use case.	Conference	(Al-Sadoon *et al.*, 2023)	Yes, in general
Applicability of the European Union's Building Renovation Assessment Framework in Spain	Assessment of the Measurable Progress Indicators (MPI) for decarbonisation set under EU Recommendation 2019/786 in Spain, evidencing the DBL role.	Journal	(Arbulu *et al.*, 2023)	No
The Digital Building Logbook as a gateway linked to existing national data sources: The cases of Spain and Italy	Identification of the mutual connections to existing data sources and propose a general dataflow structure for the DBL in Spain and Italy.	Journal	(Gómez-Gil *et al.*, 2022)	No
Review and Analysis of Models for a European Digital Building Logbook	Review of EU DBL models to summarise and compare available information.	Journal	(Gómez-Gil *et al.*, 2022b)	No

Research questions

- Are DBP and DBL related concepts?
- If yes, how should they relate at the process level?

Methods

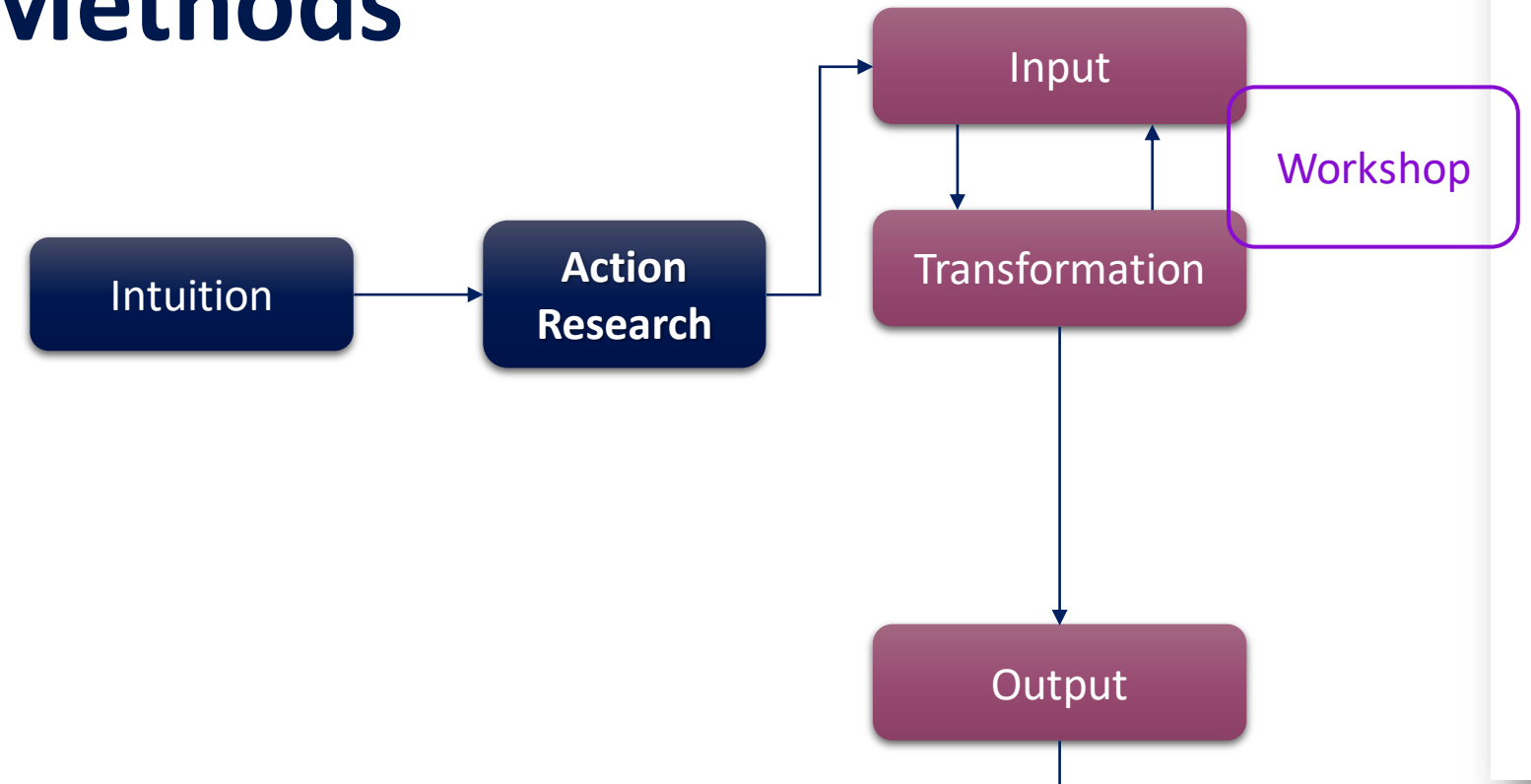


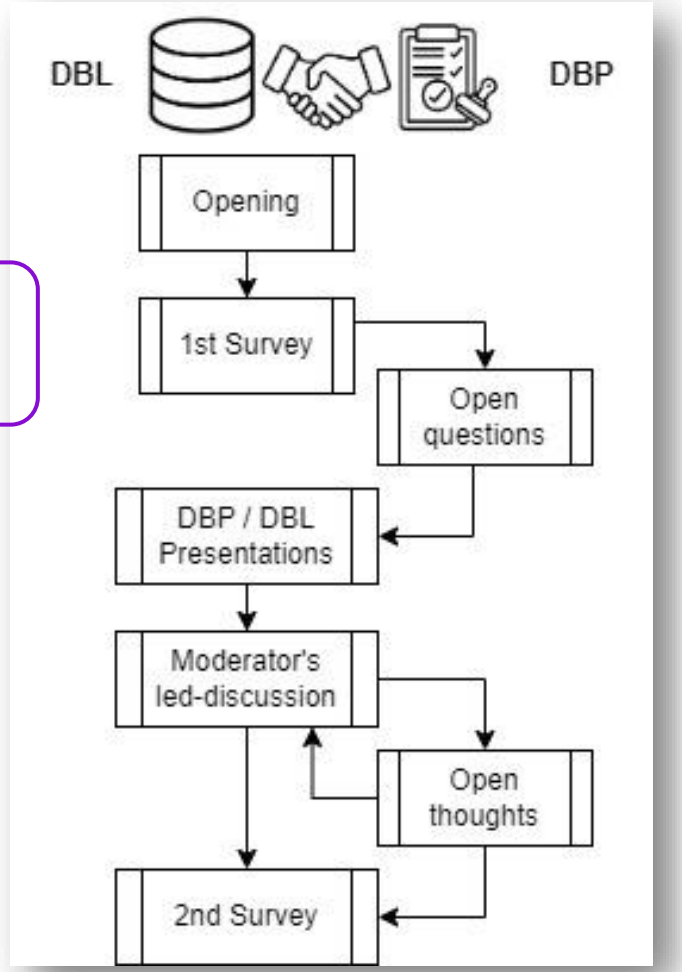
Recommended reading:

Kunz, J. and Fischer, M. (2007) CIFE Research Questions and Methods, Stanford Digital Repository. Stanford.

Fellows, R. and Liu, A. (2022) Research methods for construction. Wiley-Blac. Oxford.

Methods





Contributions and Impact

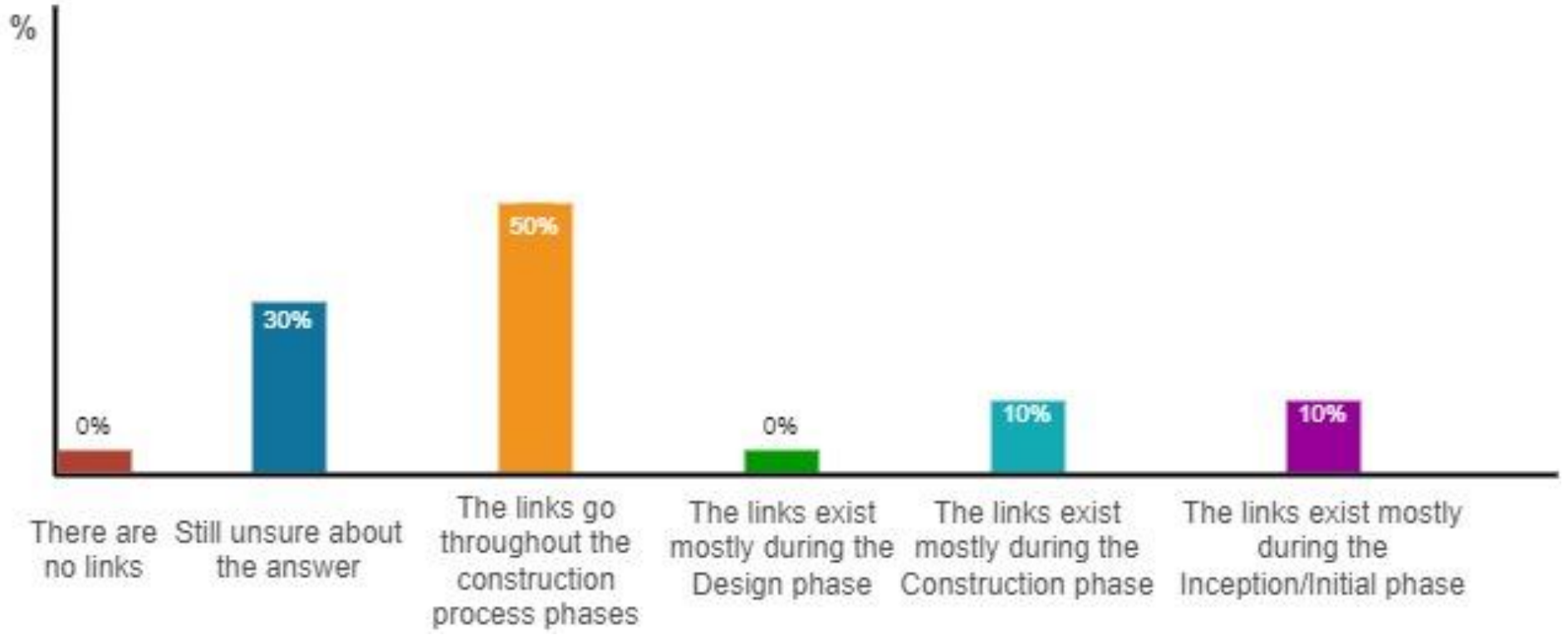
Recommended reading:

Kunz, J. and Fischer, M. (2007) CIFE Research Questions and Methods, Stanford Digital Repository. Stanford.

Fellows, R. and Liu, A. (2022) Research methods for construction. Wiley-Blac. Oxford.

Results

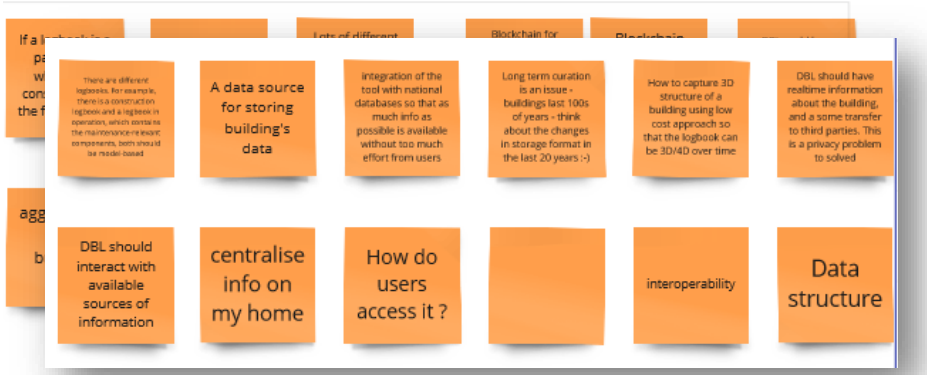
1st survey – DBP and DBL the link is not obvious (group of experts):



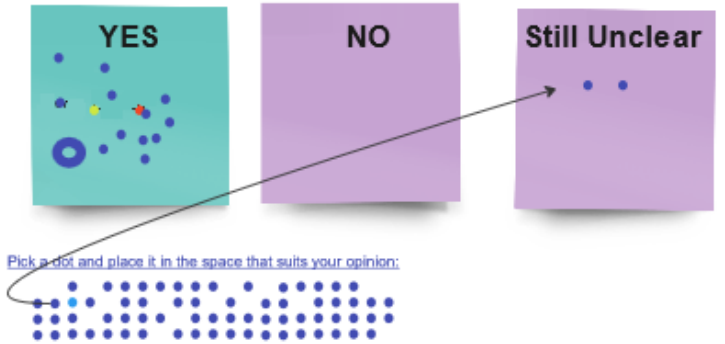
Moderators led discussion

One word or sentence on DBP - Permitting

One word or sentence on DBL - Logbook

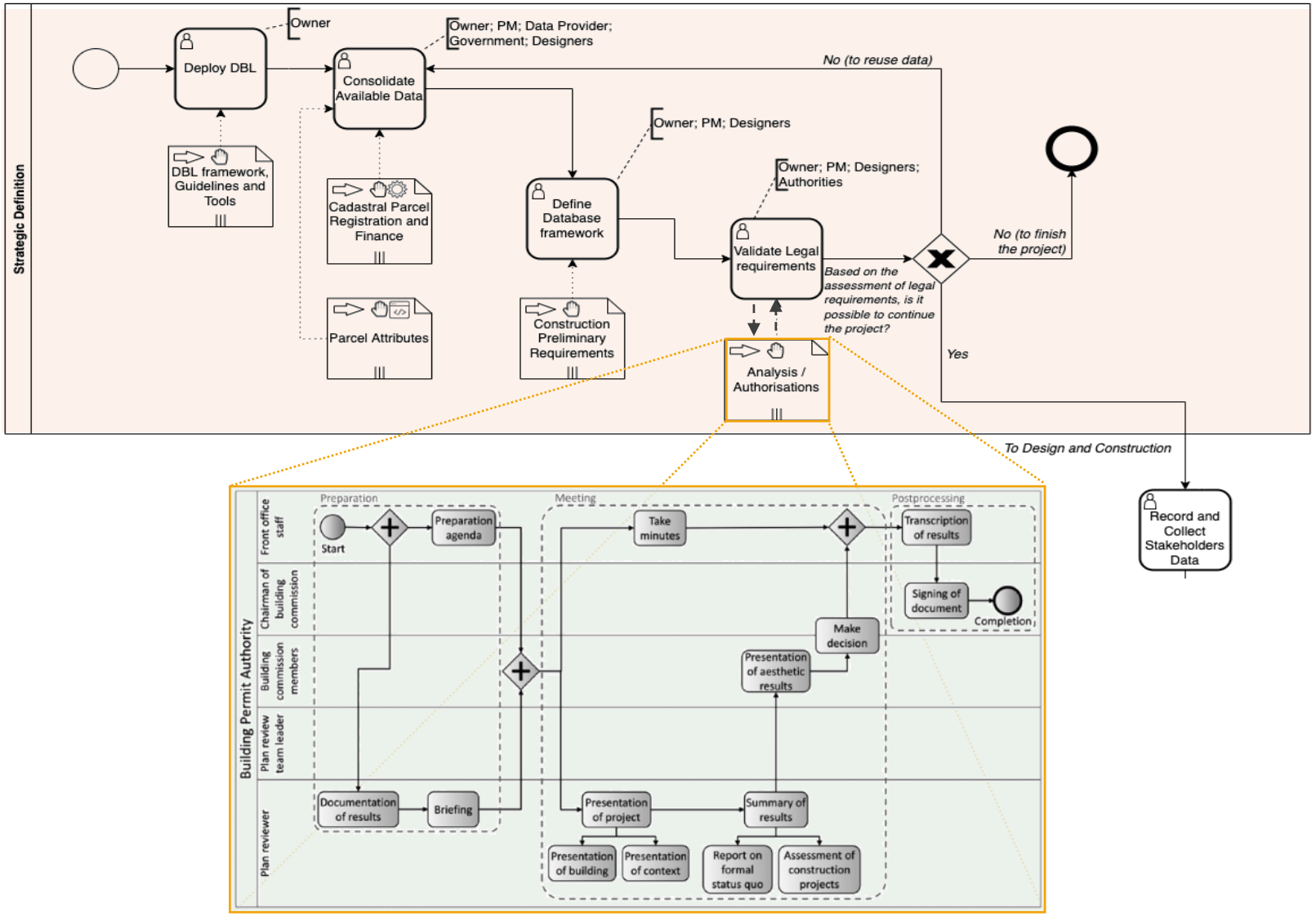


DBL and DBP should be linked concepts?

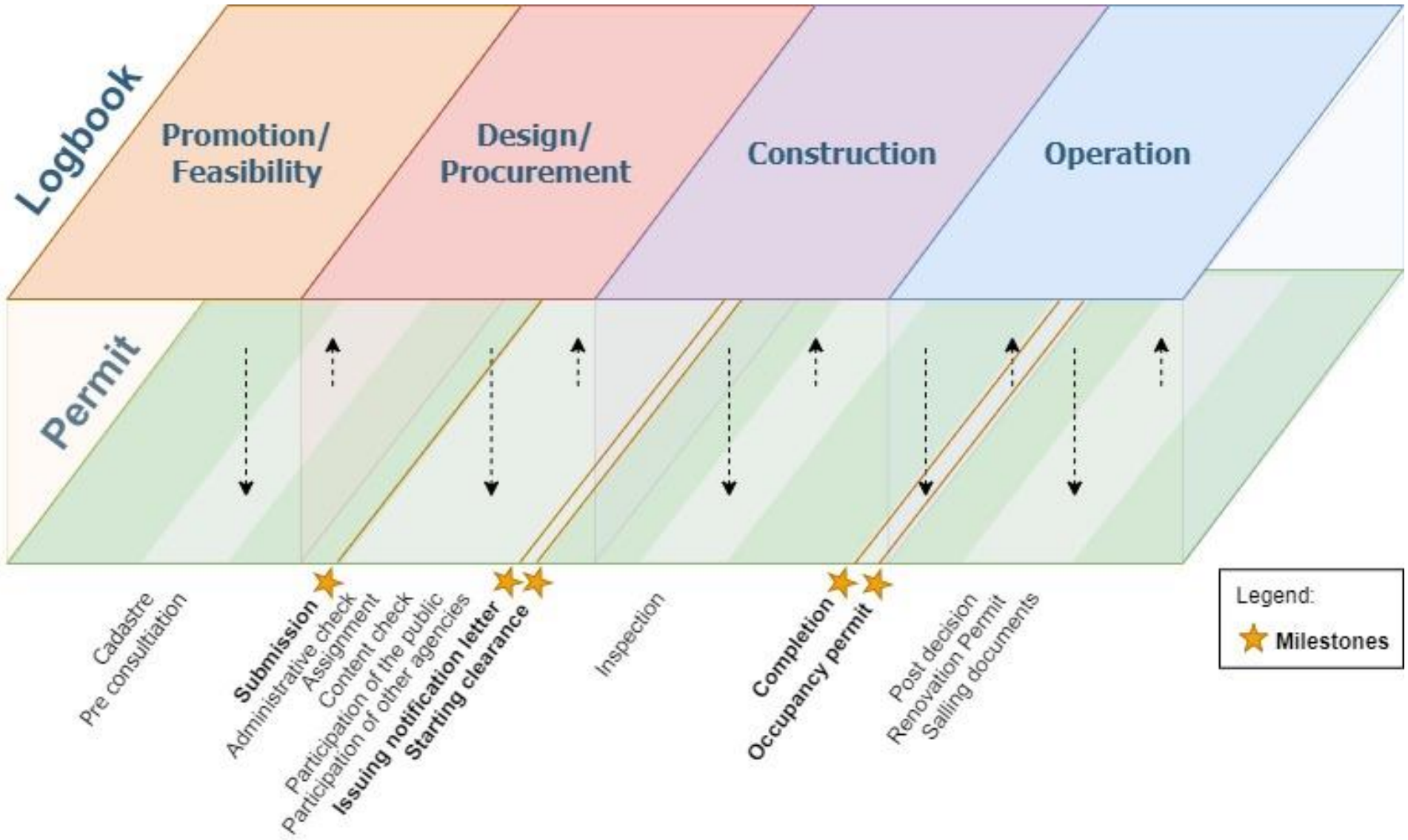


Common processes or at least related

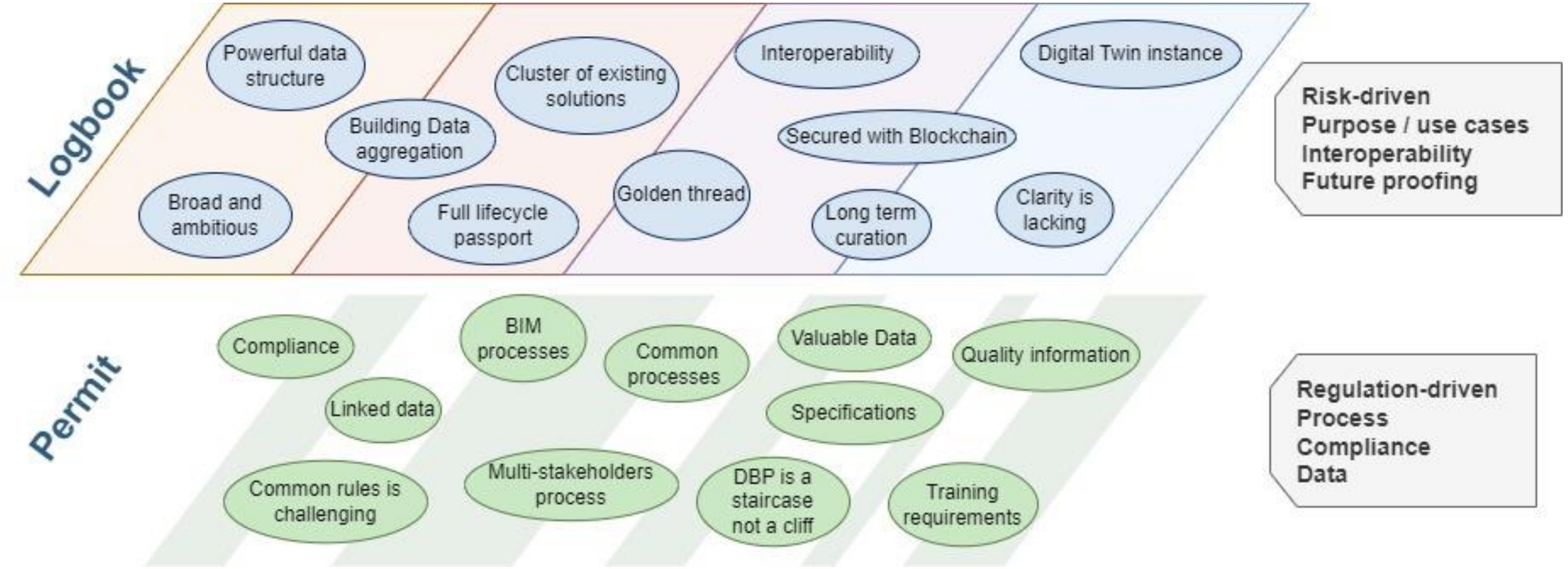
Links


Strategic Definition
Deploy DBL
Owner
Consolidate Available Data
Owner; PM; Data Provider; Government; Designers
No (to reuse data)
DBL framework, Guidelines and Tools
Cadastral Parcel Registration and Finance
Parcel Attributes
Define Database framework
Owner; PM; Designers
Construction Preliminary Requirements
Validate Legal requirements
Owner; PM; Designers; Authorities
Based on the assessment of legal requirements, is it possible to continue the project?
No (to finish the project)
Yes
Analysis / Authorisations
To Design and Construction
Record and Collect Stakeholders Data
Building Permit Authority
Front office staff
Chairman of building commission
Building commission members
Plan review team leader
Plan reviewer
Preparation
Meeting
Postprocessing
Start
Preparation agenda
Take minutes
Transcription of results
Signing of document
Completion
Make decision
Presentation of aesthetic results
Documentation of results
Briefing
Presentation of project
Summary of results
Presentation of building
Presentation of context
Report on formal status quo
Assessment of construction projects

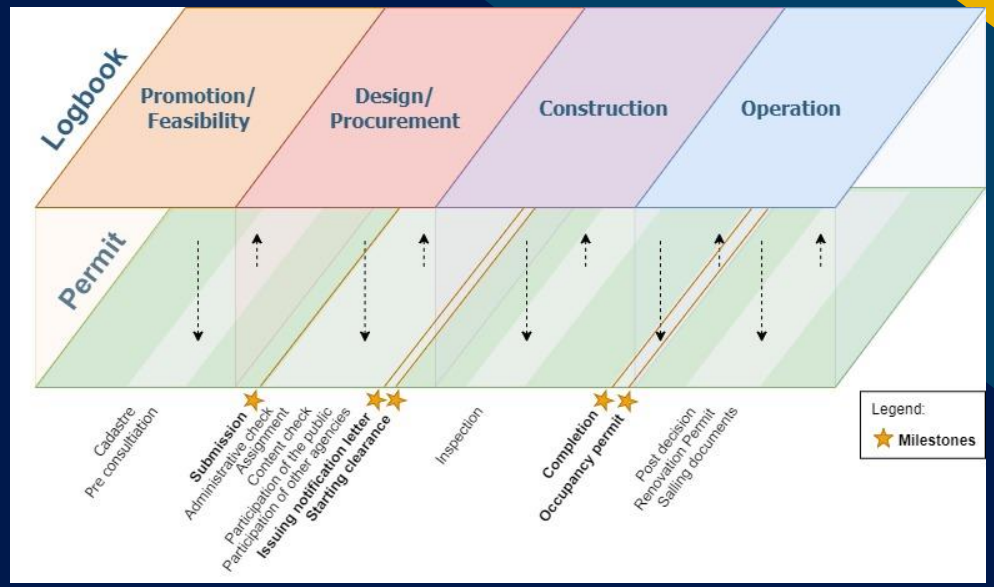
Links


Logbook
Promotion/ Feasibility
Design/ Procurement
Construction
Operation
Permit
Cadastre
Pre consultation
Submission
Administrative check
Assignment
Content check
Participation of the public
Participation of other agencies
Issuing notification letter
Starting clearance
Inspection
Completion
Occupancy permit
Post decision
Renovation Permit
Salling documents
Legend:
Milestones

Summary of DBP and DBL main aspects



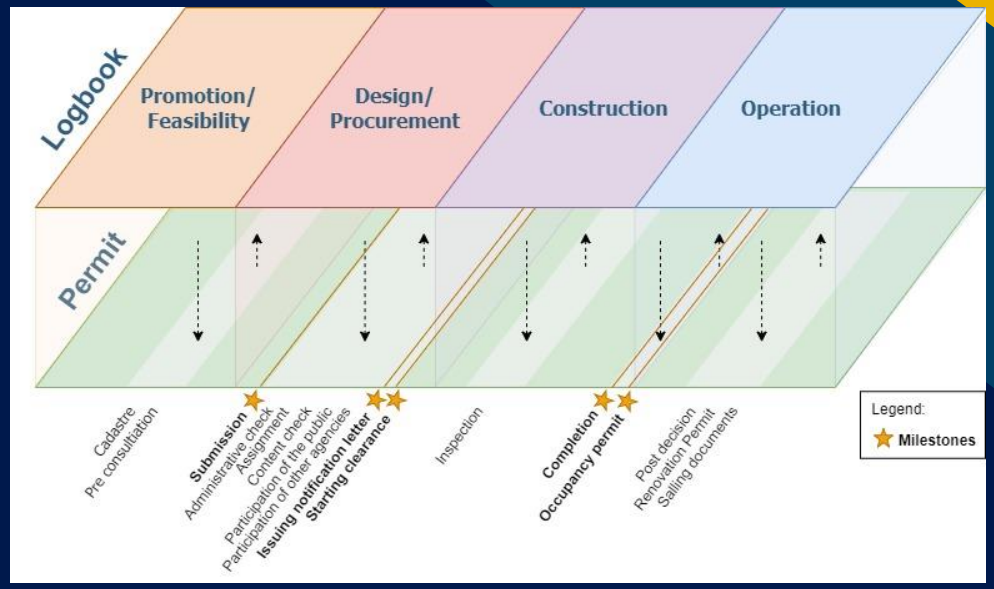
Conclusions and next steps



- The intuition can be confirmed
- DBP and DBL overlap in processes and data, meaning that technological links or, at least, compatible reference architectures should be adopted
- The EU strategic documents should assume the overlaps as a starting point for actions, guiding principles and implementation roadmaps

Conclusions and next steps

- From a data perspective, there are other meaningful developments that need to be considered, such as the INSPIRE Directive, Digital Product Passports, Asset Management systems, smart buildings management systems and Digital Twin at building scale (these are not exclusive from the CI requiring improved articulation effort)



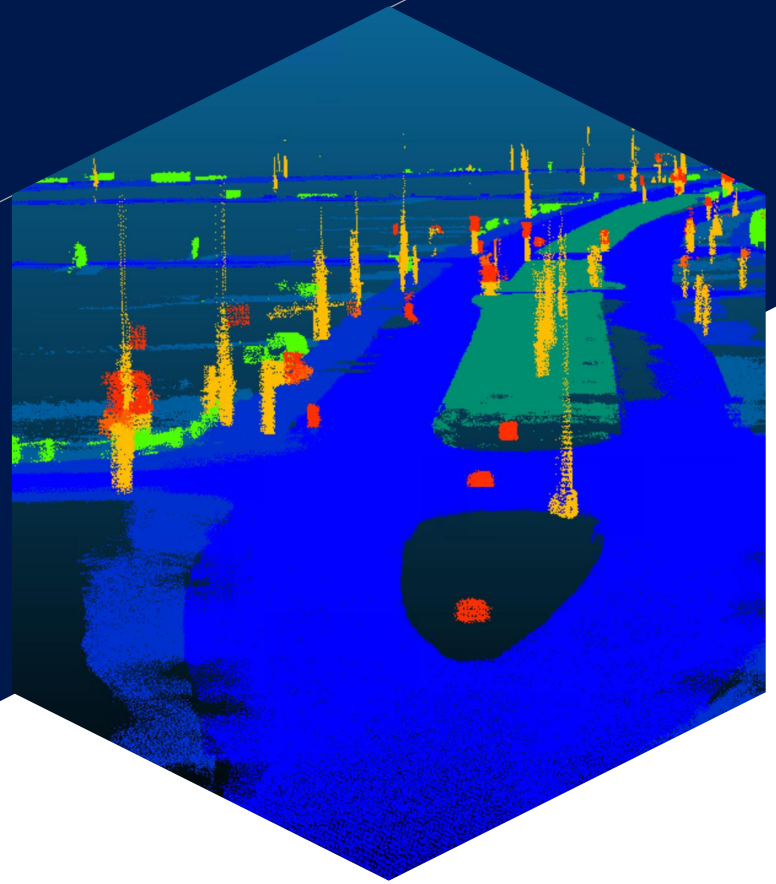
- Future studies will explore in detail the steps to be considered in each process where there are links between DBL and DBP
- Likewise, data requirements and information exchanges will be evaluated in detail through use cases

Together with

Acknowledgements

JF has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101034337.

Contact: drf-initiative@eng.cam.ac.uk



Thank you

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R2M RESEARCH TO MARKET SOLUTION

SUSTAINABLE PLACES 2024

Creating efficient and impactful DBL

Legofit

A. Araldi

Digital & Sustainable Transition in Buildings

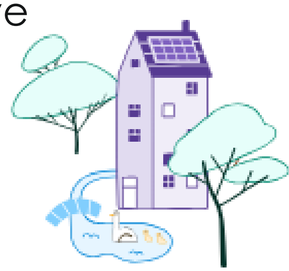
- **Objective**
  - Digital and green transition for a more sustainable built environment and society, leaving no one behind
- **Focus on**
  - Innovative Building and Digital Technologies
  - Digitalisation in construction
  - End Users
- **Topics**
  - Energy Efficient Buildings
    - Innovative building components, Smart technologies, Sensors
  - Data and information management and representation
    - Scan2BIM, 3DVM, BIM, Digital Twins, AR/VR
  - Data management and monitoring
    - DBL, Dynamic EPCs, IEQ monitoring
  - Capacity Building programmes

Legofit

Smart Tools for Smart Buildings: Enhancing the intelligence of buildings in Europe

OBJECTIVES

The LEGOFIT project aims to design, implement and validate an advanced and dynamic integrative approach to accomplish EPH based on smart and innovative solutions



HOW

- Develop the **BIM models** of the pilots building by using a Scan2BIM methodology. This BIM-based approach will support the next integration of passive and active technologies (including nature-based solutions) with an advanced use of smart management technologies in new constructions and renovations

- Create a standard, BIM-related and interoperable building performance framework for energy positive homes, the LEGOFIT Positive Residential **Building Digital Logbook**

Co-funded by the European Union

Grant Agreement Nº:101104058

Legofit

Smart Tools for Smart Buildings: Enhancing the intelligence of buildings in Europe

PILOTS

DEMO 1, SPAIN
Multifamily and multifloor residential building

DEMO 2, TURKEY
Student dormitory

DEMO 3, LUXEMBOURG
New residential building

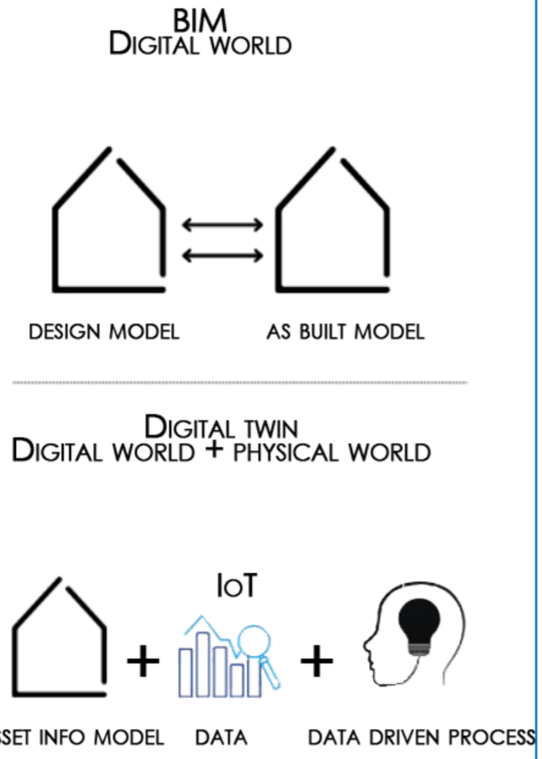
DEMO 4, HUNGARY
Multifamily residential prefabricated building

DEMO 5, BELGIUM
Residential complex in construction phase

Key Innovations

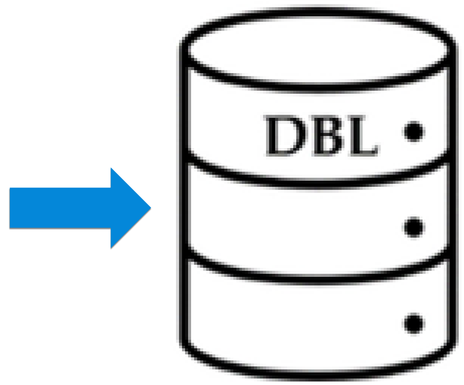
Smart Tools used and developed in the project

Scan2BIM



Digital Building Logbook

- Secure, scalable and interoperable data governance framework
- 3D/BIM models visualization
- Potential integration with the material passport
- APIs to feed data into and retrieve data from the DBL



DIGITAL BUILDING LOGBOOK

Value proposition

The DBL solves the need to have in a specific place all the information about the life of a building in a clear, organized and traceable way. It also allows to visualize, export and in some cases share the information so that stakeholders can evaluate the evolution, make decisions or so that these data can be used in third party tools to perform calculations (e.g. SRI and similar).

Approach - DBL

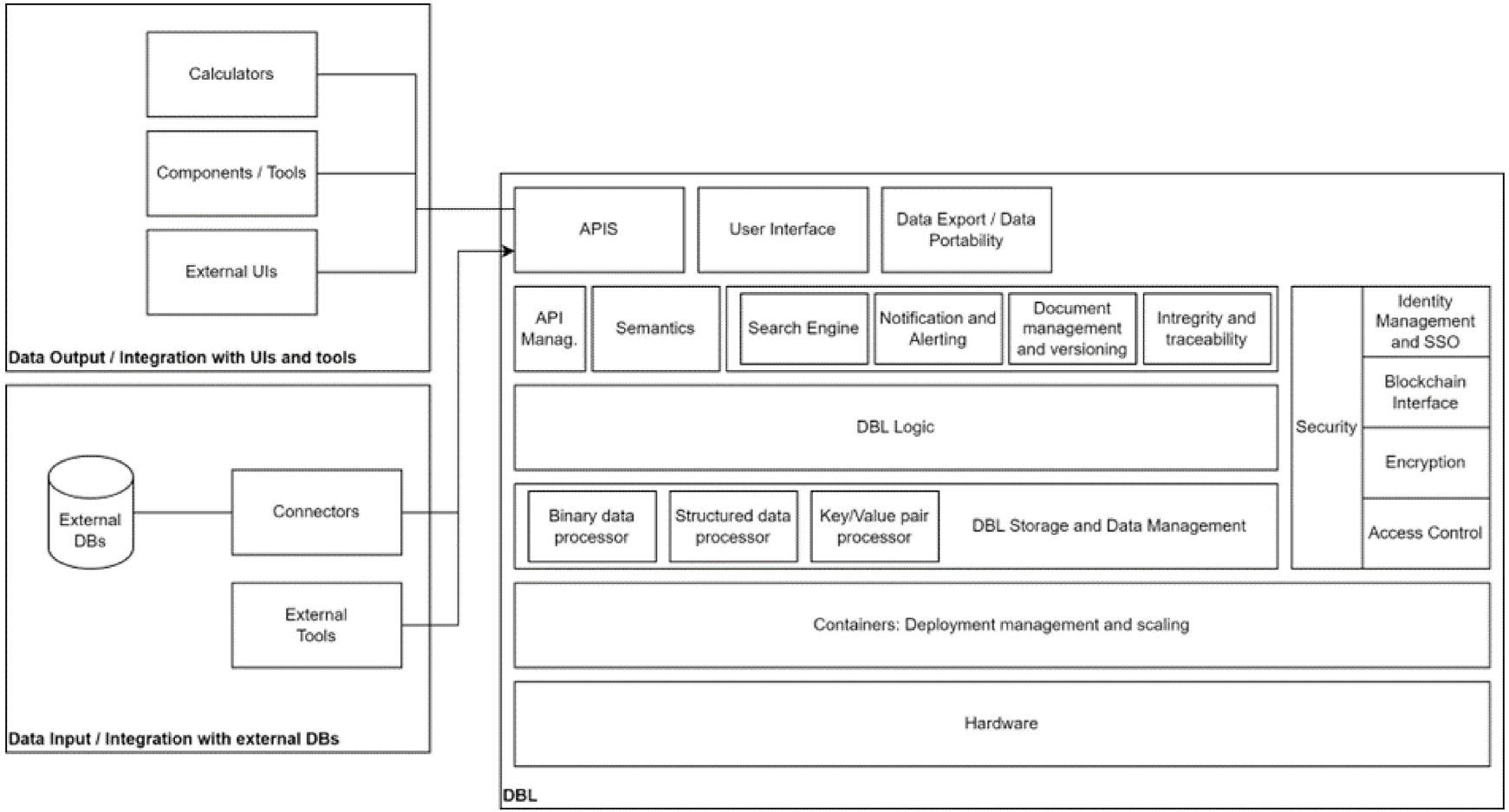
- We consider DBL a data destination (data sink)
  - DBL doesn't pull or request information. Other components and entities (e.g humans) are responsible for populating the DBL
- We offer APIs for DBL functionalities
  - Any external component can use the APIs to retrieve or upload data
- The DBL doesn't do calculations, ratings, simulations
  - The DBL is focused on the logbook functionality. The calculations are done by satellite components that reside outside of the DBL
- Supported data: i) documents and binary data, ii) key-value pair data, iv) (semi-)structured data.
  - Stream data (e.g sensors) is supported (e.g Key-value pairs) but not recommended. There are specific solutions for that purpose

Approach - DBL

Main functionalities

- Information management, search, filtering and visualization
  - Tags, bookmarks, filters, search engines, versioning, metadata
- Visual user interface (UI):
  - Web based, avoid complexity, present timelines
- User and role management
  - use of the platform, permissions and data sharing
- Integration and sources
  - facilitate data exchange (input) and allow the user to download filtered and generated data
- Notification and alerting
  - new documents, data input events

DBL Architecture



Challenges

- Understanding project tool ecosystem and interoperation with the DBL
- Define clearly the stakeholders and the use case of the DBL
- Discuss on how to adapt the DBL to the needs of the circularity passports
- Provide some simple 3D visualization strategies to facilitate the usage to the users

https://www.legofit.eu/

Chronicle

Building Performance Digitalisation and Dynamic Logbooks for Future Value-Driven Services

OBJECTIVES

The CHRONICLE project aims to improve building performance in order to increase energy efficiency, comfort and well-being. It aims to deliver a holistic framework for assessing the life-cycle performance for different building variants, and support the sustainable design of new and existing construction projects by focusing on efficient renovation procedures and investment decision-making processes.

HOW - R2M Activities

- Chronicle DBL is a cloud solution for storage, organisation and traceability of documents and relevant information about the life of the building.
- Integrate the logbook with the CDE for building data capturing in a dynamic way
- Methodology for regular data validation updates supported by blockchain technology for trust, transparency and data reliability
- Target user group is building owner

https://www.chronicle-project.eu/

Thank you

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@R2MSolution

Demo-BLog

Development and Demonstration of Digital Building Logbooks

A Horizon Europe project

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ir. Sun-Ah Hwang (s.a.hwang@tudelft.nl)

Co-funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme, under grant agreement No. 101091749

Our Partners

Demo-BLog Team:

- 14 partners
- 5 countries

Co-funded by
the European Union

Research (RO) partners

TU Delft · vito · CSTB le futur en construction

Independent innovation, standardisation and certification organisations

BPIE · energy saving trust · Association QUALITEL pour la qualité du logement

Commercial / Industry partners

R2M Research to Market Solution · ChillServices · re use materials · A.C.A. Group · TRUSTMARK Government Endorsed Quality · SOLSTICE ASSOCIATES

Society and user represent

leapforward

Policy makers

Vlaanderen verbeelding werkt

Project Vision

Demo-BLog brings together:

- **5 different DBLs** with a total of 4.5 million registered units and a wide variety of target groups offering scale and diversity.
- **4 diverse functionalities** addressing key societal challenges, ranging from ‘quick wins’ (renovation and advice and (community driven) decarbonisation pathways) to complex industrial transaction objectives (circularity).

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The 5 DBLs

Demo Blog

Woningpas (BE)

- ***Flanders (Belgium)***
- **Public** (Owned by 3 government bodies: VEKA, OVAM, Wonen-Vlaanderen)

CLÉA (FR)

- ***France***
- **Private** (Owned by QUALITEL)

CHIMNI (UK)

- ***United Kingdom***
- **Private** (Owned by Chimni)

CAPSA (DE)

- ***Germany**, Scotland, the Netherlands, Italy, India etc.*
- **Private** (Owned by Chillservices)

CIRDAX (NL)

- ***The Netherlands** (to be tested in Belgium)*
- **Private** (Owned by Re-Use Materials)

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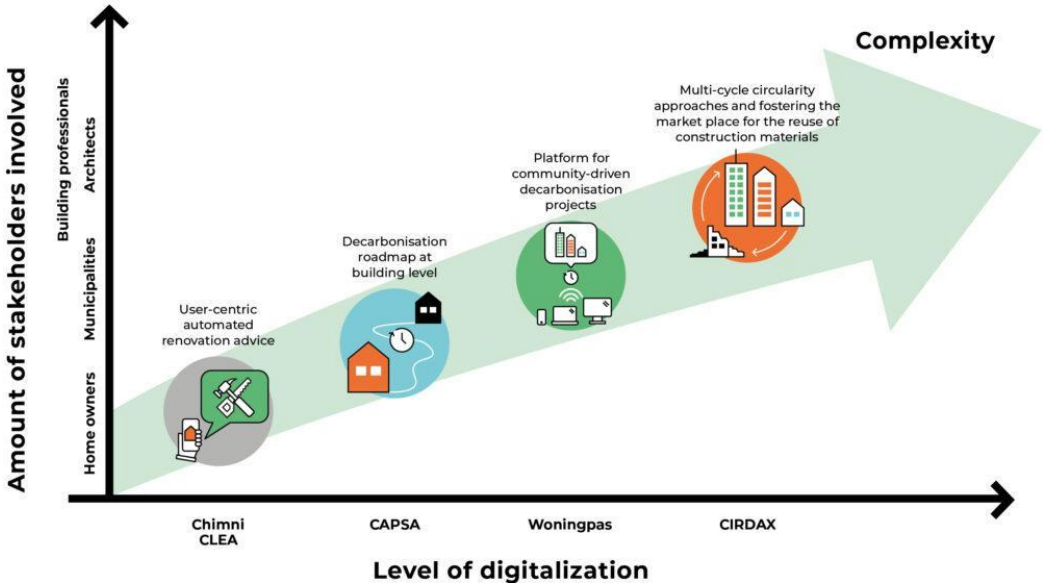
The 4 Functionalities

Demo Blog



1. User-centric automated renovation advice *(via CHIMNI and CLÉA)*
2. Decarbonisation roadmap at building level *(via CAPSA)*
3. Platform for community driven decarbonisation projects *(via Woningpas)*
4. Multi-cycle approaches and fostering the marketplace for the reuse of construction materials *(via CIRDAX)*

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Value Proposition

Demo Blog

Woningpas (BE)

- Using the DBL to demonstrate a collective approach to renovation by **enhancing energy-communities**.
- Enabling the **sharing and integration of data** from 3rd parties (both private and public).
- **Integrating smart data** from new technologies for monitoring.

CLÉA (FR)

- **Developing new services** to improve energy performance of the home.
- **Strengthening linkages** with external data platforms.
- **Improving data verification** and **reliability**.

CHIMNI (UK)

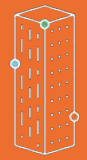
- **Developing new services** to improve energy performance of the home.
- **Creating linkages** with external data platforms.
- Creating an **open API** to draw retrofit advice from **retrofit calculators.**

CAPSA (DE)

- **Automating** the currently semi-automated **decarbonisation roadmap functionality**.
- **Strengthening linkages** with external data platforms.

CIRDAX (NL)

- **Developing a framework** that encourages the reuse of building materials to build a **circular marketplace**.
- **Applying data-analytics** to improve the characterisation of building performance features to **ensure a higher quality of data**.



Demo Blog

Key Innovations

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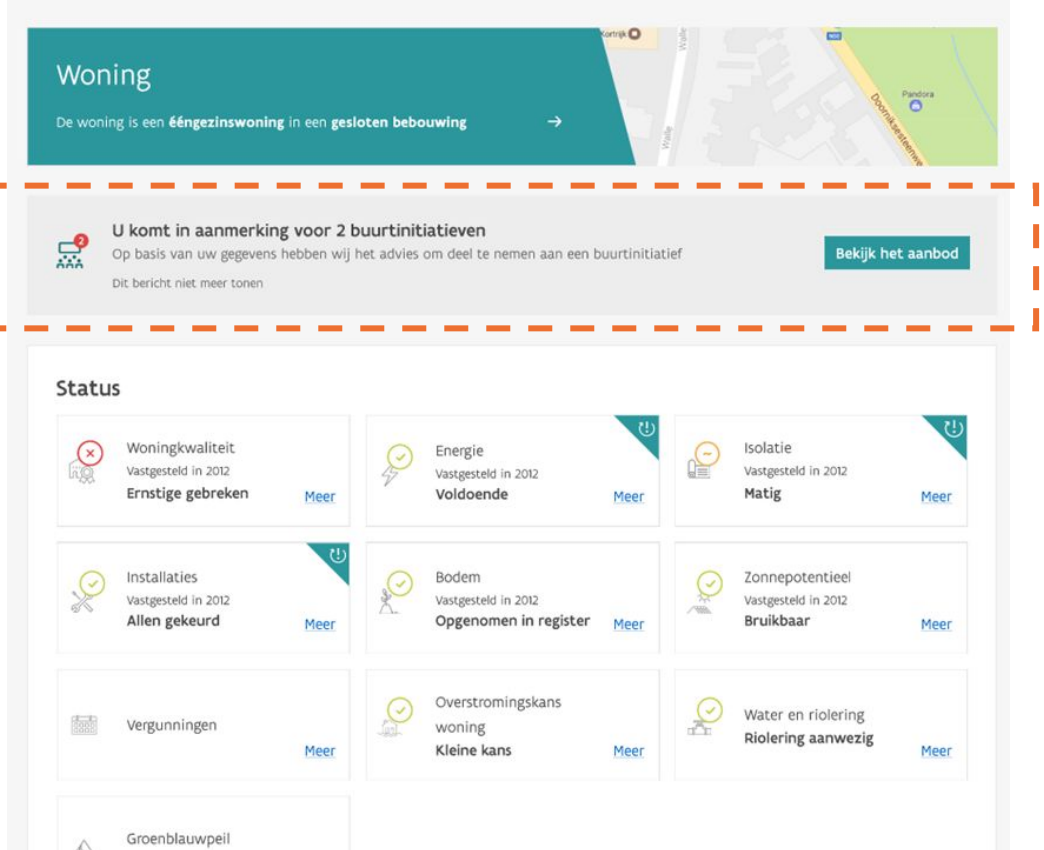
Key Innovations: Woningpas (BE)

Demo Blog

The **official launch** of the new functionality!

Scope of demonstration:

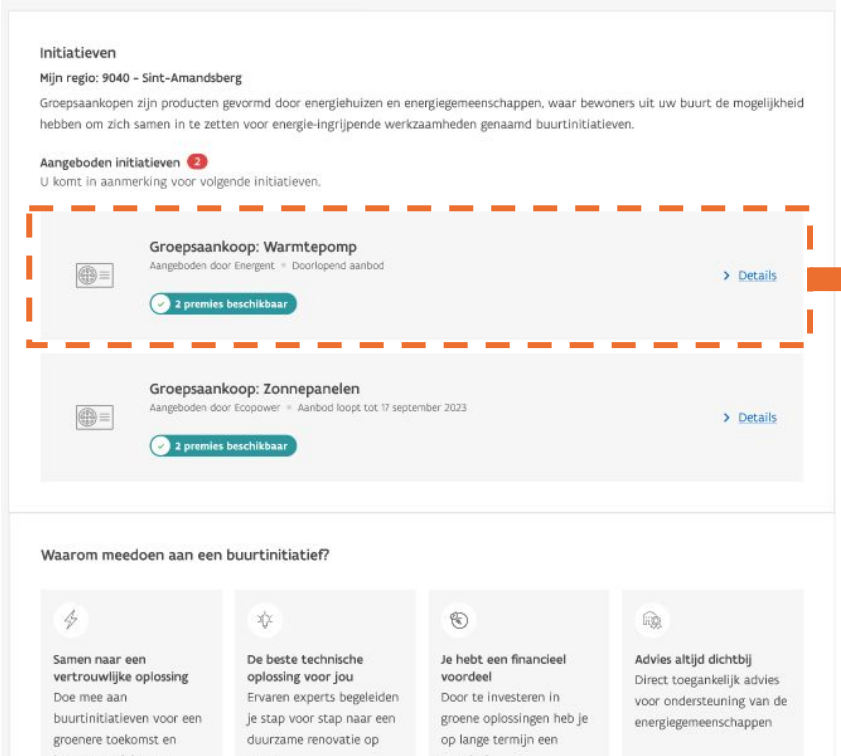
- Collective heat pump installations
- 3 energy-cooperations
- 94 cities
- 337,459 invitations in Woningpas

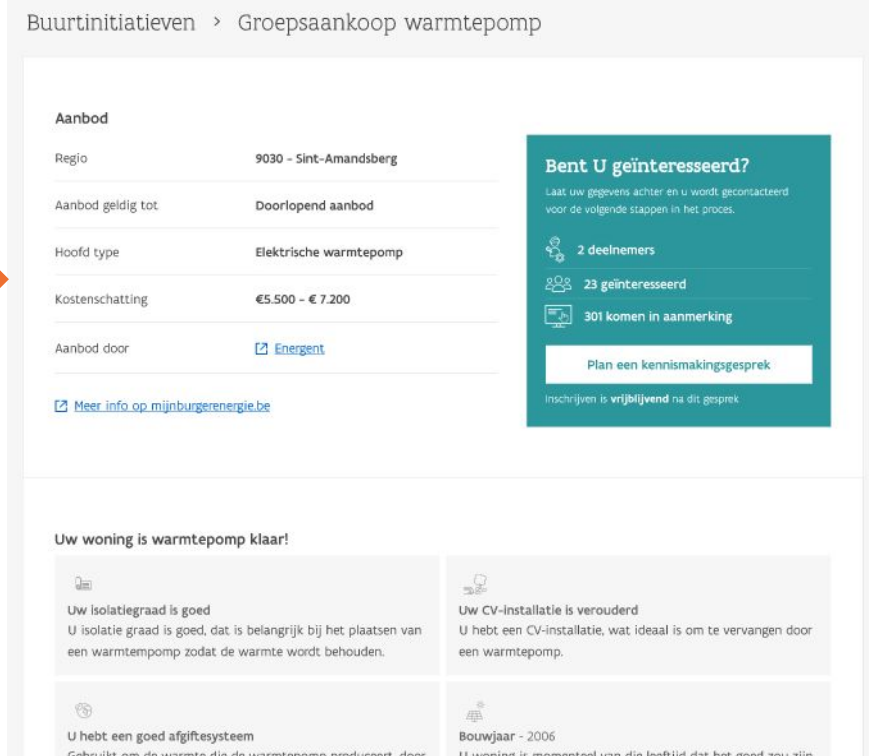


Key Innovations: Woningpas (BE)

Demo Blog

The **official launch** of the new functionality!

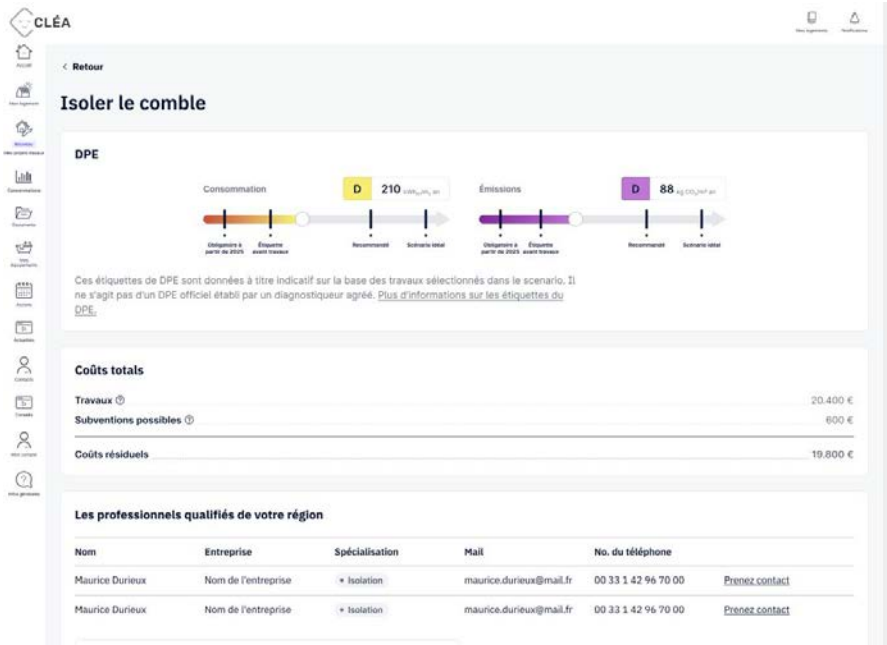


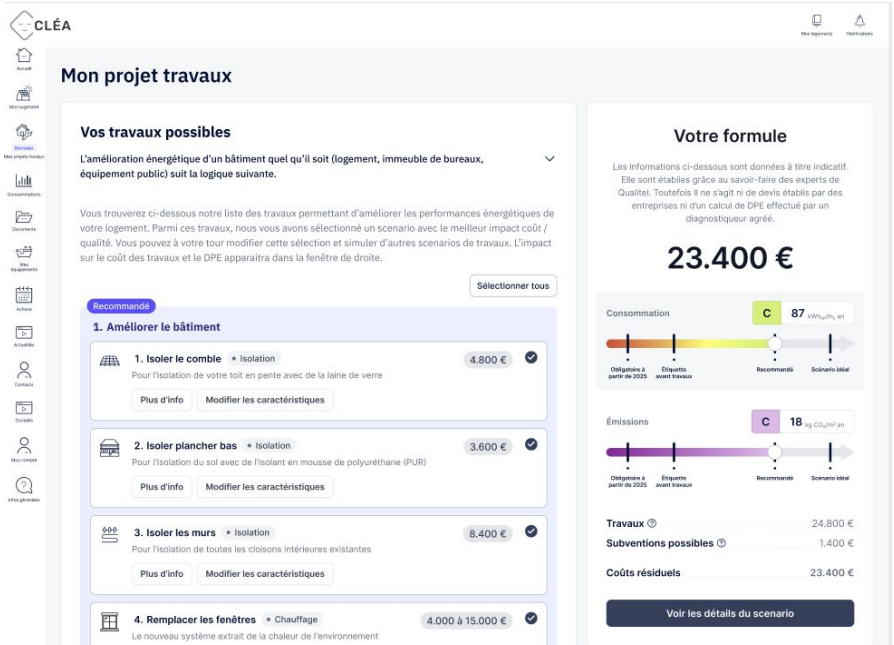


Key Innovations: CLÉA (FR)

Demo Blog

1. The development of a **user journey** to define the scope of features to be addressed by the functionality
2. The development of a **clickable prototype**

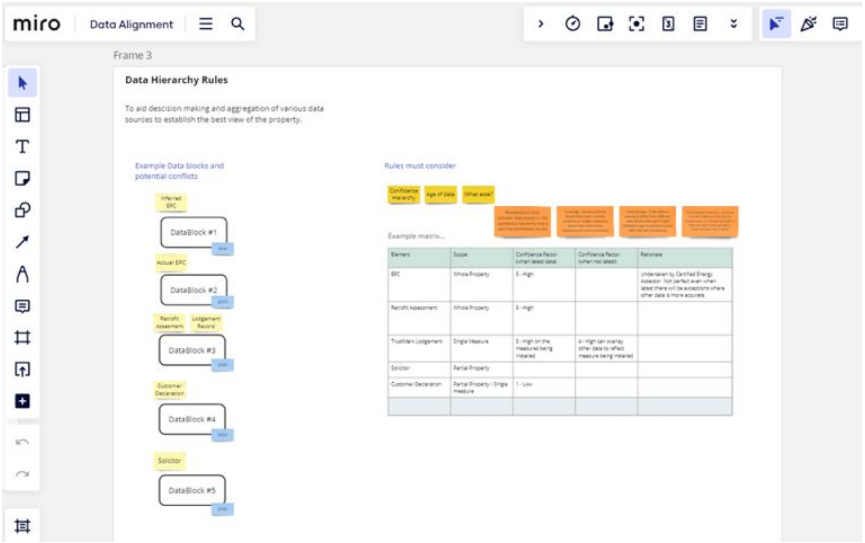


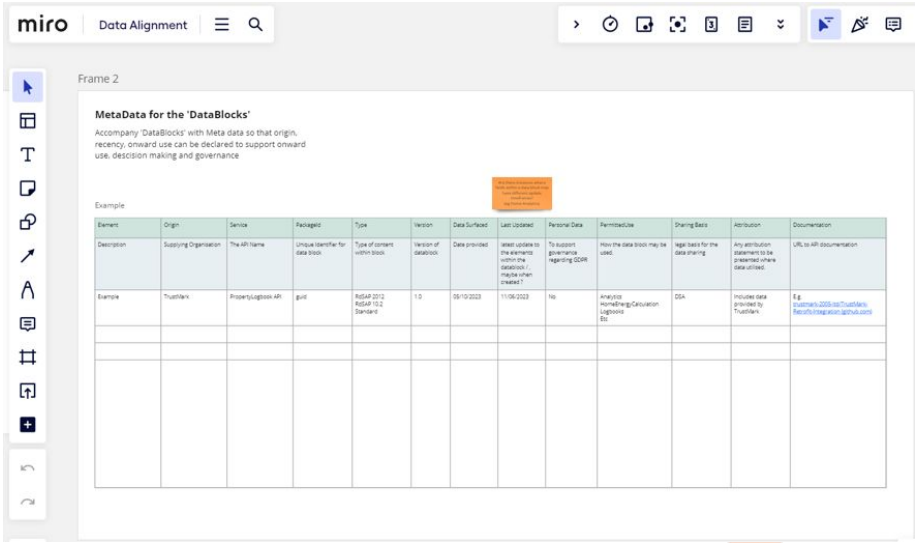


Key Innovations: CHIMNI (UK)

Demo Blog

1. The establishment of **Metadata and rules for APIs** that will be required for the integration of existing databases.
2. The establishment of **data prioritisation framework** for evaluation.



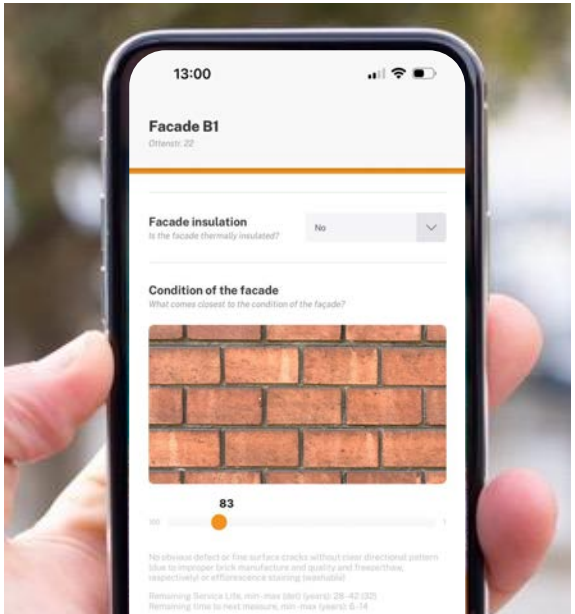


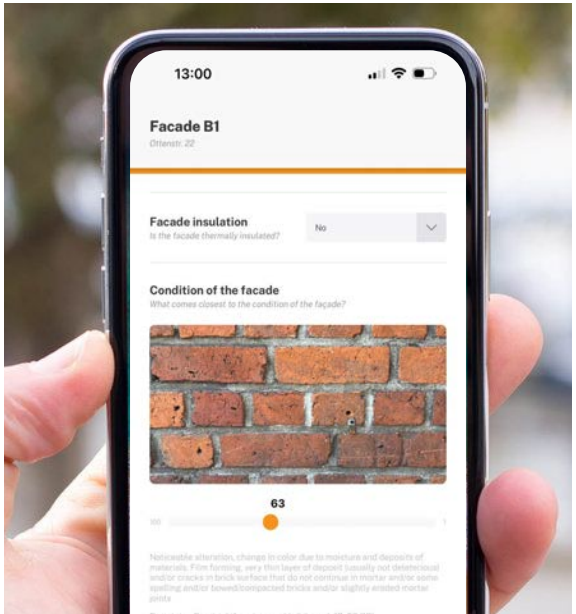
Key Innovations: CAPSA (DE)

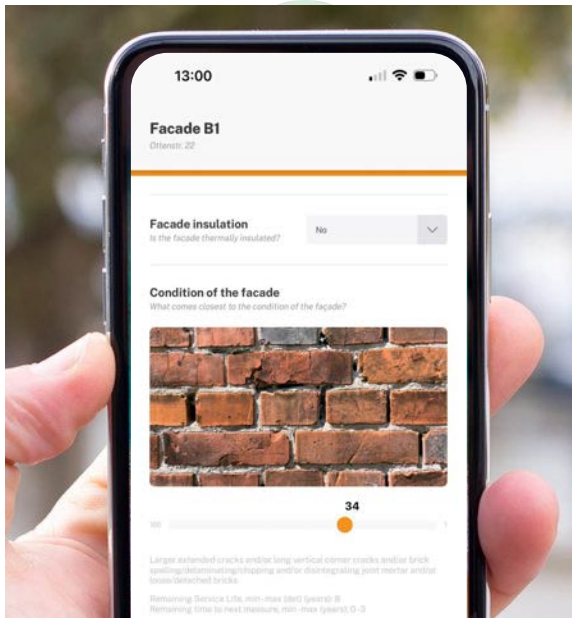
Demo Blog

1. Data collection of **50,000 units** (approximately 4500 buildings owned by 13 housing associations).
2. The improvement of **UX** and the **backend** of the CAPSA tool.

ie. Alpha reworked version of example-based element condition rating system



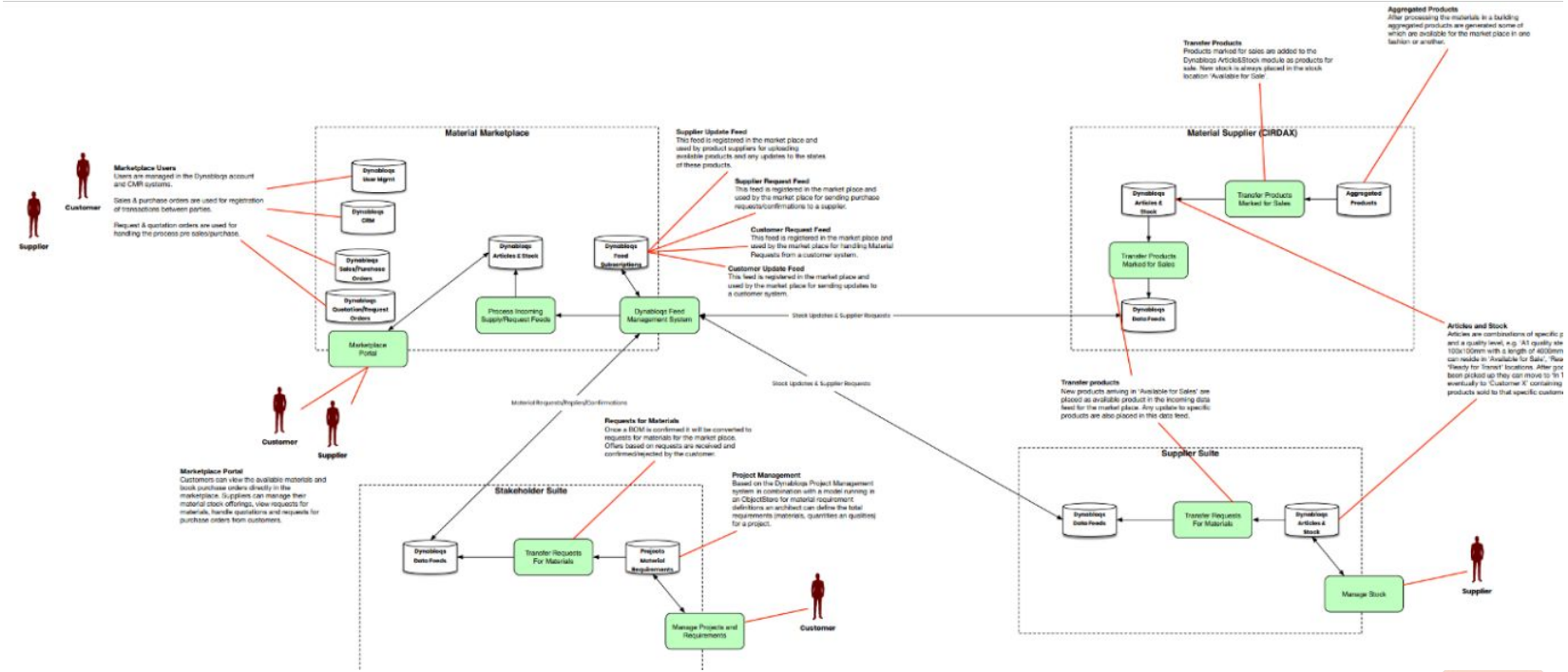




Key Innovations: CIRDAX (NL)

Demo Blog

The **development of a model** for an interactive marketplace for secondary materials.



Potential Challenges

Demo Blog

The **evaluation** of the **new functionalities**:

1. How can we define a good set of parameters?
2. How can we measure the impact of the different functionalities on energy transition?
3. What can we do collectively to promote the use of these functionalities among individual homeowners?

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Thank you!

Demo Blog

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