The relevance and purpose of Digital Building Logbooks

Why are Digital Building Logbooks (DBL) important? In this two-pager we highlight key benefits of DBLs and how they can improve decision making in the built environment. For a full overview on the reasons to invest into setting up a national DBL, please refer to the Technical Guidelines.

The purpose of national Digital Building Logbooks

A DBL allows to connect and integrate existing data sources about buildings to provide a global perspective about the building stock of a country, region or municipality. As such, DBLs has the purpose to serve as a centralised access point to building-related data, offering both policymakers and private actors access to verified and trusted building data. Public access to data may vary and depend on various factors such as data protection.

Key benefits of Digital Building Logbooks

Access to this data is critical in meeting EU and national climate goals, which require the transformation of the built environment with a focus on energy efficiency, circularity, and climate resilience. Therefore, to support decision-making, the long-term vision is to create a network of interoperable national DBL platforms connected at the EU level through a European portal.

Beyond this larger goal, DBLs can support the life cycle management of buildings, different user groups and business models and play a central role in the European policy context.

Beyond this larger goal, DBLs can support:

Building life cycle management:

Quicker and more reliable real-time data availability facilitating overall building management, ease in regulatory compliance for building owners and facility managers, easier access to market services such as financing, insurance or maintenance, improved quality and trustworthiness of data as it will capture all (meta)data needed to increase reliability and support standardisation.

User benefits:

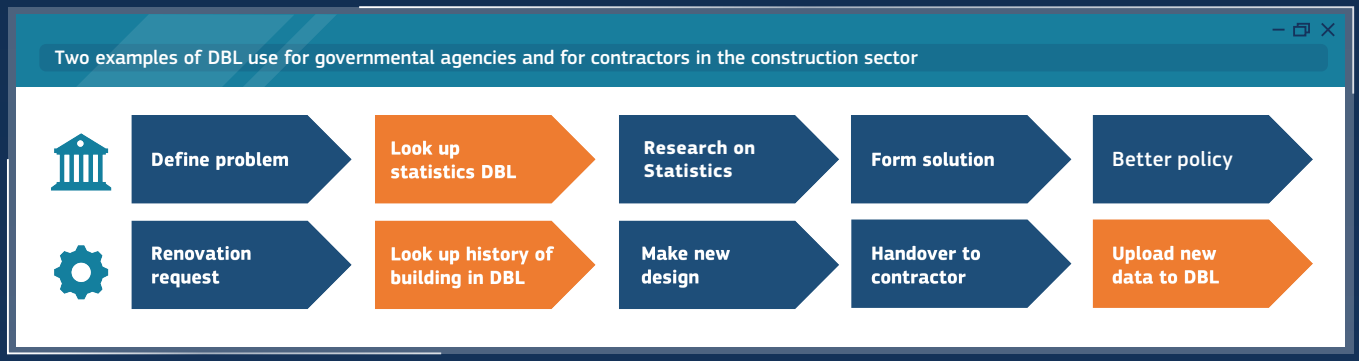
User benefits vary, but generally users among governmental agencies, the construction sector, building owners and tenants, financial institutions and utility companies are expected to benefit from more efficient and effective processes through transparency, easier data extraction and analysis as well as new business models.

European connectivity and Member State benefits:

Ultimately, the DBL Framework aims to guide Member States in setting up their national DBLs to realise national benefits while also ensuring interoperability at the EU level. Benefits such as consistent data and a comprehensive standardised record of the built environment facilitate EU regulatory compliance and data-driven policymaking to address national, European and global challenges while supporting international collaboration and harmonisation.

There are various benefits for the user groups of DBLs, the figure below lists an example for two of them:

Two examples of DBL use for governmental agencies and for contractors in the construction sector



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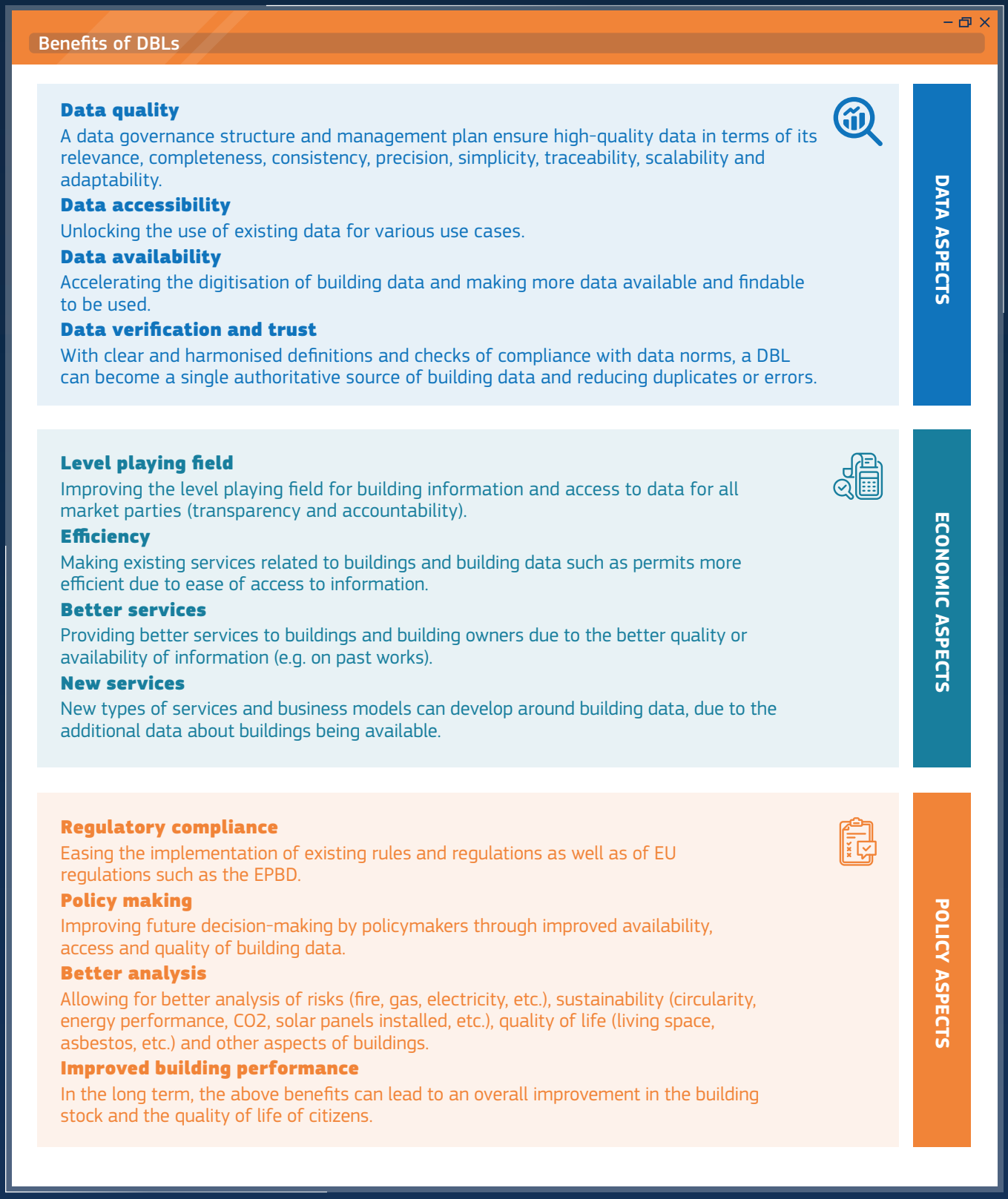
Data, economic and policy specific benefits

Beyond these overarching reasons for implementing a national DBL one can further identify specific types of benefits related to data, economic and policy aspects. See figure below:



Implementation roadmap for digital building logbooks

What are the key steps to consider when implementing a digital building logbook (DBL)? In this one pager we focus on the practical steps for proper implementation and DBL acceptance. Technical, legal and economic aspects are discussed in separate supporting documents.

Step by step approach for implementing a national, regional or local DBL

First and foremost, start simple! While the long-term ambition of a DBL is to cover all relevant building data to serve as a single point of entry to verified and trusted building data, it is better to start with a single use case to avoid overwhelming yourself and future users. Therefore, start small with available building data and slowly add more datasets and functionalities to extend the potential use of the DBL platform. Moreover, when starting the process, take a step back and assess what pre-existing components, tools and data could facilitate your work. Similar work might have been implemented in another Member State, internationally, or by market parties.

Apart from this, below are eight steps to follow. Not all of these need to be done sequentially, and some such as step four on stakeholder involvement are key throughout the process. The full roadmap with further guidance is presented in the DBL Technical Guidelines.

1 Defining the role and purpose of the DBL

As a first step, one needs to define the role and purpose of the foreseen DBL. A national or EU legal requirement to collect or publish building data could provide a good starting point for the development of a DBL. In most EU countries the national Cadastre collects data to meet certain legal requirements. Making these publicly accessible could be a good way to kickstart the development of a national DBL. However, a so-called use case methodology will still help to define the overarching goals (i.e. why we collect and publish the data).

2 Determining the data needs of the DBL

In order to determine the data needs of a DBL use case one first needs to gain a comprehensive understanding of the use case. Using the use case description and a customer journey mapping one can define the pertinent data to be collected and published as well as responsible actors.

3 Quantifying benefits

For a decision to develop a DBL, it can help to demonstrate that the benefits are larger than the costs. Our main technical guidelines provide various qualitative benefits that should help you with that. However, to quantify benefits, the so-called Standard Cost Model can help. A Standard Cost Model is essentially a method to define units and unit costs. Multiplying the unit costs with the number of units then gives the total costs. The same approach can be applied to benefits.

4 Identifying stakeholders, raising awareness and acceptance

The functional use of the DBL depends on a combination of people, processes, and data. It is therefore important to not lose sight of the human component when realising a shared database. Moreover, accountability and transparency are key for the success of projects like a national DBL. Therefore, one should involve relevant stakeholders in the development of a DBL to get their buy-in and identify bottlenecks and responsibilities. The other steps outlined in this roadmap provide further guidelines to create awareness and acceptance of stakeholders that might need to be co-opted into the DBL implementation.

5 Analysing barriers to implementation

Talking about bottlenecks, there are various barriers to implement DBLs. In the main report we group them along political, legal, technical and economic barriers. For your individual case you should identify the potential barriers and consider how to overcome them for a successful implementation.

6 Developing a working DBL prototype

From the experience of DBLs that have been implemented, it is usually best to start small and use an iterative approach that allows for regular feedback . It is therefore recommended to first start with a proof of concept and then develop a working prototype.

7 Preparing the legislative framework and an enforcement strategy

Before further developing a DBL, a legal assessment is needed. A DBL should be established in national law. The General Data Protection Regulation (GDPR) in that case requires a legal impact assessment. In this impact assessment, the legality of collecting personal data should be assessed by weighing various legitimate interests, for example, building owners versus people considering buying or renting a building.

8 Starting to implement and realising benefits and feedback loops

Following the completion of a prototype and the preparation of a legislative framework, one can move to the actual DBL implementation. The implementation includes the following steps:

a. Turning your prototype into a minimum viable product;
b. Development and implementation of a communication plan;
c. Agreement on internal roles and responsibilities;
d. Limited rollout with selected municipalities or regions;
e. Provision of training and providing support to users.
f. Wider rollout and communication of the development roadmap.

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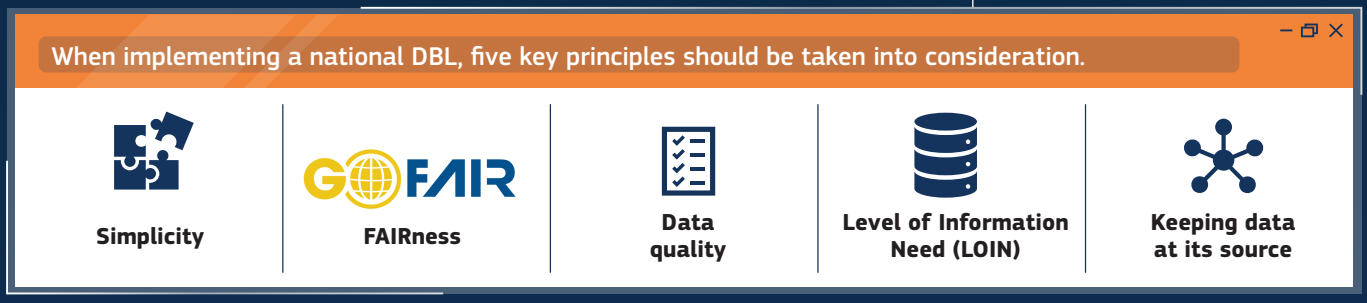
Technical implementation of digital building logbooks

How does one implement a digital building logbook (DBL) using the EU DBL Framework? A full description on the technical implementation is presented in the Technical Guidelines and the DBL Semantic Data Model. Together, they provide a framework that one can follow when implementing a DBL. Member States are recommended to replicate this core model as only an EU-wide framework can support interoperability and a common European data space for construction. However, beyond its core, this framework is also flexible and can be extended with additional elements depending on national or regional requirements.

The EU Framework for Digital Building Logbooks

The proposed DBL Framework focuses on two levels: a European portal as a centralised point for access to the DBL, and national portals for every Member State to implement its own, possibly enriched national DBL. Technically, as a third level, there are also data providers, which could be a building owner or someone providing the data on their behalf. These guidelines represent a reference framework with instructions to follow in the implementation of a national DBL at the Member State level.

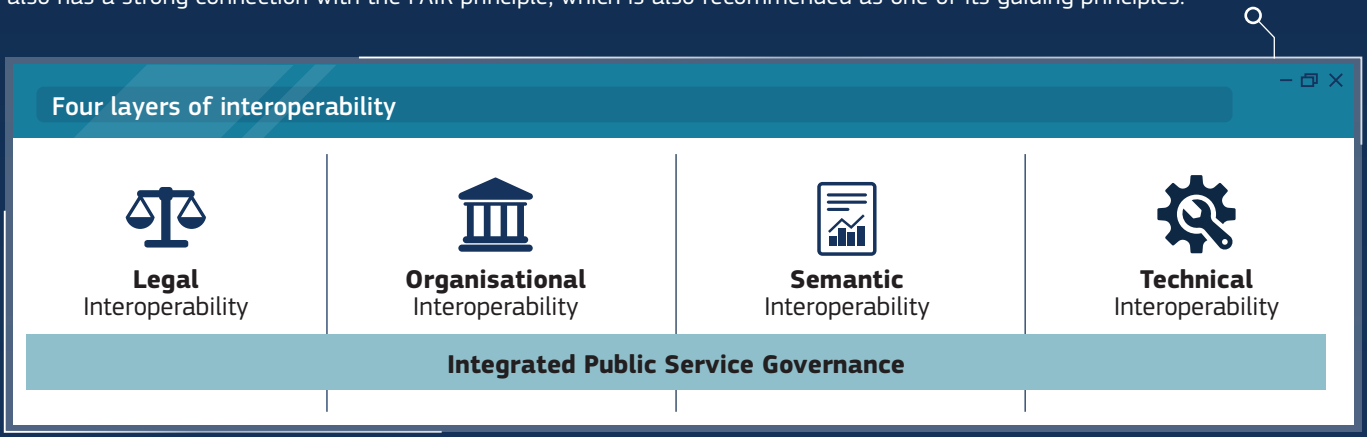
Key principles for implementing a Digital Building Logbook



Simplicity means to start simple before adding complexity. Fairness refers to the FAIR principle which advocates for findable, accessible, interoperable and reusable data. It aims to optimise the use and reuse of data by making data concise and concrete. Further to the requirement of data being concise and concrete (which is implied by the data formats) as well as clear (implied by reusability), data needs to be also correct, complete and timely to be useful. So beyond defining the data well, data quality is highly important. Another important guiding principle is to define the Level of Information Need (LOIN). LOIN discusses the level of detail required for each type of data. It refers to three levels of data: alphanumerical data sets, also known as semantic data, geometric data and simple documents. Finally, the fifth guiding principle is to keep data at its source to avoid multiple copies.

Ensuring interoperability for Digital Building Logbooks

Central to the DBL Technical Guidelines and the Semantic Data Model are considerations regarding interoperability. The 'New European Interoperability Framework (EIF)' defines four layers of interoperability that build upon each other. As such, the EIF also has a strong connection with the FAIR principle, which is also recommended as one of its guiding principles.

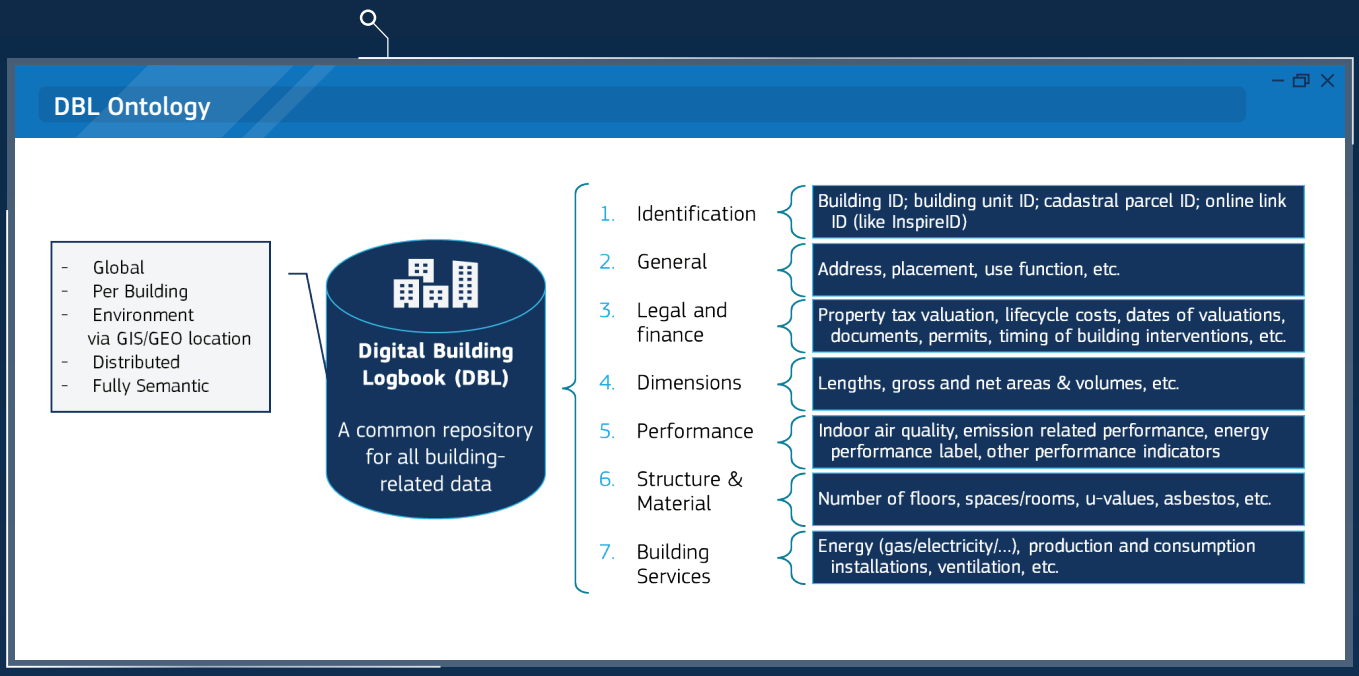


Semantic and Technical interoperability under the DBL Framework

The Technical Guidelines for DBL focus on the layer of Semantic Interoperability, covering both purely semantic aspects related to the meaning of data but also syntactic aspects of how the data (and its related semantics) are represented. In simple terms, the layer addresses the data format and the data structure. For the Technical Interoperability layer, the Technical Guidelines provide recommendations on the underlying data storage, data transport and data access aspects.

The recommended DBL data architecture is based on an extension of the standard ISO 8000 Part 110 Data Architecture. This architecture comprises various data technology elements such as identification schemes, data formats/APIs/Query Languages and data languages to be decided to define and access the data, metadata and their specifications and dictionaries. For these data technology elements, the DBL Framework proposes W3C Linked Data / Semantic Web technology and an identification scheme based on the INSPIRE Directive.

This data architecture also defines a (possibly standardised) data specification or data model that represents the different aspects of building information. In the DBL Framework, this is the DBL Ontology, which is the term used for a data specification in case linked data/semantic web technologies are used as is proposed in the core DBL model. This ontology is based on aspects defined in existing data sources available in different Member States and includes properties such as buildings, building units, parcels, systems, energy consumption, maintenance records, and other relevant attributes and relations:



Whereas the data specification defines the semantic 'things' one can encounter in the data, the dictionary defines the human-interpretable 'strings' used to name and denote different concepts such as a building and its properties.

Finally, metadata plays a crucial role in describing and organising the DBL data. It includes information such as the data source, timestamps/periods of validity, data quality, units of measurement, and other contextual details. Effective metadata management ensures data integrity, supports data governance, and enhances data discovery and understanding.

A detailed description of the DBL Semantic Data Model is provided in the separate deliverable D2.1 and its 'Linked Data' implementation in D2.2.

Economic aspects for implementing digital building logbooks

To secure public funding, the costs and benefits of implementing digital building logbooks (DBL) are key considerations for any public authority working on developing a DBL. These economic aspects depend on the national context and can vary depending on aspects such as legacy data, digitalisation levels and more. To support such an assessment, this one-pager summarises some of the key economic considerations presented in the Technical Guidelines. For more details on economic aspects, please consult the main Technical Guidelines.

A balanced team

One cost factor is the DBL development team. Next to software and data experts, it is good to involve a legal expert from the start, as national DBL needs to comply with many national regulations such as privacy and data security. Architects, engineers or other users need not be involved in day-to-day development. They are better involved in a steering committee to align with existing standards and avoid over-complicating a DBL and developing a user-friendly product.

In summary, the following personnel will be required:

Financial key considerations

Beyond the supporting team, there are other cost factors to be considered in the implementation of DBLs:

- **Developing a prototype DBL (ontology, dictionary, testing on 1 or 2 buildings), which should be done within two years;**
- **Involving key stakeholders (e.g., municipalities, large contractors) in data norms from the start and throughout the process;**
- **Formulating GDPR-compliant legislation to introduce the DBL, which is much easier based on concrete building data and a working prototype;**
- **Developing an online platform, which should take 6-12 months with maintenance being continuous ;**
- **Additional costs after the first two years depend on the digitisation of legacy data, the number of buildings, the complexity of the DBL, as well as other factors such as differences in governance structures and responsibilities.**

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Hardware and software considerations:

Many solutions exist for a hosting infrastructure that can be used and do not need to be developed, ranging from the provision of infrastructure to all-in services. Below we present two options, however solutions between these two examples can also be used.

OPTION 1

Infrastructure as a Service (IaaS), e.g., Azure Cloud, need to configure cloud computing instances

OPTION 2

Software as a Service (SaaS), e.g., Datopian, reads different formats

Beyond this, there are four types of software needed to implement the DBL Framework:

Software needed

To develop a semantic model

(two tools are needed, those below are free)

- ***Protégé*** *(ontology developer) and*
- ***CKAN*** *(data management system)*

Semantic model hosting tool

(many options)

E.g., ***Azure blob storage*** *(=IaaS),* ***GitHub*** *or* ***LacesHub*** *(=SaaS)*

Software to structure, search and store data

(many options)

E.g., ***Neo4j, Ontotext GraphDB***

API software to collect and/or share data

(many options)

- ***Azure Cloud*** *(=IaaS): this software is integrated*
- ***Datopian*** *(=SaaS): a version with API solutions is recommended*

Legal implementation of digital building logbooks

What are the key legal aspects to consider when implementing a national digital building logbook (DBL)? In this one-pager, we give a quick overview of the legal considerations that should be taken for proper DBL implementation. Further considerations on legal aspects and risks are provided in the DBL Technical Guidelines.

Key legal considerations

Legal risks are some of the key challenges in developing a DBL. The three main legal risks identified were:

When implementing a national DBL, three main legal risks should be taken into consideration

- **The rights of individuals to access, rectify and transfer personal data**
- **Documents may contain privacy-sensitive data**
- **Uncertainty about who is responsible for data security**

The Technical Guidelines for DBLs provide both guidance concerning the identified legal risks and additional suggestions for 1) organising the processing of personal data so that it complies with EU data privacy law; 2) classifying degrees of privacy sensitivity; 3) types of licences to deal with commercial rights.

Processing data

The General Data Protection Regulation (GDPR), Art. 4(1) states that "personal data is any information relating to an identified or identifiable natural person". However, many EU Member States consider most data purely relating to a building to not relate to a person.

> *Therefore, it is recommended to enshrine the need for a DBL in law to facilitate compliance with GDPR Art. 6(1), 14(5)(c), 17(3) and 21(1). Furthermore, there is a requirement for a privacy consultation and impact assessment – GDPR Art. 35(1) and 36(4). Generally, it is recommended that applicable national laws and their legal interpretations are checked by a legal expert.*

Bulk extraction of data

The most demanded data extraction feature for a DBL seems to be bulk extraction, i.e. extracting a large amount of data falling under one or more categories, e.g. “Buildings after 1990 in Brussels”.

However, GDPR Art. 21(2) and 21(5) limit data processing for direct marketing and automatic profiling.

Therefore, the recommendation is to define four degrees of privacy and security sensitivity:

1	2	3	4
Not sensitive (e.g., year of construction, number of balconies) – open access with bulk extraction	**Somewhat sensitive (e.g., tax value) – view only, one building at a time**	**With the risk of automatic profiling (e.g., email address) – limited access to selected authorities**	**National security risks (e.g., military assets) – should not be in DBL at all**

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GDPR and personal data protection requirements

Furthermore, the following requirements need to be taken into account:

1. **Art. 24 & 28:** The data processor & data controller are responsible (e.g., a designated DBL managing authority)
2. **Art. 37-38:** The data protection officer must be a legal expert in data protection law
3. **Art. 32(1):** For the security of processing, one needs to take into account the state of the art and the cost of implementation to ensure a level of security appropriate to the risk
4. **Art. 46(11):** Requires measures against direct access from unapproved countries

Data Governance Act (DGA) protection of commercially confidential data

Following the DGA, further considerations need to be made on responsibilities and protecting commercially confidential data:

1. **Art. 5(3):** The public body holding these data is responsible (e.g., the DBL managing authority)
2. **Rest of Art. 5:** various requirements to protect commercially confidential data

Copyright and sui generis rights

Finally, regarding copyright, Directive 96/9/EC on the legal protection of databases specifies the use without the maker's consent:

1. **Copyright must be claimed**
   - If certified no part may be used
2. **Automatic sui generis rights after substantial investments in a database**
   - No substantial part may be used and no small part may be systematically re-used

EU Member States may restrict the rights of the maker for administrative processing but without prejudice to the rights of data owners (whose data are in the database, e.g., architectural drawings).

For copyright-protected data (e.g., architectural drawings), the recommendation is to use a declaration of pre-existing rights, that specify under which conditions the data may be accessed, shared, or otherwise used.

For publicly owned data in DBLs, it is recommended to use an "Attribution-NonCommercial-ShareAlike" creative commons license. For more information, see: https://creativecommons.org/licenses/by-nc-sa/4.0/.