

# **Re-shaping the construction industry**

**A cura di**

**Angelo Ciribini**

**Giuseppe Alaimo**

**Pietro Capone**

**Bruno Daniotti**

**Guido Dell'Osso**

**Maurizio Nicolella**

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## **Streamlined management of the built environment: the district and the building logbook as risk prevention tools**

**Mario Claudio Dejaco<sup>1a</sup>, Nicola Moretti<sup>1b</sup>, Fulvio Re Cecconi<sup>1c</sup>**

*<sup>1</sup>Dipartimento di Architettura, Ingegneria delle Costruzioni e Ambiente  
Costruito, Politecnico di Milano, Via G. Ponzio 31, 20133 Milano, Italy*

*<sup>a</sup>mario.dejaco@polimi.it, <sup>b</sup>nicola.moretti@polimi.it,  
<sup>c</sup>fulvio.receconi@polimi.it*

**Topic:** Innovative technologies for new process management  
Building Information Management

### **Abstract**

Management of information related to the real properties is a key topic both in private and public sector. In the Italian context, can be spotted an overall lack of organisation of the information concerning the real estate assets, from the building scale, to the neighbourhood, until the city and the territory. Moreover, management of the urban environment is characterised by the presence of different players asking for common needs in management and use of data. This research aims at proposing the Building Logbook and the District Logbook as tools for collection, organisation and management of information, in a perspective of streamlined real estate management process. Moreover, the Logbooks can be conceived as tools for risk management. They should be exploited especially in technical management phase of assets, as well as in the verification of compliance with laws, authorisations and licenses, since these issues often bear to disputes between public and private players. Often disputes concern that areas where the competences and responsibilities among different players are not clear (connections to system, property boundaries, licenses, occupation of public land etc.). In this situations, information management assumes a key role, since it could be a powerful mean to clarify responsibilities among players. Therefore, the scope of the research concerns the investigation on the relationships and related information flows among stakeholders in the real estate field. Altogether, it can be stated that the logbooks can streamline processes in the use phase of assets, despite they could be intended as rigid control tools. Through this paper these issues will deepened and clarified. The paper concludes with some considerations concerning the possible integration of the Logbooks in a digital environment, following the BIM approach.

## **1. State of the art**

Production, collection and management of information in real estate is related to different players, belonging to the public or private sector. The public player assumes a double function: on one hand it has a role of legislator taking also decisions on the typologies of information which must be collected, stored and provided (when requested) to validate interventions on buildings. On the other hand, it is itself one of the players which must produce, collect and preserve that kind of mandatory information about real estate. Therefore, the public player is also responsible for the production, management and update of information related to management of its real properties, both from a technical and economic point of view. Accordingly, it plays the role of the controller; since it is responsible for checking of the reliability and accuracy of the documentation which the private player must deliver, during the execution of the building process (design, execution, use and management of buildings). Simultaneously, it has to be compliant with standards related to the production and conservation of required documentation and must respect some restrictions imposed by the central administration. In order to receive the necessary resources for development and management assets, for instance, it must respect strict guidelines, defined by law. These guidelines and procedures affect not only its work (from the tender to the disposal of assets), but also the business process of the private player (D.Lgs n. 50, 2016). According to this, it can be stated that the public administration plays both a proactive and coercive role.

The private player is obliged to produce that documentation, required by law, related to its real properties. Moreover, it is responsible for update and management of this information. Altogether, the private player collects and produces data, since it is obliged by the public player. Therefore, it answers to a duty defined by the public administration. Nevertheless, in the case of a transaction or a work on assets, the private can refer to that documentation, in order to set a better business process and ease the due diligence process.

In this context, tools for information management acquire a key role at the building and territory level. Especially in the context of risk management in that places and areas where the competence and responsibility between public and private player is not clear. Therefore, in this paper, are presented the District and the Building Logbooks as risk prevention tools both for the public and the private players.

To conclude will be presented an insight on the integration of the Building and District Logbook in the wider context of the Building Information Modelling (BIM) process. According to this perspective, the tools can be included in a more comprehensive strategy for management of real properties.

## **2. Real properties quality improvement**

One of the most critical issues to be taken into account in management of the built environment concerns management of precincts, where competences among players are not clear. These spaces can be, as instance, connections of systems from the public to the private network, private areas used as public spaces and occupation of public property.

Though not considering peculiar cases to be analysed carefully, the city environment can be divided in open space and buildings (Gabellini, 2012). Tangible, but also intangible goods that can be found in this context must be managed, in order to achieve a higher level of quality of spaces and life. Typically, the discipline devoted to management of these matters is Facility Management (FM). More recently, FM has been declined at the urban level as Urban Facility Management (UFM), in order to achieve a more comprehensive strategy for quality improvement of the built and open environment (Sharifi *et al.*, 2014) . Moreover, the UNI 11447 (2012) provides a breakdown structure, useful for the determination of UFM services.

According to this classification, services can be applied to buildings, neighbourhood and the whole city. Increasing the scale of intervention, also complexity, in terms of stakeholders, elements, systems, entity to be managed, methods and procedures increase remarkably. Moreover, at the building and urban level, ownership and stakeholder structure, in most cases, can be defined precisely, though there are some situations where this subdivision and categorisation cannot be performed easily. As cited above, this is happening in the case of hybrid situations concerning, for instance, connection to services from the public distribution network to the single building or facility; permissions and authorisations for instance concerning the rights to access and economic activities' licenses and authorisations for occupation of public property. These situations might cause dispute between public administrations and privates.

Therefore, the tools presented in this research aim at streamline the management of information related to these “grey spaces” in order to facilitate the communication among stakeholders and, in general, different players appointed for management of the real properties. Accordingly, in the next paragraphs will be presented the District Logbook and the Building Logbook. These tools are employed to store, analyse and update documentation, at the building and at the urban district level. The tools are not only useful in management of technical issues, but also in legal and economic discussion which might come out in dialogue among real estate players.

## **3. Information management for real estate**

The District and the Building Logbooks are both based on a strong structure for management of information. Moreover, they can be implemented in different moment of the real property life cycle. Information can be exploited for different purposes (Dejaco *et al.*, 2017):

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- knowledge of the building and urban areas,
- management of technical, functional issues;
- safety;
- conservation of economic value;
- certification of the building and the urban precinct.

According to the phase of the process taken into account, level of information can vary, though a minimum amount of data must always be present, in order to be compliant with codes and laws. The tools must be considered as complementary, since the former cannot overlook the latter. Accordingly, the District Logbook can be considered as a higher level information repository which refers, for specific issues and characteristics related to the single building, to the Building Logbook.

The Logbooks can streamline the information management in real estate, preventing dispute in the transaction and management process of assets. Therefore, they can be intended as powerful risk management tool. Moreover, glancing at the international context, risk management is encompassed in the asset management framework, according to International Organization for Standardization.

### 3.1 District logbook

The district logbook is a tool developed for management of information related to the real properties at the urban level. The contents and the structure of the information to be collected has been defined through a careful analysis of needs of the various players acting in the city environment in the Italian and international context. Therefore, the main structure of the logbook has been defined as described in Table 1.

**Table 1:** contents of the District Logbook.

<b>Section</b>	<b>Information to be collected</b>
Urban and building registry info	<ul style="list-style-type: none"><li>– General info about the neighbourhood,</li><li>– quantitative data and reference to infrastructures, urban facilities and buildings,</li><li>– urban planning info and forecasts.</li></ul>
Population registry info, property management and tenancy	<ul style="list-style-type: none"><li>– Data on the population of the neighbourhood,</li><li>– data on city users,</li><li>– data on management entities.</li></ul>
Technical info on urban goods and elements	<ul style="list-style-type: none"><li>– Location,</li><li>– ownership/responsibility/manager,</li><li>– geometric info,</li></ul>
Operative info for management and maintenance	<ul style="list-style-type: none"><li>– technical condition,</li><li>– instructions/procedures/guidelines for maintenance and management,</li><li>– safety measures,</li><li>– plan/program for maintenance.</li></ul>

The contents can vary according to the life cycle phase in which the logbook is developed and to the specific case. In the management phase the completeness of the information is a remarkable issue, but in this case information can be collected gradually, starting from compulsory documentation concerning the city environment and its components.

Here is important to underline that this information can be seen in two different ways. On one hand, it can be intended as the data exploited by the public administration to control and monitor services provided and to optimise the planning process. Moreover, it can be used in the setup phase of public tenders, and in the following implementation phase. In this sense, the District Logbook can be conceived as the information framework for controlling tenders and public works. On the other hand, the contents of the Logbook can be seen in terms of compliance with urban laws and codes, urban parameters and taxation issues, licenses and permissions. Therefore, in this case it can be seen as a tool supporting the coercive function of the public administration, in granting the safety and validity of the process.

Nevertheless, in a continuous improvement process, this information should be exploited for enhance the effectiveness of processes in the Public Private Partnership (PPP), leading to a streamlined approach to urban transformation and management.

## **3.2 Building Logbook**

The Building Logbook, can be considered as the declination of the same tool at the building level. Therefore, if the District Logbook should be employed in the collection, management and update of documentation concerning the open space, urban facilities and infrastructures. Following the same approach, the Building Logbook must be considered as the repository of the documentation related to the buildings.

Even in this case information completeness and the structure of the Logbook can vary according to the function, complexity and typology of the building under analysis. However, some basic contents, presented in Table 2, can be spotted.

Even in this case, it is interesting to focus on the function related to the risk management of the Building Logbook. Accordingly, from this perspective the tool can be exploited for:

- control and update of the minimum documentation concerning authorisations, certification of structures, fire systems and plans and structures, namely the documentation which allow the use of the building in a safety condition;
- check of deadlines requested by law in terms of periodic inspections on critical systems or component and update of the related documentation.

It must be taken into account that this information is not only the minimum required by law for a correct and compliant use of the building and its parts, but also the information base for communication and discussion among different players.

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**Table 2:** Contents of the Building Logbook.

<b>Section</b>	<b>Information to be collected</b>
Building registry info	– Concerning the urban registry information and the updated internal subdivision in sub-units.
Information about the property, management and tenancy	– Updated documentation on ownership, – updated documentation on tenancy and related contracts and agreements, – documentation concerning the management structure, appointed to the management of the building (concerning leasing contracts and technical management contractors).
Technical info on building elements	– Building breakdown, – description of technical, typological and functional characteristics of components,
Operative info for management and maintenance	– Documentation related to technical, administrative and economic management of the building, – safety and certification documentation.

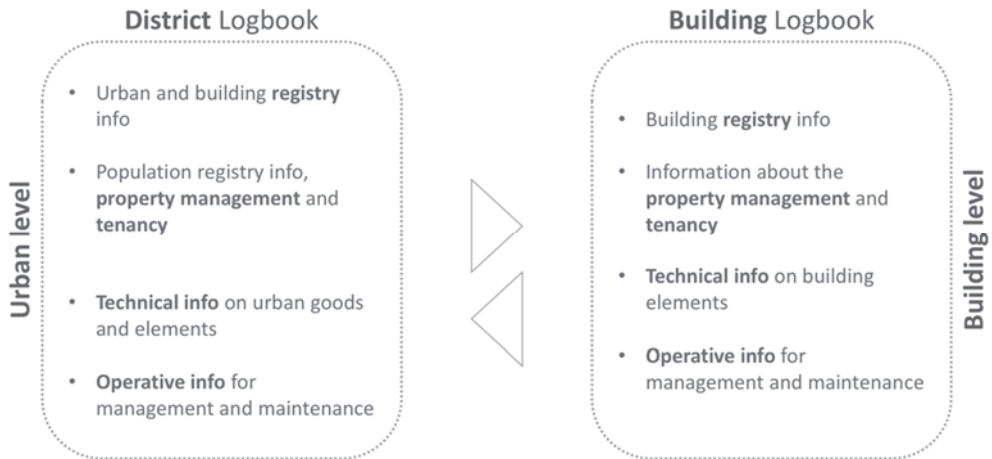
## **4. Process support and risk prevention**

The District and the Building Logbook can be considered, in this perspective as two complementary tools. Data and information stored in them must be intended as a support for the bidirectional flow of information (Fig. 1) from the urban to the building level. Therefore, exploitation of the tools in the dialogue between public administration and private players, acting at the different levels, can be improved. The tools are conceived to manage data in different formats as, for instance:

- graphical documentation concerning the design stage and following retrofitting;
- quantitative data concerning consistencies and costs;
- documentation concerning the use of the building, authorisations and certifications;
- other kind of information related to the specific use and typology of the real property.



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*Fig. 1: Information sharing between District Logbook ad Building Logbook.*

As mentioned in the previous paragraphs, this information can be exploited in different stage of the lifecycle of an asset, though it assumes a key role mainly in the transaction and management phases. More in detail, these tools should be used by the private player in terms of code and compliance checking and to have the access to updated compulsory documentation concerning the asset. Public administration, on the other hand, assumes a double role of legislator and controlled entity, since it is simultaneously the writer and the controller of codes and standard. Moreover, public player and the private one, are in a mutual relationship: the public player is responsible for checking compliance of the codes and standards, applied by the private player. At the same time, the latter in the case of discrepancies between decision taken by the public player and the evidence of facts, can refer directly to the District and the Building Logbook, solving easily the dispute.

Information flows shown in Fig. 2, are indicated as bi-directional since, verification instances can be requested both by public and private players. Moreover, there is no question that transactions can be underwent both by real properties owned by private and public subjects. Moreover, documentation flows are not related to the whole data archived in the District and Building logbook. It could happen that the verification concerns only some specific issues.

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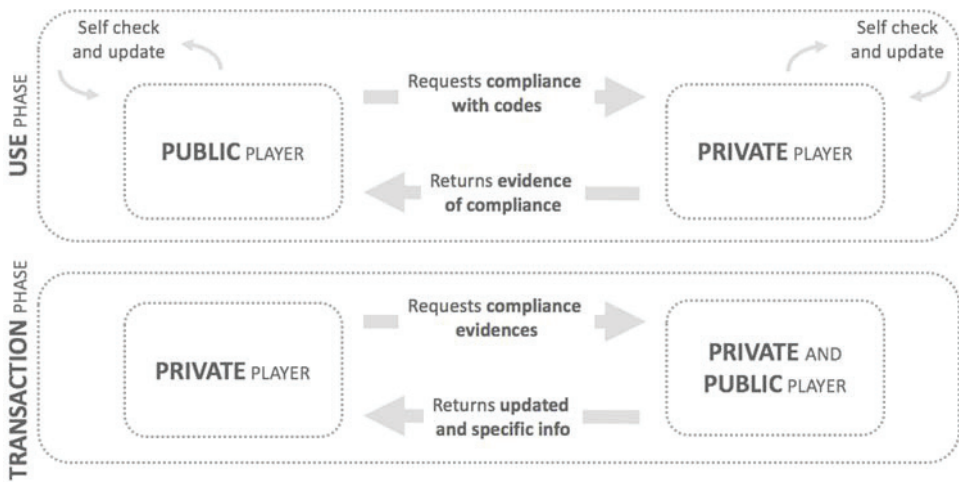


Fig. 2: Information flows among players in use and transaction phase.

## 5. Discussion and conclusions

The tools presented through this paper can be considered as relevant instruments for collection, update and management of information concerning real properties. Often disputes and complaints emerge from the lack of data and awareness on properties, due to the scarce standardisation and attention storage and management phase. Therefore, the District and the Building Logbook can be considered a step forward in prevention of critical condition among real estate players, caused by the condition described above. Moreover, when the competences of public and private players are not clear, or it can be spotted an overlapping in management of technical, economic and functional issues, the Logbooks allow to decrease magnitude of conflicts. Nevertheless, since information must be updated and organised, they can be considered a mean through which reduce uncertainty, both in the case of compulsory compliance with codes and laws and in the relationship between stakeholders. Nevertheless, it is a voluntary risk prevention tools since:

- it allows to prevent the private player by the possible intrusiveness of the public administration, in the case of compliance checking. Therefore, it can prevent from the payment of fines and sanctions due delays and faults in providing the required documentation;
- it is a value added tool in transaction phase, both for the public and the private player, demonstrating the technical, functional and financial quality of the real property.

The tools, looking at a wider context, can be encompassed in the BIM process. Needless to say that this approach cannot be neglected, nowadays, when dealing with real estate. In this case, the approach to be followed could be very similar to what is called Asset Information Model (AIM), namely a modular information system able to support

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informed decision making and asset management process. The AIM is featured as a digital model of the asset. It can be composed by a 3D graphical model of the building, by information concerning technical characteristics of element and by an array of documentation related to safety, permissions and responsibility on the asset and its components. Thus, concerning the documental part, it can be considered as a translation in digital terms of the Logbooks. It must be take into account that, the AIM does not require the use of a BIM editor software, but it must be conceived as a more extensive and complex virtual model of the asset.

A good example of how the Logbooks can be integrated in a complex information model following the BIM approach, concerns the experience of the District Information model (DIM). The DIM has been developed during a case study research work in San Donato Milanese.

In this experience the District Logbook, has been included in a survey tool developed for the purposed, thanks to the joint use of a Database Management System (DBMS) and a Geographical Information System. The DIM, in its first version, has been conceived as support for the setup phase of a UFM service. Later it has been developed further, through the integration of some modules (mainly based on the same technologies), exploited to carry out some urban sustainability analysis and assessment. To conclude, it can be stated that, some remarkable improvement in the management process of assets, could be achieved following the proposed approach. Nevertheless, costs could be downgraded and efficiency increased, with particular attention to issues related to conflicts and delays in the business process.

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