Documenting Theatres as Spaces for 'Transitions'

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Abstract

The paper is focused on an extensive analysis of historic theatres in Emilia-Romagna affected by the 2012 earthquake, aimed at optimizing an integrated survey procedures for seismic risk mitigation.
These specific heritage buildings allowed to deepen the concepts of historical, spatial and survey 'transitions', by assessing changes in social perception of these spaces for imagination and new needs for documentation and digital data management for heritage preservation.
The Social Theatre of Novi, Modena, is presented as an emblematic case study, analysed through integrated survey procedures according to three documentation levels: historical, by identifying architectural features; spatial and volumetric, highlighting space connections; experimental, by developing an optimized digital workflow. This procedure proposes a transition from analog datasheets to 3D digital environments for multi-level analysis optimisation aimed at the integrated and extended documentation of the architectural asset.

Keywords
Heritage Documentation, Historical Theatres, Integrated Survey, Digital Transition, 3D Representations

The Historical Theatres of Emilia-Romagna damaged by the 2012 earthquake. Archive photos from the IBC - PATER digital catalogue. CC BY-NC-ND 3.0.

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Introduction and research scenario

Theatres have historically been places of 'public performance', where the act of observing and the performance of a live event come together to form 'representations'.
From antiquity [Bianchini et al. 2016] to the present day, the possible definitions of 'theatre' are multiple, but all share the concept of relationship (between those who act by 'performing' and those who 'observe' by watching, and sometimes participating).
From a spatial point of view, the history of theatrical performances places is complex and articulated, further supporting the concept of transition: from 'other' spaces, set up to stage theatrical performances [Ciammaichella 2022], to specific places, which typological and spatial features remain almost unchanged over the centuries (at least from the 17th century to the end of the 19th century), defining the 'historical theatres' [Mele, Ziosi 2016].
The research – part of a larger project – focuses on the Emilia-Romagna theatres, a rich and articulated heritage that has been back in the spotlight after the 2012 earthquake. The damage suffered by the cultural heritage, and theatres in particular, triggered a deep discussion not only from a 'physical' point of view (the need to restore or consolidate or preserve historical buildings), but also, and above all, from a socio-cultural point of view. Theatres are a collective historical heritage, which requires 'intellectual' as well as physical/material recovery, now more than ever, considering the new (sometimes alienating), pervasive forms of contemporary communication and entertainment, which risk condemning this boundless space for the imagination to oblivion. The need to document, learn about, preserve and restore historic theatres materialises the need for the re-appropriation of a collective historical heritage.
"The issue of monumental heritage restoration is first and foremost as a requirement of the communities that over the centuries have produced, used and modified them. And we believe that communities must keep on consider them as irreplaceable parts of their lives" [Di Francesco 2015, p. 4].
In the context of the 2012 Emilia earthquake, great emphasis was given to the debate on post-seismic reconstruction, a process that has raised the issue of enhancing the 'awareness' dimension of documentation to ensure the transmission of heritage tangible and intangible dimensions. Within the post-seismic management, cultural heritage could only be an act of inclusion involving communities and the stratigraphy of their own cultural-historical memory.
Just after the seismic events, the Emilia-Romagna Web Gis database for cultural heritage collected thirty-one damaged historic theatres (listed buildings): twelve in Reggio Emilia, eleven in Modena, four respectively in Bologna and Ferrara.
Regional and local Public Administrations, as well as citizens, immediately recognised the recovery and restoration of historic theatres as a priority of the cultural heritage reconstruction strategies. The close link between historic theatres and communities can be understood by analysing how historic Italian-style theatre (fig. 1) is grafted onto the regional territory throughout history, starting in the late seventeenth century [Farneti, Van Riel 1975].

Theatres' historical transitions

The political, socioeconomic and cultural importance of the theatrical institution on the regional territory from the late seventeenth century onward is documented in the first systematic study achieved in 1982 by the IBC (former regional Institute for Cultural Heritage – now Cultural Heritage Sector) on historic regional theatres [Bondoni 1982]. The report mentions seventy-two Italian-style theatres in the region compared to the one hundred and thirty documented in the first census of 1868. According to the IBC's survey, the considerable loss of historic theatres was mainly caused by the bombings of World War II. However, other theatres had been earmarked for demolition as they were in a critical state of degradation and abandonment. Others, especially those converted into cinemas, had undergone irreversible transformations that significantly altered their original features. "The crisis of the theatre probably had reasons that went beyond the cancellation and abandonment to which much of the historical-artistic heritage had been subjected: it was perhaps a true identity cri-

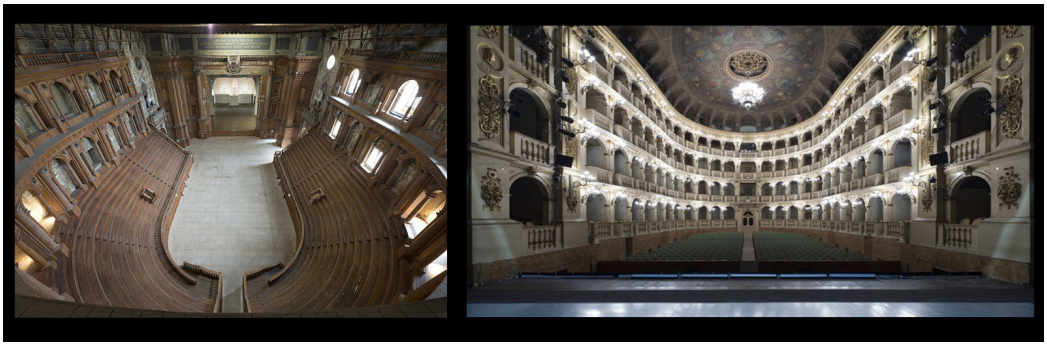

Fig. 1. The first experiments of the typological scheme of the Italian Baroque in the first half of the 17th century follow the layout of the Pillotta Theatre - Teatro Farnese in Parma. Photo by A. Scardova, IBC, 2018. The Teatro Comunale in Bologna represents the exemplary model of morphological and structural development. Photo by A. Scardova, IBC, 2016. CC BY-NC-ND 3.0.

sis. The theatre had been abandoned not because it was no longer functional, but perhaps because it was considered an anachronistic remnant of the past inadequate to the needs of 'modern' society" [Vasumi Roveri 2005, p. 187].
In the mid-1990s, the cultural trend was reversed: local administrations and the Cultural Heritage Authority became the promoters of a wide-ranging preservation action aimed at a broader use and enhancement of the regional theatres. Restoring some theatres and making them usable again represented a necessary action to preserve the documentary and testimonial heritage. In 1995, a new survey was therefore carried out, listing eighty-seven regional theatres, 30% of which were closed due to decay or for restoration works. To this end, the first digitisation of the data collected by the IBC from the 1982 survey was carried out. In 2002, a new study was performed, documenting the work carried out since the mid-1990s and enabling many restored buildings to be reopened to the public. At the beginning of the 2000s, a few theatres were closed due to renovation works.
Ten years later, the earthquake in Emilia marked the state of conservation of the recently restored historic regional theatres once again, making a new survey urgent.
The research analysed all regional theatres damaged by the earthquake; in particular, the Teatro Sociale in Novi (fig. 2), Modena, was the focus of an extensive integrated documentation activity aimed at focusing on the transition among analog datasheets and digital tools to collect and manage data for theatres knowledge, documentation, monitoring and preservation.

Fig. 2. View of the main façade of the Theatre of Novi along Via dei Martiri della Libertà. Photographic survey, July 2020. Photo by M. Suppa.

The Novi Theatre

The Teatro Sociale in Novi [Manicardi 2005] is located between Emilia and Lombardy; the formal models of Reggio Emilia and Mantua influenced the theatre's features. From archival sources, there are no official documents allowing a faithful tracing of the building's construction phases. The historical analysis was mostly based on bibliographic and local sources. The 1982 IBC survey mentions that the theatre was built from 1923 to 1929, designed by architect Pietro Pivi and built entirely by craftsmen from Novi. The theatre had an initial intense activity until it was converted into a cinema in 1995, when it became municipal property from private ownership. This new use led to some transformations to accommodate new projection equipment.
The decorative scheme remained unchanged until the 1970s; then the decorations were covered with a plaster still visible today. In the 1980s, the theatre was increasingly abandoned, until its occasional use for carnival celebrations. Decorations are of late Art Nouveau origin and still preserved, especially in the upper part of the ceiling and in the scenic arch (fig. 3). The veil, divided radially into sectors, features four masks representing Sorrow, Serenity; Sadness and Hilarity, and four panels representing Dance, Music; Tragedy and Comedy. Symbolic decorations placed above the scenic arch are typical decorative elements of historic Italian theatres.

Fig. 3. View of the stalls of the Novi Theatre.

On the extrados surface of the ceiling of the hall, there is the symbol of the 'Sociale', also present in the Storchi Theatre in Modena, which, together with the Carpi Theatre, is the architectural-figurative reference of the Novi Theatre. In the foyer, on the walls of the central hall, two stucco decorations represent Dance and Music, in Art Nouveau style (fig. 4). Externally, the theatre is characterised by an exposed brick covering.
Historical documents testify that maintenance work was carried out in 1940 [Manicardi 2005]. In 1997, the theatre underwent consolidation work on the roof, to repair water infiltration that had caused significant collapses in the ceiling of the third order. In the 2009 restoration, a consolidation anchorage was carried out between the beam system and the plaster shell, but inappropriate construction materials and some improper interventions led to the theatre being damaged during the 2012 earthquake.
As part of the research, the Theatre of Novi was surveyed by applying different methodologies, including 3D laser scanning (figs. 5, 6) and aerial photogrammetry, in addition to the direct and photographic survey of the state of conservation, as tools to assess seismic risk [Bertocci et al. 2018].

Fig. 4. Theatre of Novi. Detail of the velarium decorations (top); detail of the stucco decorations in the foyer's central hall (bottom). Photographic survey , July 2020. Photo by M. Suppa.

Spatial analysis transition

Part of the research focused on the documentation of historical theatres in Emilia-Romagna was focused at first to the analysis of theatres geometric-spatial layouts (fig. 7) [Zerlenga 2020], then addressed to seismic risk assessment and the updating of seismic damage survey tools. Theatres can be included in the category of complex architectural typologies due to their stereometry and altimetric articulation. Despite this, the MiC (Ministry of Culture) does not yet set ad hoc datasheets for assessing the vulnerability of this typology and for surveying seismic damage. Datasheets applied according to the DPCM 23/2006 are: A-DC model to damage survey of churches, B-DP for buildings and C-BM for movable assets.

Fig. 5. View of the point cloud of the Novi Theatre. The data acquisition was carried out using Leica C10 and BLK360 laser scanners.

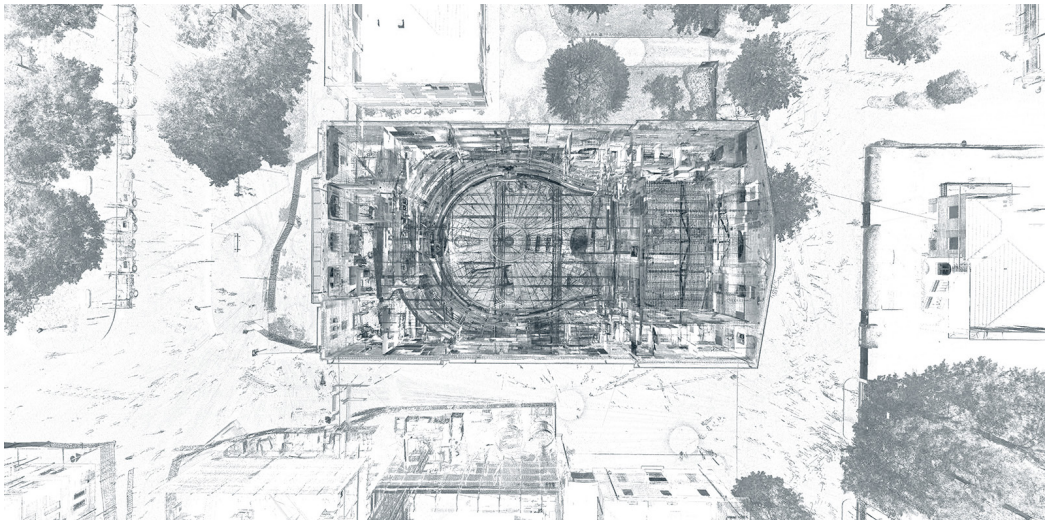

Fig. 6. Top view section of the point cloud of the Novi Theatre.

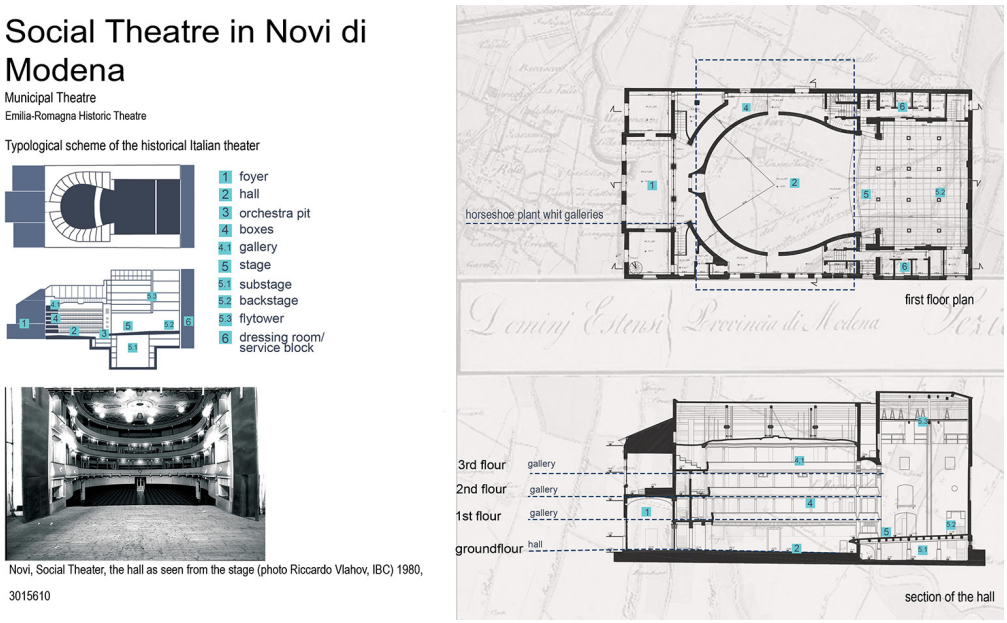

Fig. 7. Morpho-typological scheme of the Theatre of Novi characterised by a horseshoe-shaped plan with galleries. Graphic elaboration by M. Suppa.

In order to understand the spatial and volumetric peculiarities of the historic theatres, the comparative critical analysis of morphological and geometrical features was essential.
From a methodological point of view, the analysis was based on a sample of inspections by professionals on damages in specific theatres, who identified four structural units: Unit A – front body; Unit B – hall; Unit C – stage and wings; Unite D – service spaces.
Considering the morpho-typological features of the Italian theatres, it was proposed to adopt and extend the macro-structural subdivision to provide a parameterisation of the damage index. Therefore, to the four structural units previously identified, the structural units of the proscenium arch and the foundation system were added and examined.
This subdivision helped to overcome the shortcomings in the simplification of some MIC-B datasheet items, which does not consider the theatres articulated altimetric-spatial organisation compromising the data collection and filing.
By applying the macro-schematisation to the Novi Theatre and comparing it with other case studies, it was possible to define spatial volumes A and D (foyer, service spaces) as confined spaces with planimetric and altimetric regularity; B and C (hall and stage), open and 'free' volumes, with different elevations; and the proscenium arch and the vertical connections (fig. 8).

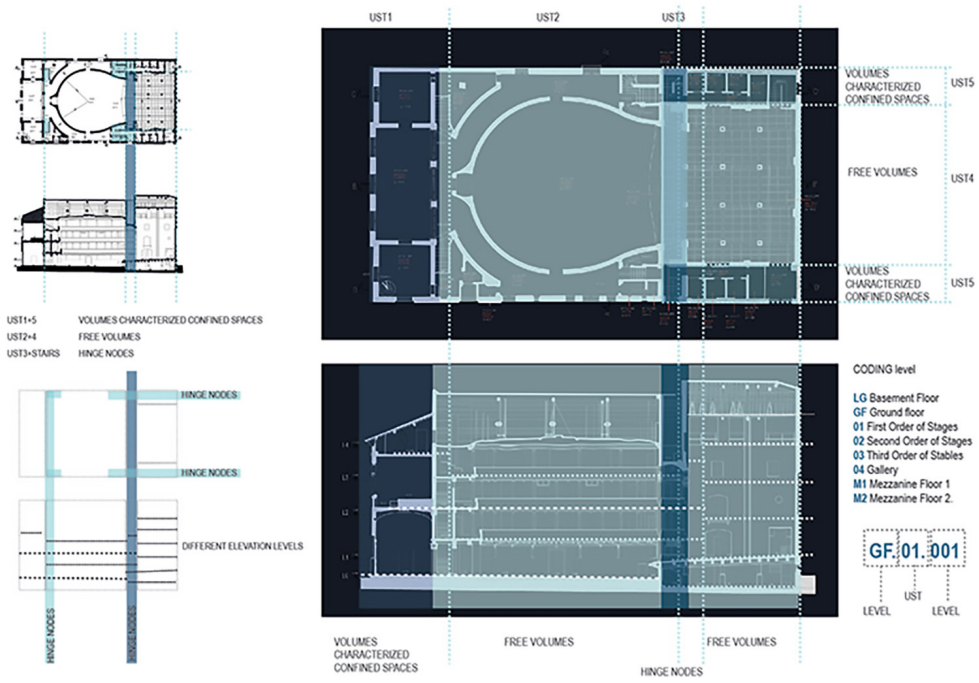

Fig. 8. Study of the spatial relationships between the main volumes of the Novi Theatre. The subdivision into confined volumes (foyer and service spaces) and free volumes (hall and stage) is highlighted, allowing a detailed interpretation of the complex spatial articulation for seismic damage analysis. Graphic elaboration by M. Suppa.

The analysis showed that the theatre includes significant altimetric variations related to the different functional-spatial conformations, influencing the seismic behaviour. The general regularity assumed in the datasheet precludes a correct and consistent assessment of seismic damage. The proposal for a 'transition' in the theatres analysis conceived an integration between the 'analog' documentation tools adopted in rapid surveys, and the tools proper to the digital survey, which allow a deeper understanding of the structural units, at a local and global scale.

Survey transition

The macro-schematisation contributed to outline the methodology for surveying and documenting historic theatres to analyse their structural behaviour.
The research – starting from national and international existing documentation standards, databases and risk management policies – developed an integrated digital documentation workflow aimed at surveying seismic damage for the specific typology, applied on the pilot case of the Social Theatre of Novi. The workflow (fig. 9) is organised into three levels of investigation:

– Screening Level (L1): digitised implementation of the MIC damage survey datasheets used in 2012 - A-DC and B-PD models – adapted to theatres. The digital tool is called SD T (Seismic Damage-Theatres) and it is the matrix of a single digital database related to the 106 historic theatres surveyed at regional scale. The SD T is structured into 13 main categories on the basis of the ICCD datasheets and implementing the models mentioned above (fig. 10). All available information and data related to each theatre are collected and digitised, optimising data retrieval and damage survey phases during emergency operations.
– Survey Level (L2): digital integrated survey by applying a protocol to obtain 3D morphometric models to be consulted and implemented over time. The Data Acquisition Protocol (DAP) applied is the one developed within the Inception project [Balzani, Maietti 2017] adapted to seismic damage survey categories and aimed at ensuring the HBIM modelling of theatres.
– HBIM Plus Level (L3): collector of the first and second levels. The information collected by the SD T and the data acquired and processed in L2 are the basis for the parametric HBIM models, which are then linked to the Inception semantic platform [Iadanza et

al. 2020]. At this workflow level, attention was paid to the information layers (LOI) that parametric BIM models can include in representing the damage survey directly on geometric morphologies.

The platform can support management and monitoring, linking the digital model with the information and morphometric database [Masciotta et al. 2021] (fig. 11). The HBIM environment is a valuable support for documenting, classifying and archiving essential information for theatres knowledge, updating metric and geometric surveys, and assessing analysis of damage and state of preservation [Žarnić et al. 2012]. In addition, it is a support for conservation planning for professionals and for management and maintenance actions by institutions in charge for conservation, being also an accessible tool for the general public.

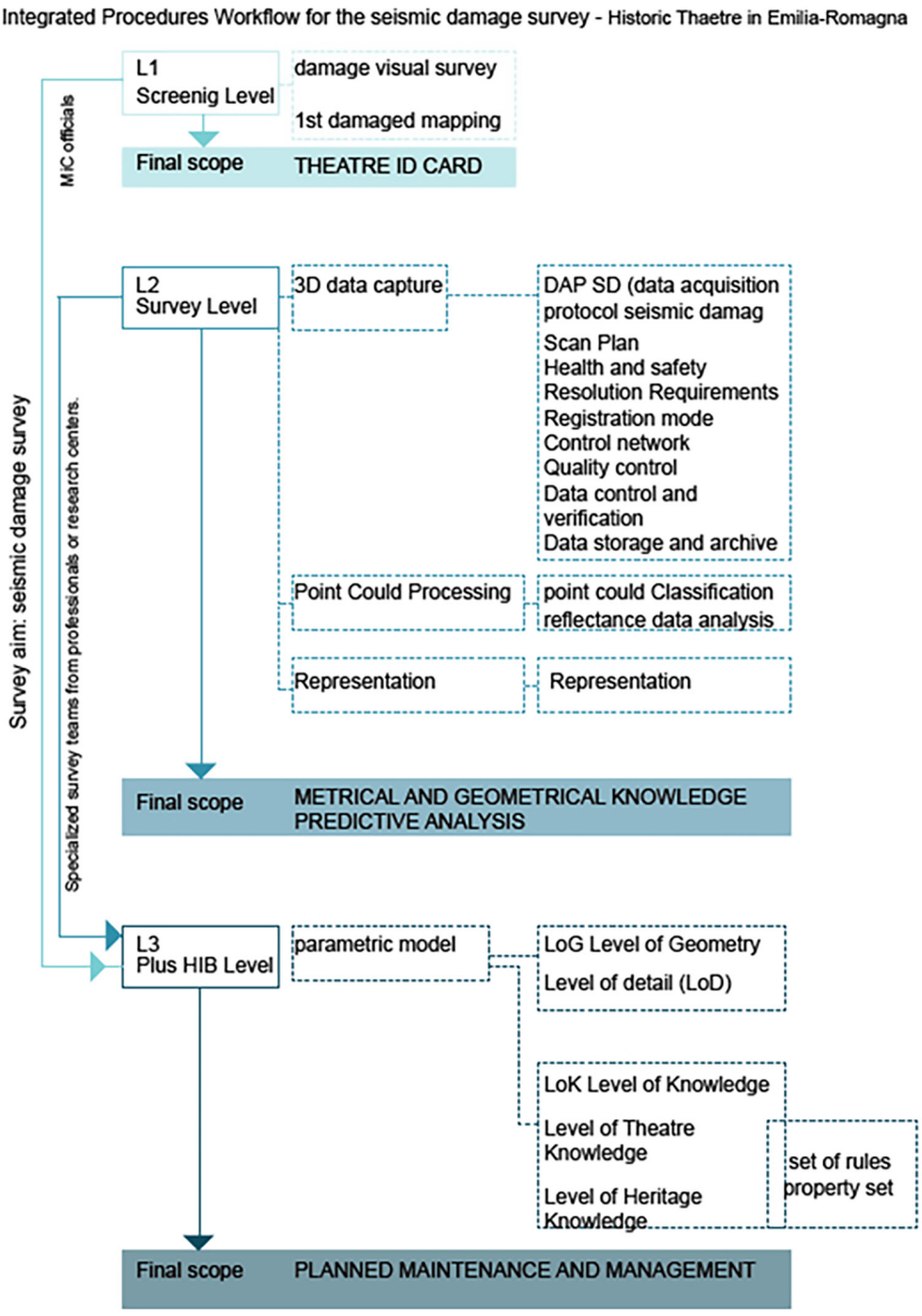

Fig. 9. Diagram of the workflow of integrated procedures for the seismic damage survey of historical theatres in Emilia Romagna. Elaboration by M. Suppa.

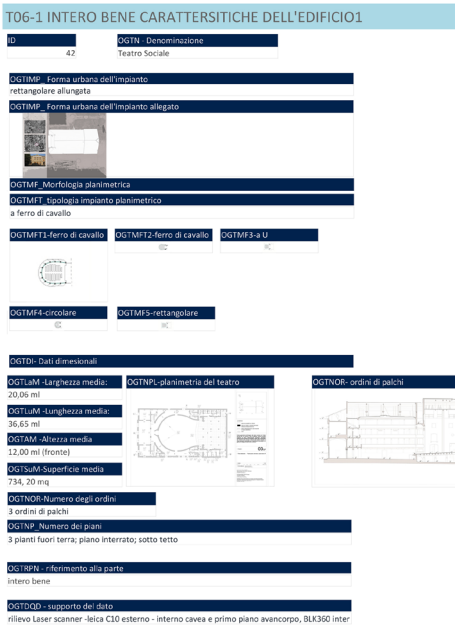

Fig. 10. Development of the digital meta-sheet for seismic-theatre damage survey (L.1 screening level). The datasheet implements the MiC A_DC and B-DP models by adopting the ICCD standards.

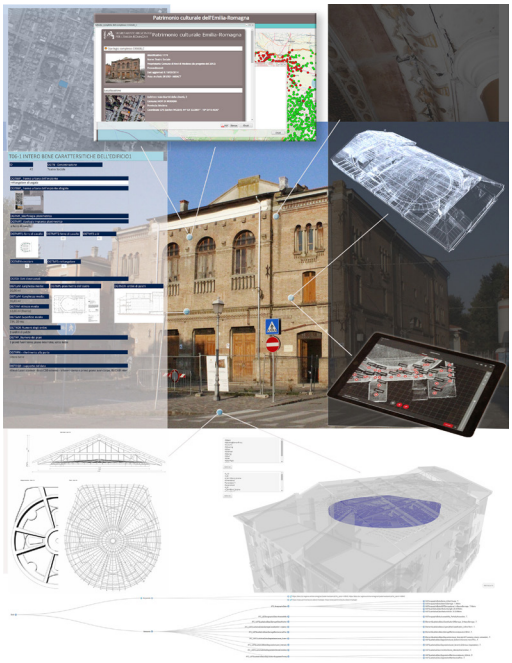

Fig. 11. The research is aimed at developing a unique application to be connected to regional databases and to the Inception's HBIM platform to check and manage the three levels of the integrated workflow. Graphic elaboration by M. Suppa.

Conclusions

As part of the research aimed at optimising damage survey procedures for historical theatres in Emilia-Romagna, the documentation of the Novi Theatre was developed according to three levels of knowledge: historical, morphological-typological and geometric (survey). Although analysed separately, these levels overlapped to obtain an integrated documentation suitable for assessing risk indicators. The first two levels of knowledge were the basis for developing the digital workflow of the survey procedures. This methodology could flow into a monitoring tool for theatres, inside and outside the Emilia-Romagna region. The integration of documentation tools indeed allows strategies and practices for heritage conservation and management. The systematisation of qualitative and quantitative data and information made it possible to define protection and planning actions according to a process involving monitoring, diagnosis and intervention, considering the individual building and the overall system of historic regional theatres.
The impacts of this process are also relevant for strategic policies of inclusive use of theatres, whose needs for valorisation as cultural spaces also emerged during the Covid-19 pandemic. In this direction, interoperable digital platforms and the development of interactive VR or AV applications can be future integrative tools, exploiting the digital model developed for preservation purposes, to implement enhancement pathways and new ways of enjoyment of these spaces by a wide public, encouraging physical use through virtual or augmented navigation models.
Within this framework, the concept of transition is central for historical analysis, spatial analysis and survey toward the creation of new connections for knowledge, awareness and documentation through digital tools development and new visions.

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