SCIRES it
SCIentific RESearch and Information Technology
Ricerca Scientifica e Tecnologie dell'Informazione
Vol 14, Issue 1 (2024), 175-186
e-ISSN 2239-4303, DOI 10.2423/i22394303v14n1p175

CASPUR-CIBER Publishing, http://www.sciresit.it

INTEGRATED PROCESSES OF KNOWLEDGE, CONSERVATION AND VALORISATION OF THE RELIGIOUS ARCHITECTURAL HERITAGE. CHAPELS AS PART OF THE WHOLE

*Renata Prescia, Fabrizio Giuffrè, Clelia La Mantia**

*Department of Architecture - University of Palermo, Italy

Abstract

The study of church architecture for its conservation is the focus of this research. The project aims to create a filing whose original characteristics, in a broader field of specifically historical-architectural study, lie in the collection of unpublished data on the history of restoration, intertwined with the identification of authentic material-constructive values, and in their restitution on exact surveys, for the subsequent "networking" of the same, through the use of communication and fruition strategies, capable of attracting the greatest possible number of users, so as to contribute to their valorisation. The chapel of Blessed Gerard in the Basilica of St. Francis of Assisi and the chapel of the Holy Rosary in the church of St. Catherine in Palermo were chosen as examples of this research.

Keywords

Churches, chapels, surveys, history of restorations

1. *The value of documentation for integrated knowledge (R.P.)*

The study of church architecture for its conservation is one of the fields of research of the authors of this contribution, applied to the case of Palermo, a city dense with such heritage. The aim of the project is to create a filing whose original features, compared to a broader field of specifically historical-architectural study, lie in the collection of unpublished data on the history of restoration work, interwoven with the identification of authentic material and construction values, and their restitution on exact surveys, for their subsequent "networking", through the use of communication and use strategies capable of attracting the largest possible number of users, so as to contribute to their enhancement. The census also includes the state of conservation of the monument, with the identification of the main pathologies, for a 'planned conservation', constituting an archive as a source of reference for any future action. (Baratin & Cattaneo, 2021).

Certainly, all this requires a sharing of data and knowledge, i.e. not so much a computerisation of the project tools, but a real digitisation of all the process phases and all the dedicated tools, in order to allow the exchange and circulation of data; the aim of the Survey and Representation is to structure the knowledge of the asset in such a way as to make it continuously implementable, i.e. able to contain and manage further information, and to share it externally, to a specialist user as well as to the general public (Della Torre, 2023; Florio, Catuogno, Della Corte & Bonelli, 2023). In such a changed context, the relations between History, Representation and Restoration, in the past closely integrated and more recently distanced for misunderstood needs of progressive didactic specialisation, are now recomposing themselves in the knowledge necessary to develop integrated programmes of monumental complexes such as those presented (Bartolozzi, 2016; Acuto, Cardinali, Fornara & Novelli, 2023)[1].

As mentioned, the religious heritage is so impressive in the city of Palermo and the lack of attention by the institutions, for various reasons, has been so accentuated that the general state of conservation of this heritage is rather precarious (www.chiesacattolica.it)[2]. At present, there are very few digitised scientific surveys, even of large

[1] Compare with the best practice in Turin of the Compagnia di S. Paolo Foundation with the ChiesTO project.

[2] The portal opened in 2000 by the National Office for Ecclesiastical Cultural Heritage and the Italian Episcopal Conference (CEI) reveals many gaps, including the one on the two churches presented here.

complexes such as those presented, a deficiency that is unfortunately also found over a large part of Sicily. This naturally entails a considerable delay in risk prevention and protection policies, as well as in the planning of actual restoration work (Prescia & Scianna, 2017a; Prescia & Scianna, 2017b).

Furthermore, it should be noted that churches, as well as all architecture of value in Palermo, are characterised by their high degree of stratification, the city having been the site of intense and multiple historical events, as well as different dominations. This means that the state of studies on this heritage shows a focus on the religious building as a whole, while being significantly more deficient in the case of parts of it or its sacred religious furnishings. For these reasons, the current research has chosen to investigate chapels as individual entities since each of them is recognised as having a fundamental value as a testimony to rich and complex palimpsests. They also reveal multiple stories of people and events particularly in demand in all those community events that by now, and especially in the South, are becoming almost the only opportunity for youth entrepreneurship.

In particular, two chapels in two of the most important and stratified churches in Palermo were chosen as illustrative cases of such research: the chapel of the Blessed Gerard in the Basilica of St. Francis of Assisi and the chapel of the Holy Rosary in the complex of St. Catherine (Prescia & Scaduto, 2019; Prescia & Scaduto, 2020; Scaduto, 2022)[3], both under the management of the Worship Buildings Fund (Fig. 1).

The disciplinary culture of restoration, statutorily founded on the disciplines of History and Representation, makes use of the innovative technological importance of instrumental surveying, from photogrammetric to 3D laser scanning, for its work on monuments, while maintaining integration with traditional manual detailed surveying, especially for stylistic-constructive details. In this regard, we would like to recall here the importance of the Florence Declaration (2014) that, insisting on the value of 'traditional knowledge', invites to guide the development of innovative instruments, within the objectives of their sectors, precisely to avoid the solipsistic progress of knowledge in technological sectors and not in conservation practices (Florio, Catuogno & Della Corte, 2019; Aterini & Giuricin, 2020; Banfi, Stanga & Landi, 2023).

The architectural survey of a monumental complex, geo-referenced to a site by means of a preliminary overall topographic survey of the entire church, is an indispensable base on which to graft all the useful data to plan an intervention, or to update the information on the state of conservation of the heritage that becomes necessary to allow periodic inspections, pursuing a process of 'programmed conservation'. The use of 3D digital models makes it possible to have an 'aggregative core' of complex and heterogeneous information, but with an intuitive interface (Gaiani, 2017); and it helps to better communicate the monument, contributing to its valorisation. This importance is recognised internationally with the ICOMOS Charter for the Interpretation and Presentation of Cultural Heritage Sites (2008).

The data acquisition phase was conducted with topographic instruments and laser scanners, so that each part refers to a topographic polygonal of the complex[4]. A point cloud was obtained with the Pointools 4Rhino software, supplemented with a second cloud, obtained thanks to the photogrammetric survey with the Agisoft Metashape software, which returned a 3D model with textures obtained from the information of the photographs. The digital model has a remarkable versatility that allows it to be used in different contexts and for different purposes. For the purposes of analysing the geometric components of structural degradation phenomena (out-of-plumb, bulges, etc.) it is important that the 3D model Structure from motion (Fig. 2) has a good correspondence with the measured data; the visualisation of the point cloud within the modelling environment, in the case of chapels in question, made this task easy. The texturisation of models is important for the material characterisation and the analysis of surface degradation phenomena. Finally, the possibility of contextualising previous restoration work in the digital model offers the possibility of understanding the nature of the parts being worked on.

[3] These researches started from the didactic activity of the Laboratory of Restoration of Monuments course, or as a thesis in the degree course in Architecture at the University of Palermo, held by the writer, with the collaboration of architects Clelia La Mantia and Fabrizio Giuffrè.

[4] The survey was carried out by my colleague, professor Francesco Di Paola, as part of an agreement between the Palermo Provincial Government and the Department of Architecture.

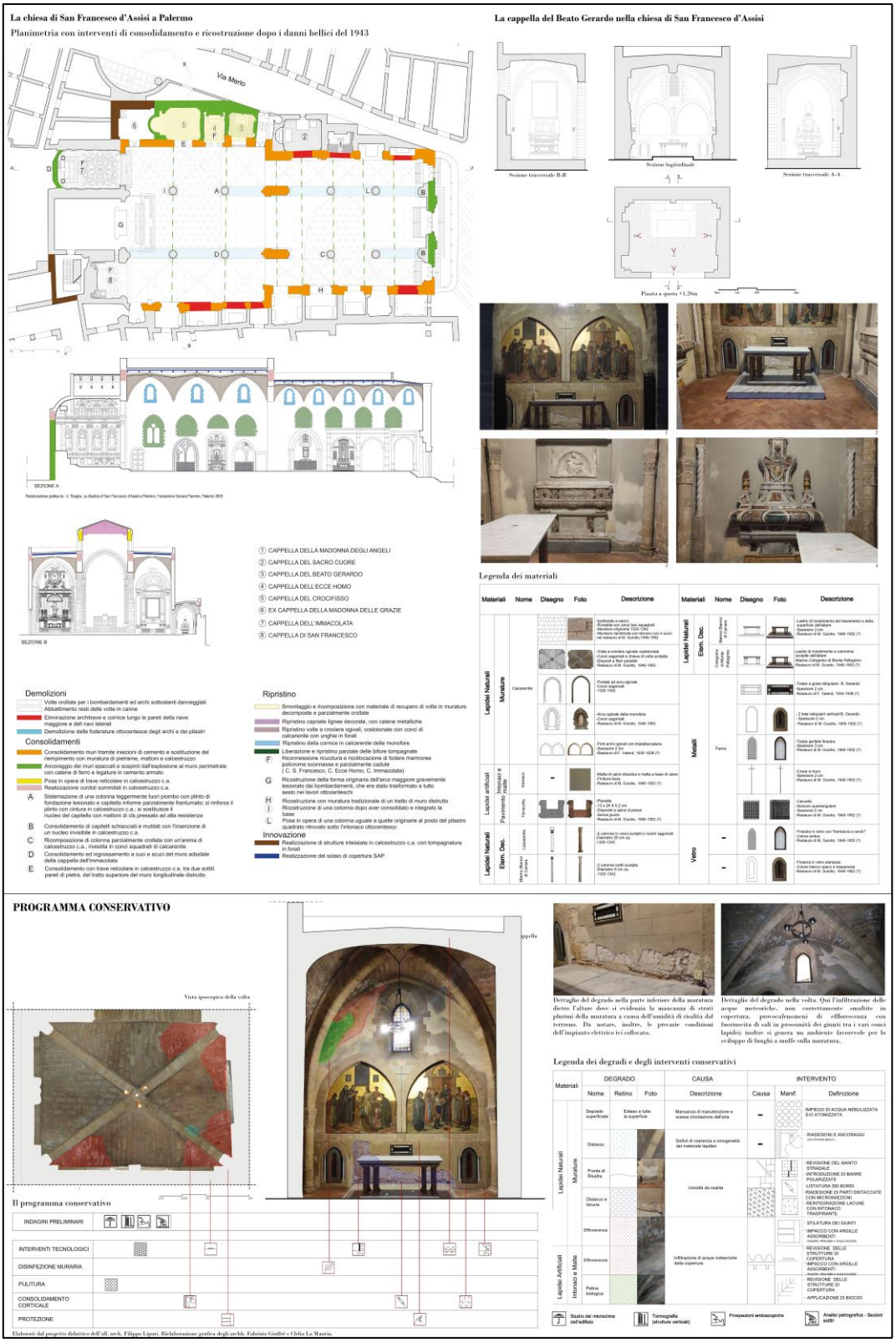

Fig. 1: Panel elaborated by the authors and exhibited at '3EXP - Exhibition of scientific methodologies of Italian culture for the knowledge, protection and valorisation of the Architectural Heritage' still underway in Bogotá and Buenos Aires.

Fig. 2: Structure for motion models of the Hecce Homo and Madonna degli Angeli chapels, located in the right aisle of the Church of St Francis of Assisi. 2023 (graphic elaboration by the students of the "Laboratory of Monument Restoration", 2022-2023).

Several slices corresponding to the plan, the hyposcopic view of the vault and the cross and longitudinal sections of the chapel were obtained from the point cloud, then integrated with the photoplans, obtaining photorealistic models of the investigated areas.

On these high-resolution images, information was mapped on the material characterisation and, above all, on the identification of degradations, and the related planned interventions. This digital information can be easily updated at regular intervals.

2. The cases (F.G., C.L.M.)

2.1 Chapel of the Blessed Gerard in the Basilica of St Francis of Assisi (C.L.M.)

The chapels of the medieval basilica of St Francis of Assisi, added starting from 1320 by noble families for their burials, have been the subject of many modifications over the centuries (Rotolo, 2010).

The chapels on the southern side, such as the one in question, differ from those on the other side in being the original 14th-century chapels, which were later made an integral part of the church.

The chapel of Blessed Gerardo has a quadrangular plan, with a ribbed ogival cross vault, set on corner columns. The chapel of Blessed Gerard has a quadrangular plan, with a ribbed cross vault set on angular columns. In the middle of the 16th century, the original entrance on the western front was occluded, while in 1750, the apse on the eastern front was deprived of its apse, of which only two twisted columns remain. The chapel houses the tombs of members of the Grimaldi family, who took over in 1608 from the Crispo family, who had, in turn, acquired it from the Gualbes family (in 1432); in 1638 it was re-named after the Blessed Gerardo.

The analysis of the materials[5] constituted a fundamental moment for understanding the architectural structure, also in relation to its

[5] The analysis was conducted as an educational exercise by the student Filippo Lipari for the Monument Restoration Laboratory of the Course in Architecture of the University of Palermo, held by the professor arch. Renata Prescia (A.Y. 2022-23).

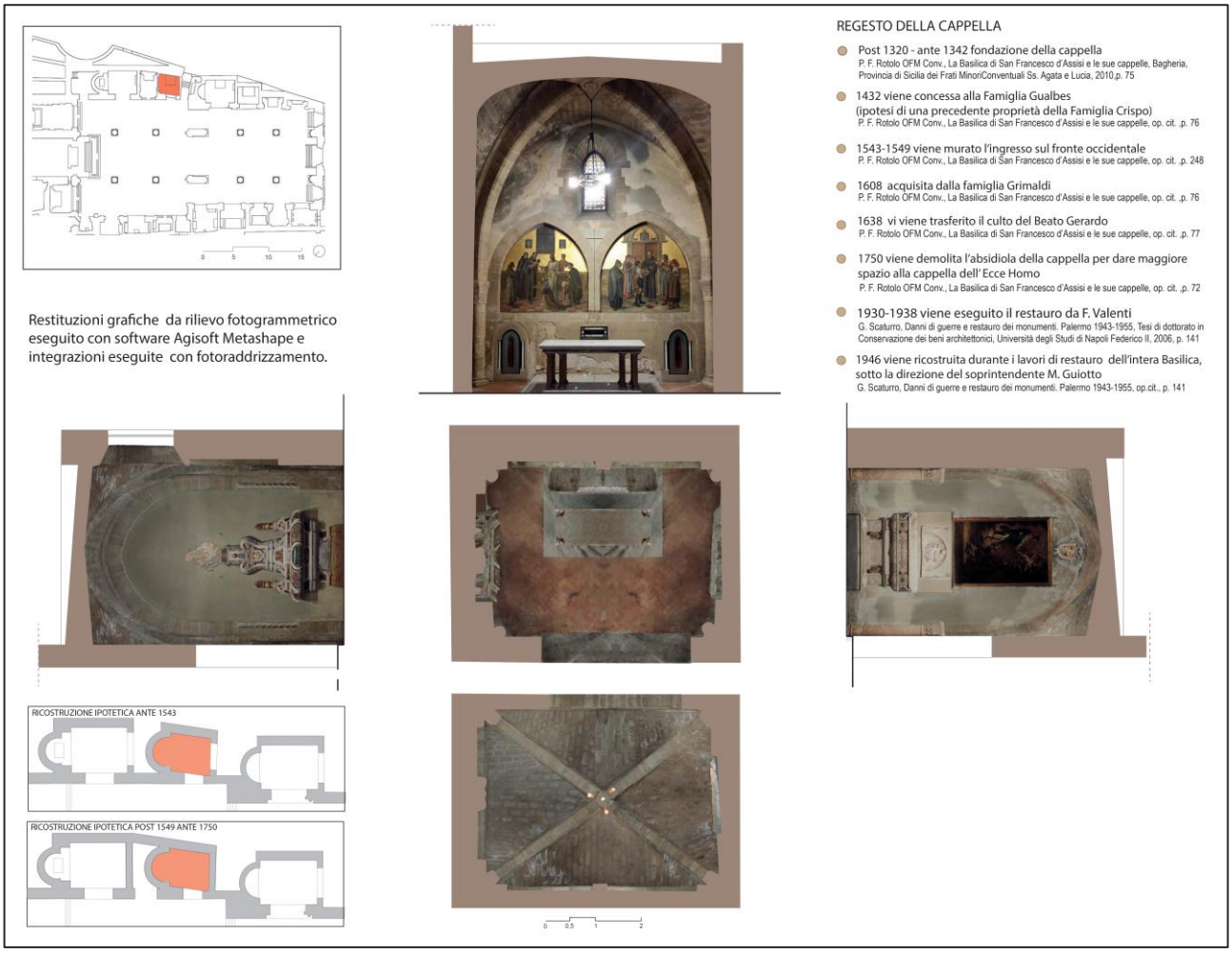

Fig. 3: The survey of the chapel with photo-recording of the elevations and outline of the hypotheses of the transformations undergone throughout history (elaboration by student architect F. Lipari, 2023-24).

transformations over time (Fig. 3), including the most recent restoration and reconstruction interventions of the 20th century: those of the Superintendents Francesco Valenti, in the 1930s, and by Mario Guiotto, after the war damage between the 1940s and 1950s (Guiotto, 1946; Rotolo, 2010; Tinaglia, 2005).

The mapping of materials followed a "logical order": starting from the recognition of materials and construction techniques relating to the structural masonry, up to the decorative and finishing elements, through direct observation and comparison with historical bibliographic and iconographic sources. Thanks to this process, the portions of masonry reintegrated in Guiotto's intervention were identified, using the "sew and unstitch" consolidation technique. Furthermore, the complete post-war reconstruction of the "royal" vault in calcarenite ashlars was attested through the comparison between the state of fact and pre- and post-war photographs, setting it on the four existing authentic fourteenth-century columns of the same material.

The result of this reconstruction is also the upper part of the south wall, where there is a small lancet window with an ogival arch, also completely restored "in style".

The lower part of this wall instead shows two niches with fake ogival arches containing two canvases by the painter Antonio Cianci (1937), which can be attributed to the restoration carried out by Valenti, thanks to the use of the veneering technique, already experimented in previous restorations by architect Giuseppe Patricolo.

In the chapel there are also sculptural elements of significant interest, such as a marble bas-relief representing the Pietà, by Domenico Gagini (ca. 1470), the marble sarcophagus for the burial of Pietro Grimaldi (1751) and the monument to Giulio Grimaldi (1762) with inlaid marble.

2.2 Chapel of Holy Rosary in the Church of Saint Catherine (F.G.)

The current Dominican church of Saint Catherine of Alexandria was built, starting in the late 16th century, on the site of a pre-existing one annexed to the 14th-century monastery of which, the present one, is the result of various unifications and transformations (Lo Giudice, 2018). The chapel of the Holy Rosary, the second on the western side of the church's nave for those accessing it from Piazza Bellini, constitutes, from a decorative point of view, an object of particular interest, due to the coexistence of several executive phases, evidence of different historical moments. The exterior of the chapel (Fig. 4), decorated like the rest of the nave with polychrome marble with phytomorphic motifs, has the heraldic insignia of Sr. Lorenza Antonia Amato, who commissioned the work (1711-13) at the bases of the pilasters, later replicated also on the balustrade and on the inner shoulders of the entrance arch; the altar with its frontal and the two statues of Dominican saints, placed on brackets, date back to the same phase (Sola, 1994).

To a 19th-century modernisation in a neoclassical style - common to many churches in Palermo - can be attributed the decoration of the side walls, in imitation marble, and of the vault, with gilded stuccoes and frescoes, as well as the current altarpiece with the Madonna of the Rosary. The canvas conceals the pre-existing niche with an 18th-century sculptural group of the same subject while, on the side walls, within squares, 17th-century canvases variously attributed to Andrea Carreca or Pietro Novelli were reinserted (The Virgin and Child in Glory appears to sailors on the left, and Pius V blessing Andrea Doria on the right) (Mortillaro, 1836; Reginella, 2018).
The simple flooring with white marble squares and red marble stripes, similar in all the chapels of the church, except for the last one on the left dedicated to St. Dominic, which presents a more complex decoration, seems to be a new 20th-century creation that has not yet been documented. It is noteworthy that the altar predella on two red marble steps houses a piece, undoubtedly reused, of an 18th-century mixed decoration, as is also the case in all the other chapels.

Fig. 4: General view of the Chapel of the Holy Rosary in St. Catherine's Church (photo by F. Giuffrè, 2022)

The historical-critical analysis has therefore constituted, in the complex of the transformations that have affected the church of St. Catherine, the first step towards understanding the chapel, together with the geometric-dimensional and architectural survey of the state of affairs. The latter was carried out with direct methods and with the use of photogrammetry, which was particularly useful as a support for extracting detailed photoplans for subsequent mapping of materials and degradation.

With regard to the pavement, which constitutes the most degraded part, due to wear from treading and/or accidental impacts, due to displacements, we find, with the aid of detailed surveys returned at a scale of 1:25, in addition to the natural surface deposits, extensive erosions, cracks and gaps (Fig. 5)[6].

[6] The teaching project was carried out by student Martina Rita Campo, in the academic year 2022-23.

Fig. 5: Photogrammetric survey of the flooring of the Chapel of the Holy Rosary in St. Catherine's Church (elaboration by student architect M.R. Campo, a. y. 2022-23)

Differentiated choices can be made for work on manifestations depending on the type of degradation and the surface to be treated.

With reference to chapels, with relatively limited surfaces and with marked artistic peculiarities (from stuccoes, to polychrome marbles, to frescoes) it is desirable, for example, for cleaning/disinfection, treatments with compresses or soft brushes (sorghum, nylon or similar), preferable, also to preserve the natural patina of time, to heavier cleaning with aero-abrasive equipment or general water treatments (use of low pressure sprays); for cortical consolidations, use of controlled chemical products and grouting of cracks with epoxy resin and marble dust.

For the category of reintegrations, certainly the one fullest of design cues and theoretical interactions, it is necessary to consider the individual lacunas or missing elements, questioning and simulating, by means of the drawing tool, different solutions with similar materials (undercuts, chromatic/material or finishing differences, interposition of thin foils, etc.) on the effective final yield, without neglecting the requirements of compatibility and distinguishability.

3. Problems of conservation (F.G.)

The main themes of restoration for side chapels in church architecture can be, without neglecting the differentiations relative to each individual case under study, summarised in the general need for material conservation of the decorated surfaces, always in relation to the causes of degradation and, following this, in the possibility of proposing specific strategies for better use and valorisation.

For conservation, in particular, the phase of knowledge takes on absolute significance, declined, as the procedural iter carried out by the discipline of restoration envisages, in the analysis of materials and construction techniques and in the analysis of the state of "defects", that is, degradations and instabilities. For an analysis that is as correct and detailed as possible, it is therefore necessary to rely on the elaboration of "thematic maps", according to a procedure that is standardised in the Italian academic context - albeit with the relative local and "school" differences - and also adopted by the Superintendencies and many professional studios. The research group author of this contribution adopts a 'mapping' method codified, for the first time, in Palermo by Professor Salvatore Boscarino[7]. For the identification and description of the degradations we based ourselves, following the national regulations, on UNI-NORMAL 11182/06, on which, once the manifestations and triggering causes of the degradations are identified for each individual case, through the use of legends, the "conservation programme" is set up. Subdivided into five categories (technological intervention/repair, wall disinfection, cleaning, cortical consolidation, protection), the conservation programme devised is represented in the "pentagram", which is useful for restating the temporal and procedural course of action to be carried out, firstly resolving the causes of degradation and then their manifestations on the surface (Fig. 6).

The main causes of degradation, for example in the Chapel of the Most Holy Rosary in the Church of Santa Caterina, as in Palermo's churches in general, are to be found in the problems of damp, both rising from the ground and from infiltration from the roof and walls exposed to driving rain.

[7] The method, in the course of a long teaching activity, has been continued and perfected by Professor Renata Prescia

The recurring degradations are therefore efflorescence, paint exfoliation, stucco erosion, detachments, gaps and deficiencies, but also degradations of a biological nature, such as patinas and colonisation of macro-organisms, favoured by the consistent presence of water both in the masonry and in the air (condensation humidity).

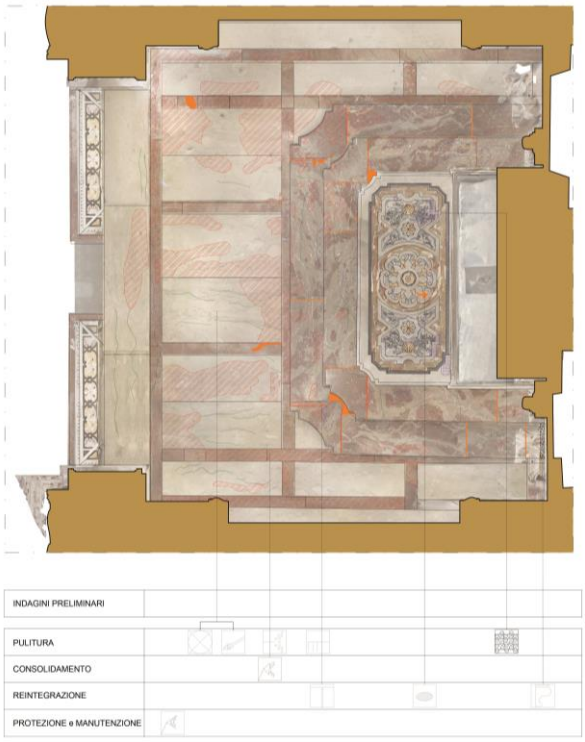

Fig. 6: Excerpt from a table on the conservation programme with the pentragramme for the flooring of the Chapel of the Holy Crucifixin St Catherine's Church (by student architect A. Gambino, 2022-2023).

For the ground connection, the rising dampness is amplified due to the difference in elevation between the chapels and the road sections behind them due to the lowering as part of the urban transformations at the end of the 19th century, which resulted in the anomalous external exposure of a portion of the foundation of the chapels insisting on the western front. By way of example, it would be possible to create an underlying air chamber, possible given the unexceptional value of the current twentieth-century marble flooring, to be dismantled and reassembled, or to adopt a more sustainable option one could rely on capillary interception systems (Conti & Martines, 2004; Musso, 2013).

For the chapel of the Blessed Gerard in the basilica of St Francis, on the other hand, given the presence of simple plastered surfaces and a terracotta floor, moreover the result of post-war restoration, it could be thought of associating or replacing the horizontal cavity with a vertical cavity to allow evaporation of the external wall underneath the street level.

The issue of roofs, is the most referable to maintenance interventions over time and, above all, to post-war or earthquake restorations (the last one in Palermo occurred in 2002). In the case of side chapels, these have often resulted in a change from a single-pitch system to a flat floor system which, in relation to the drainage of water from the nave, has sometimes given rise to technological criticalities, which can be summed up, first and foremost, in poorly designed slopes (due to the amount of water to be disposed of) or guttering and downpipes with too small a section. No less important, in this sense, is the issue of ordinary maintenance, too often disregarded, whereby the accidental displacement of a tile or the natural accumulation of extraneous materials in the drains (leaves, soil) actually triggers a sudden process of degradation destined to involve, in a short time, the roofing structures, the vaulted ceilings and therefore the interior surfaces.

4. Problems of use and enhancement (C.L.M.)

The didactic experience of studying and analyzing many of the church complexes in the historic center of Palermo, including those previously mentioned, has highlighted common critical issues in their use and enhancement.

Leaving aside the cases relating to monuments closed to the public, inaccessible for management or security reasons, one of the main problems concerns the physical accessibility of the monuments as a whole and in their relationship with their immediate context. In fact, there are frequent cases in which urban transformations, such as the leveling of road levels which, in addition to determining degradation factors as described in the previous paragraph, have generated notable differences in height between the inside and outside of the buildings. A direct consequence were the architectural transformations of the façades, to which in most cases substantial staircases were added, today perceived as considerable architectural barriers. This is the case of the church of S. Caterina d'Alessandria, to whose southern and western façades stairways were added following the lowering of the opposite Piazza Bellini and

Pretoria in 1864 (Fig. 7), for the leveling of Via Maqueda.

In the Basilica of San Francesco d'Assisi, the difference in height is less accentuated, but it is still present.

The choice to be made in such cases is certainly to realise architectural designs, which take the form of additions in the long process of stratification of the monument and which are preferable to technological solutions (stair servos, retractable staircases, self-supporting lifting platforms), that are difficult to maintain and require constant assistance in use and, therefore, non-independent use by disabled people.

Fig. 7: Facade of the Church of St Catherine of Alexandria, with the staircase built after 1864.

This approach was explored and applied in two cases of churches in the historic center of Palermo: S. Maria in Valverde and S. Maria la Nova[8]. Ramps were designed (Fig. 8) to overcome the difference in height between the inside and outside of the buildings. It was an opportunity to verify how contemporary architectural design can relate to historical architecture, while respecting it, at the same time offering a proposal for the redevelopment of the connection spaces between the monument and its urban context.

The hypothesized solution, however, for the Basilica of S. Francesco is the opening of an access from Via Merlo, which runs along the southern side of the church, where the difference in height between the road and the interior of the church is smaller than that of the square in front of the main façade.

Fig. 8: The new churchyard with the ramp, planned and realised in 2021 in the church of S. Maria in Valverde in Palermo thanks to the 'I-Access' project (photo by C. La Mantia, 2022).

On Via Merlo, the installation of an architecturally designed ramp, at the existing side access, would make it possible to overcome the difference in height, as well as to view one of the apses of these medieval chapels from the outside.

Even inside churches, situations may occur that prevent full physical accessibility. Precisely in the case of chapels, there are often minor obstacles such as the presence of steps or gates that remain closed. It is appropriate, in such situations, to raise awareness among those who manage churches of the importance of giving the possibility of accessing all spaces, without interposing impediments. Furthermore, full valorisation should also include the preparation of visit itineraries that make the relationships between the main nave and the micro-architectures made up of the chapels understandable.

The theme of physical accessibility is accompanied by that of cultural accessibility, which means a difficulty in accessing content relating to history and other important information and in understanding it, due to the lack of “narrative devices”, which need to be designed in a unified manner.

Starting from the preparation of visit itineraries, which guide both historical understanding and physical routes, the introduction of totems and supports for educational panels can be envisaged, in which Braille language, tactile prints and all the devices are used, according to the principles of *design for all*; these can be combined with the use of audio guides or interactive videos, accessible via QR

[8] The experimentation took place within the framework of the INTERREG V-A Italy-Malta project 'I-Access' (2018-2020), focused on the theme of implementing physical and cultural accessibility in the historic centres of Palermo and Valletta (Malta), scientific head Prof. Renata Prescia (Prescia, 2021).

codes applied on the same panels, which link to virtual platforms where the contents can be explored further.

The preparation of systems based on digital technologies also allows the creation of information databases, accessible to large audiences of users and updatable; but above all it allows for the structuring of integrated systems (georeferenced platforms, websites) in which to network even multiple monuments of the same city, giving visitors and citizens the opportunity to have an overall picture of the cultural heritage of a territory, with the possibility of access in-depth information and data on accessibility and use conditions.

In the previously mentioned didactic projects, various solutions of didactic panels, plaques and information totems were studied, to be placed inside the churches and in each chapel, according to a common graphic and communicative language. In the case of the church of S. Caterina, a visitor route was also designed, highlighted by the placement of a carpet on the floor, which also serves the purpose of preserving the inlaid marble flooring.

Problems of physical and cultural accessibility within buildings also arise in the case of difficulties in visual enjoyment suitable for understanding the architecture and the works it contains. It has been observed that in most cases the lighting, both natural and artificial, is not adequate and does not allow one to appreciate the architecture of the chapels and the works of art they contain. Sometimes, this is due to the occlusion of the windows themselves, due to larger architectural transformations of the buildings (e.g. lowering/raising of the roofs, as happened in the church of S. Francesco, or merging of volumes).

The central theme remains, however, that of the artificial lighting of the spaces and works contained therein, not neglecting how the emission of light, in addition to guaranteeing the correct visual enjoyment of the space (shadows, colours, etc.), can also constitute, if not appropriately designed, a problem from a conservation point of view. The subject of lighting in churches is in any case central, and must be addressed, without devolving it separately to other transversal competences (engineers, installers, etc.), within the overall restoration project, taking into account two constraints: avoiding that the installation of systems results in destructive operations for the historical material (e.g. making tracks for the passage of wires) and at the same time, guaranteeing that these do not visually alter the image of the architecture. In the cases under study, due to the presence of protruding cornices at the top (impost of the vaults), it was planned to install the lighting fixtures on them, not making them obvious, and to add, where necessary, adjustable floor lamps and fixed pin sockets (lower, at 40 mm from the ground, placed at the height of the plinth), all with copper-coated wires left exposed. The existing antique chandeliers are, however, kept hanging from the chapel's access arch.

The lighting design in religious architecture, given the symbolic and sacred value of the places, related to the general restoration, is however so important that it requires a dialogue with theological experts as well as knowledge of the specific standards.

5. Conclusions (R.P.)

The work presented is moving forward and is focusing on possible solutions to improve the accessibility of church cultural heritage and to identify the most suitable management methods. Improving the accessibility of cultural sites is, moreover, an objective of broader national strategies, such as those promoted by the italian National Recovery and Resilience Plan (PNRR), within which a specific call for proposals was issued precisely for the removal of any cognitive barrier through digital means (Measure 1, Component 3).

With regard, on the other hand, to the identification of appropriate management methods, a collaboration is underway with the local Worship Buildings Fund (FEC) for a survey of churches and the problems they present and for the creation of a database that can be used for future restoration projects, but also for entrusting cooperatives.

REFERENCES

Acuto, G., Cardinali, M., Fornara, L. & Novelli, F. (2023). Gestione della conoscenza e monitoraggio delle trasformazioni nei processi di conservazione programmata del patrimonio architettonico religioso nel progetto Chiese del centro storico di Torino. ChiesTO. In S. Della Torre (Ed.), *Il concetto di qualità e il tema della programmazione*, sect. 2a, in S. Della Torre & V. Russo (coord.), *Restauro dell'architettura. Per un progetto di qualità,* (pp. 375-382). Napoli, Italy: Quasar.

Aterini, B. & Giuricin, S. (2020). The integrated survey for the recovery of the former hospital/monastery of San Pietro in Luco di Mugello. *SCIRES-IT - SCIentific RESearch and Information Technology*, *10*(2), 99-116.

Balzani, M. (2011). Il rilievo morfometrico e il restauro architettonico. Le banche dati 3D per l'innovazione del progetto e gestione del patrimonio architettonico monumentale. In M. Balzani (Ed.), *Il progetto contemporaneo nel contesto storico* (pp. 87-96). Losanna, Switzerland: Skira.

Banfi, F., Stanga, C. & Landi, A. G. (2023). Virtual access to heritage through scientific drawing, semantic models and vr-experience of the stronghold of Arquata del Tronto after the earthquake. *SCIRES-IT - SCIentific RESearch and Information Technology*, *13*(1), 83-100.

Baratin, L. & Cattaneo, A. (2021). Documentazione e rilievo dei beni culturali: passato e futuro nell'era delle nuove tecnologie. In D. Esposito & V. Montanari (Eds.), *Realtà dell'architettura fra materia e immagine. Per Giovanni Carbonara: studi e ricerche*. *Quaderni dell'Istituto di Storia dell'architettura*, 73-74 (II), 457-462.

Bartolozzi, C. (2016). Un confronto aperto sul tema dei processi di trasformazione. In C. Bartolozzi (Ed.), *Patrimonio architettonico religioso. Nuove funzioni e processi di trasformazione* (pp. 13-22). Roma, Italy: Gangemi.

Conti, C. & Martines, G. (2004). Conservazione di materiali e superfici. In G. Carbonara (Ed.), *Trattato di restauro architettonico: atlante*, 2 (pp. 669-671). Torino, Italy: UTET.

Della Torre, S. (2023). Metodologie digitali per la gestione degli interventi, sect. 7ª, in S. Della Torre, V. Russo (eds), *Restauro dell'architettura. Per un progetto di qualità* (pp. 1271-1220). Napoli, Italy: Quasar.

Florio, R., Catuogno, R. & Della Corte, T. (2019). The interaction of knowledge as though field experimentation of the integrated survey. The case of Sacristy of Francesco Solimena inthe church of San Paolo Maggiore in Naples. *SCIRES-IT - SCIentific RESearch and Information Technology*, *9*(2), 69.84.

Florio, R., Catuogno, R., Della Corte, T. & Bonelli C. (2023). Rilievo integrato e rappresentazione digitale nei processi di conoscenza per la valorizzazione dell'architettura storica. Il caso della Palazzina dei Principi nel R. Bosco di Capodimonte. In S. Della Torre (Ed.), Metodologie digitali per la gestione degli interventi, sect. 7a, in S. Della Torre & V. Russo (coord.), *Restauro dell'architettura. Per un progetto di qualità*, (pp. 1221-1229). Napoli, Italy: Quasar.

Gaiani, M. (2012). Creare Sistemi informativi per studiare, conservare, gestire e comunicare sistemi architettonici e archeologici complessi. *DisegnareCon*, 9-20.

Guiotto, M. (1946/2003). *I Monumenti della Sicilia occidentale danneggiati dalla guerra: protezioni, danni, opere di pronto intervento*. Palermo, Italy: Edizioni Salvare Palermo.

Landi, A. G. (2017). Pensare la luce artificiale per conservare l'architettura. In S. Della Torre (Ed.), *Progetto e cantiere: orizzonti operativi*, sect. 3a, in D. Fiorani (coord.), *RICerca/REStauro*, (pp. 699-704). Roma, Italy: Quasar.

Lo Giudice, S. (2018). *Santa Caterina al Cassaro: il monastero delle Domenicane a Palermo*. Palermo, Italy: Torri del Vento.

Mortillaro, V. (1836). *Guida per Palermo e pei suoi dintorni*. Palermo, Italy: Tipografia del giornale letterario.

Musso, S.F. (2013). Tecniche di restauro: aggiornamento. In G. Carbonara (Ed.), *Trattato di restauro architettonico*. Torino, Italy: UTET

Prescia, R. (2021). *Il progetto I-ACCESS patrimonio culturale e accessibilità*. Palermo, Italy: Edizioni Caracol.

Prescia, R. & Scaduto, R. (2019). Il monastero di S. Caterina d'Alessandria in Palermo: conoscere per conservare. In L. Bellanca, M.C. Di Natale, S. Intorre & M. Reginella (Eds.), *Sacra et pretiosa. Oreficeria dai monasteri di Palermo Capitale* (pp. 249-258). Palermo, Italy: Regione Siciliana, Assessorato dei beni culturali e dell'identità siciliana.

Prescia, R. & Scaduto, R. (2020). Dalla didattica al progetto di restauro: la collaborazione fra istituzioni per conoscere, conservare, valorizzare e fruire il patrimonio storico architettonico. In S. F. Musso, M. Pretelli (Eds.), *Committenze e patrimonio*, sect. 3.1a, in E. Coïsson, C. Giannattasio & M.A. Giusti (Eds.), *Restauro: conoscenza, progetto, cantiere, gestione* (pp. 402-409). Roma, Italy: Quasar.

Prescia, R. & Scianna, A. (2017a). Arab-Norman heritage: state of knowledge and new actions and innovative proposals, Geomatics and Restoration: Conservation of Cultural Heritage in the Digital Era. *The international archives of the photogrammetry, remote sensing and spatial information sciences*, 52-55, 535-549.

Prescia, R. & Scianna, A. (2017b). Il patrimonio architettonico arabo-normanno: stato delle conoscenze e proposte innovative. *Ananke*, s.i., 88-92.

Reginella, M. (2018). Sui passi della priora. Storia, arte e tradizione del monastero di S. Caterina. In S. Lo Giudice (Ed.), *Santa Caterina al Cassaro: il monastero delle Domenicane a Palermo* (pp. 41-55). Palermo, Italy: Torri del Vento.

Rotolo, F. (2010). *La basilica di San Francesco d'Assisi e le sue cappelle: Un monumento unico nella Palermo medievale*. Palermo, Italy: Provincia di Sicilia dei Frati Minori Conventuali Ss. Agata e Lucia.

Scaduto, R. (2022). Space of seclusion and life: the monastery of Santa Caterina d'Alessandria. In F. Palla, I. Rusu, L. Panteri, C. Pelosi, N. Apostolescu (Eds.), *Proceedings of ESRARC 2022*, *12th European Symposium on Religious Art, Restoration & Conservation. Palermo between conservation, use, maintenance and enhancement* (pp. 199-201). Torino, Italy: Kermes.

Sola, V. (1993-94). La decorazione marmorea della chiesa di S. Caterina al Cassaro in Palermo. *BCA Sicilia*, *3-4*(1), 11-33.

Tinaglia, V. (2005). *La basilica di San Francesco d'Assisi a Palermo*. Palermo, Italy: Edizioni Salvare Palermo.