ARCHITECTURE HERITAGE and DESIGN

Carmine Gambardella

XXII INTERNATIONAL FORUM

Le Vie dei Mercanti

WORLD HERITAGE and CITIES IN EMERGENCIES

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NAPLES 14 - CAPRI 15 June 2024

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World Heritage and Dwelling on Space
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Peer review

Scholars has been invited to submit researches on theoretical and methodological aspects related to the impact of natural ecological disasters and armed conflicts on Cultural Heritage, and show real applications and experiences carried out on this themes. Based on blind peer review, abstracts has been accepted,conditionally accepted, or rejected. Authors of accepted and conditionally accepted papers has been invited to submit full papers. These has been again peer-reviewed and selected for the oral session and publication, or only for the publication in the conference proceedings.

Conference report

300 abstracts and 550 authors from 20 countries:

Albania, Algeria, Austraia, Belgio, China, France, Germany, Greece, Hungary, Iran, Italy, Japan, Mexico, New York, Portugal, Romani, Serbia, Spain, Turkey, United Kingdom.

From the XXI FORUM WORLD HERITAGE and DWELLING ON EARTH
to the XXII FORUM WORLD HERITAGE and CITIES IN EMERGENCIES.

World Heritage and Dwelling on Space – World Heritage and Cities in Emergencies: this is the title of the International Forum "Le Vie dei Mercanti" which reached its XXII Edition in 2024. A story of love for the Earth, its Inhabitants, Landscapes, Architecture, Cultural and Archaeological Heritage told by more than 7000 Scholars and Lecturers from all over the World to with the aim of integrating expertise, sharing and disseminating scientific knowledge and implementing best practices to protect and safeguard our planet.

The focus of the Forum is no longer be only Inhabiting the Earth but is stretched and extended to Inhabiting Space, in a broader sense, to reflect on the impact of natural ecological disasters and armed conflicts on Cultural Heritage. Now more than ever, with the war in Ukraine, geographically closer than others, and with the latest events in the Middle East, the theme of wars and conflicts has become even more present in our lives.

Armed conflicts, synonymous with death and destruction, as well as weakening the social and economic fabric, put at risk the cultural heritage of besieged countries whose destruction has a strong symbolic as well as strategic significance because of the enormous identity value that resides in cultural heritage which stimulates a sense of belonging and social cohesion.

And it is precisely in order to deal with the tragic devastation of entire cities and territories and the terrible wound inflicted on the cultural heritage of peoples that the scientific community must create starting points to implement important and immediate actions aimed at safeguarding monuments, architectural works, archaeological sites, works of art, manuscripts, books and other objects of artistic, historical or archaeological interest, as well as scientific collections of all kinds. If the future is an eternal now, as I remind every year, it is good for the Academy, Scientific Institutions, civil society, and stakeholders involved to make their knowledge and expertise available to promote a more widespread and in-depth knowledge on the issues regarding the safeguarding cultural heritage during armed conflicts.

Dal XXI FORUM WORLD HERITAGE and INHABIT THE EARTH
AI XXII FORUM WORLD HERITAGE and CITIES IN EMERGENCIES

World Heritage and Dwelling on Space – World Heritage and Cities in Emergencies: è questo il titolo del Forum Internazionale "Le Vie dei Mercanti", che nel 2024 ha raggiunto la sua XXII Edizione. Una storia d'amore per la Terra, per i suoi Abitanti, i Paesaggi, l'Architettura, i Beni Culturali e Archeologici raccontata da oltre 7000 Studiosi e Docenti da tutto il Mondo per integrare competenze, condividere e diffondere conoscenze scientifiche e mettere in atto best practices volte alla protezione e salvaguardia del nostro pianeta.

L'obiettivo del Forum non è più solo quello di Abitare la Terra ma è proteso e si estende verso l'Abitare lo Spazio, in senso più ampio, per riflettere sull'impatto dei disastri ecologici naturali e dei conflitti armati sul Patrimonio Culturale. Oggi più che mai, con la guerra in Ucraina, geograficamente più vicina di altre, e con gli ultimi avvenimenti in Medio Oriente, il tema delle guerre e dei conflitti si è fatto ancor più presente nelle nostre vite.

I conflitti armati, sinonimo di morte e distruzioni, oltre che di indebolimento del tessuto sociale ed economico, mettono a rischio il patrimonio culturale dei paesi assediati la cui distruzione ha un forte significato simbolico oltre che strategico per l'enorme valore identitario che risiede nel patrimonio culturale che stimola senso di appartenenza e coesione sociale.

Ed è proprio per far fronte alla tragica devastazione di intere città e territori e alla terribile ferita inflitta al patrimonio culturale dei popoli, che la comunità scientifica deve creare spunti per mettere in atto azioni importanti ed immediate volte alla salvaguardia di monumenti, opere architettoniche, siti archeologici, opere d'arte, manoscritti, libri e altri oggetti di interesse artistico, storico o archeologico, nonché collezioni scientifiche di qualsiasi tipo. Se il futuro è un eterno presente, come ricordo ogni anno, è bene che l'Accademia, le Istituzioni Scientifiche, la società civile, gli stakeholders coinvolti, mettano a disposizione le loro conoscenze e competenze per promuovere una più diffusa e approfondita conoscenza sui temi della salvaguardia del patrimonio culturale durante i conflitti armati.

Prof. Carmine Gambardella
General Chair XXII Forum 'World Heritage and Cities in Emergencies'
President and CEO of the Benecon University Consortium
UNESCO Chair on Landscape, Cultural Heritage
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UNESCO Chairholder on Landscape, Cultural Heritage, and Territorial Governance; President and CEO of the Benecon University Consortium - Research Centre on Cultural Heritage, Ecology, Economy (Pegaso University, University of Campania "Luigi Vanvitelli", University Federico II of Naples, University of Salerno, University of Sannio). Full Professor of Drawing at the Pegaso University and at the University of Campania. President of the International Forum 'Le Vie dei Mercanti' since its first edition in 2003 to the XIX edition in 2022. Editor and Founder of the series "Surveying is/or Project", "Knowledge Factory" and "Architecture, Heritage and Design". Component of the Scientific Committee of International A Class Magazine 'Abitare la Terra'/'Dwelling on Earth' (Gangemi Editor International Publishing). He covered various roles for the University of Campania, including the Pro Rector of Institutions, Academic Senator, Director of the Department of Architecture and Industrial Design Luigi Vanvitelli, Dean of the Faculty of Architecture Luigi Vanvitelli, Director of the Department of Culture of Design, Director of Doctoral School in the Discipline of Architecture, Coordinator of the PhD in Protection, Safety and Representation of the Environment and Structures and Territorial Governance, Coordinator of the PhD Program in Surveying and Representation of Architecture and the Environment. He is author of numerous scientific international papers, publications and proceedings on surveying and representation of the built and natural heritage.

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XXII INTERNATIONAL FORUM

14 • 15 June 2024 Napoli Capri

Brutalism as a Post-war Syndrome,
The Case of City Archives by Georgy Konstantinovski)

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Abstract
Images of daily devastation from recent natural disasters and armed conflicts show us the fragility of our environment and bring us back to the subjects of war and architecture. Destructive changes from wars or natural disasters affect life environments and their spatial constitutions — they affect the way environments are perceived, created, and represented. We can associate these critical periods with the effects of post-war syndromes. In this sense the episode of brutalism, from the second half of the twentieth century, can be seen as a reflection of the post-war conditions on a global level, and the different post-natural disaster effects at the local level. We will explore brutalism in architecture through the work of Georgi Konstantinovski, the student of Paul Rudolph, in the post-earthquake period of Skopje. The three city archives, in Skopje, Štip and Ohrid, as parts of his brutalist oeuvre, show the influences of his mentor and simultaneously seem to represent the specifics of post-conflict disturbances in structural, material, and figurative formal sense. The exposed massive concrete structures, the rough textures of the walls, and the dismemberment of the bodies of the buildings have ambiguous associations, show the reform of the modernist idea and the spirit of the time, but also the associations of military architecture and the ruins of post-destructive events.

Keywords: brutalism, post-war syndrome, archive, architecture

1.   Introdution

In 1967, the archive of Skopje was built, a promotion of Georgi Konstantinovski and the new architectural paradigm two years after his return from postgraduate studies at Yale University. It caused a particular interest in relation to the previous architectural production in many ways. Konstantinovski will notice the reactions during the presentation of the project model by one of the participants of the acceptance council: "This project does not belong on the Earth! This project's place is on the moon! I know this boy; he is a great fantasist!" [1]. The promotion of concrete buildings in the post-earthquake period in Skopje, what we recognize today as Brutalism, caused a series of contradictory interpretations.

Fig. 1: Georgi Konstantinovski (1966-1968). Archive of Skopje (personal archive of Konstantinovski).

Brutalism, mostly timed from 1950 to 1970, as a kind of post-war phenomenon, basically deepens the principles of modern architecture in terms of honesty of expression, ethics, structure, and materialization. It takes on different manifestations in different tendencies, from the reduction of the expression to the figurativeness of the form, related to the possibility of the material, natural concrete (la beton brut) from which the name originates, and becomes a global phenomenon. It emerged as a post-war reaction to the ethics, aesthetics and possibilities of architecture. On an associative level related to exposure, exposure of material and fragmentation of form. The remarks of Prince Charles are known, but also the negative sentiment that was created regarding the exposure of the concrete: "You have to give this much to the Luftwaffe: when it knocked down our buildings, it did not replace them with anything more offensive than rubble. We did that "[2].

In its in-depth structure, Brutalism can also be referred to as the military as evidenced by Paul Virillio [3]. Virilio documented the abandoned bunkers of the Nazi fortification. Virilio wrote: "Why continue to be surprised at i.e. Corbusier forms of modern architecture? Why to speak of "brutalism"? And, above all, why this ordinary habitat? So, very ordinary over so many years? These have grey masses with sad angles and no openings - brought to light much better than many manifestos the urban and architectural redundancies of this postwar period that had just reconstructed to a tee the destroyed cities" [3]. Thus, those reduced, monolithic and often bizarre structures will become an associative basis of the expression of Brutalism.

2.   The Contradictory Roots of Brutalism: from an architecture of recovery to an architecture of crisis

In the case of Skopje, the architecture of Brutalism is a manifestation of the post-earthquake reconstruction of the city. It arose from the involvement of the international architectural scene in the reconstruction of the city that suffered from a catastrophic natural disaster, but also from the dominant tendencies of the time, the 1960s and 1970s.The experiences of brutalism were disseminated immediately through the suggestive and influential project for the central area of Skopje, by Kenzo Tange and his team, as well as through the study stays of a number of young Macedonian architects in European and American universities.

Georgi Konstantinovski stayed at the prestigious Yale University for his master's studies under the mentorship of Paul Rudolf, then famous as an "American formgiver of the Space Age" [4]. His intense sculptural and unique treatment of form, structure and material certainly influenced the work of the young Konstantinovski. Art & Architecture Building opened to students at the beginning of the 1963–64 academic year "was a truly original building, a tour de force of light, mass, and space, with great design attention lavished on every quirky corner" [4]. In one photo of the interior space, Paul Rudolph is leaning against the parapet of a rough concrete structure; in the background, there is architecture of massive concrete pylons, light falling through them, and students working in a common space. The seated figure in the central position in the lower zone, leaning over the desk, is Georgi Konstantinovski, who is studying at Yale then.

Fig. 2: Paul Rudolf, in the foreground, Georgi Konstantinovski at the desk, in the background, in the interior of the Art & Architecture Building.

Fig. 3: Georgi Konstantinovski, 1967. Entrance hall of the City Archive, Skopje.

The appearance of brutalist architecture in the period of the post-earthquake reconstruction of Skopje can be multi-meaning: the result of different circumstances, the global background, the new ethical but also the formal attitude of the time, the personal attitude of the authors, the reaction to the post-post-war and/or post-earthquake situation. Of course, the exposed concrete structures, the buildings' fragmentation and monumentality, and the new architecture's resistance and permanence indicate the desire for a new beginning. But is there another possible reason for that phenomenon?

We can connect the "distortion" of the architecture on a personal and collective level to the experience of specific key episodes and/or exposure to certain traumatic events. *Posttraumatic stress disorder (PTSD) is a psychiatric disorder that may occur in people who have experienced or witnessed a traumatic event such as a natural disaster, a serious accident, a terrorist act, war/combat, and other violent acts. A diagnosis of PTSD requires exposure to an upsetting traumatic event.* [5]

Spatial aspects of our environments can be associated with different conditions: **Intrusion**: Intrusion as a retrospective, analogies of destructive events and/or their overcoming; **Avoidance**: Avoiding reconstruction of past spatial sequences, avoiding and suppressing previous spatial syntax; **Alterations**: Alternation of structural compositions, in the ratio of the elements and the whole. In the sequence of Konstantinovski's Archives, we can follow that associative sequence.

3. The three archives

In Konstantinovski's oeuvre, the archive theme has a significant place. Through the three archives in Skopje, Shtip, and Ohrid and the analysis of the physical structure, spatial organization, and material basis, we will follow the architectural procedure regarding their similarities and differences.

3.1 Archive of Skopje (1966-1968)

In explaining the project, Konstantinovski always started with one problem: lighting the depot. How can we provide natural light in the depot without negatively affecting the archival material? To meet the required criteria for natural but indirect lighting, the free corners on the square base of the depot, 10m x 10m, are expanded by placing niches 1.0m x 1.0m, and windows are opened on the sides. This way, natural dispersed light is introduced to manipulate the depot.

The architectural composition consists of two autonomous parts: a low part and a high part. The lower part consists of a cruciform figure of two parallelepipeds placed crosswise over each other. The high part is a tower, a prism with a square base (8 stories high). These two parts are connected by a bridge on the first level. Program distribution follows the composition procedure. The administration is in the lower part, and the depot is in the upper part. The entrance and entrance hall are in the cross-section of a cruciform figure in which the light comes from above.

The object is a monolith cast from one material, natural concrete. The way of processing its "ribbed flickering structure in the interior and exterior was supposed to evoke a feeling of security and stability". In the materialization, Konstantinovski undoubtedly applied the experience of Paul Rudolph's Art & Architecture Building.
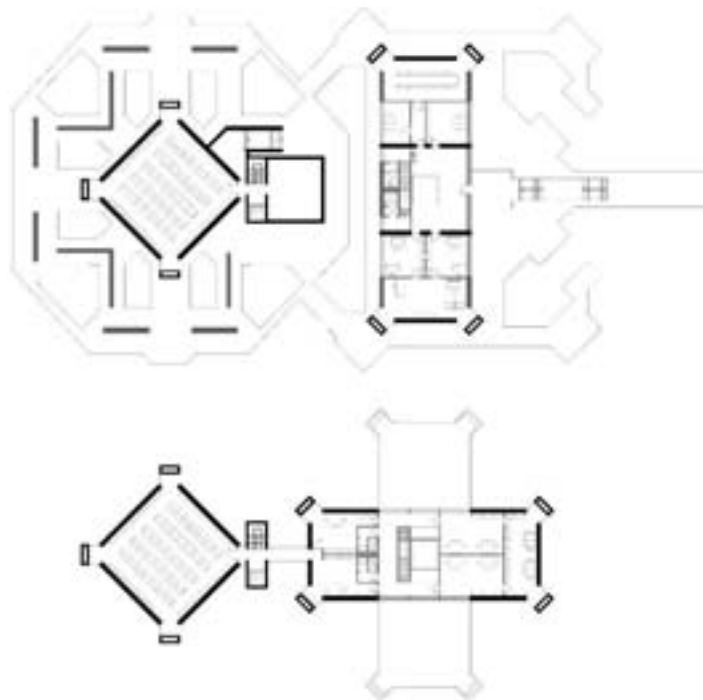
Fig. 4: Georgi Konstantinovski (1966-1968). Archive in Skopje: Ground floor plan and First floor plan.

3.2 Archive of Shtip (1972-1976)

As Konstantinovski (2015) wrote, the location planned for the Archive in Shtip delighted him because it was located on top of an exposed hill in the city, and it could be a place of marking and identity: "so from the beginning, I tried to give it a monumental character, to act as a place of recognition." [7]
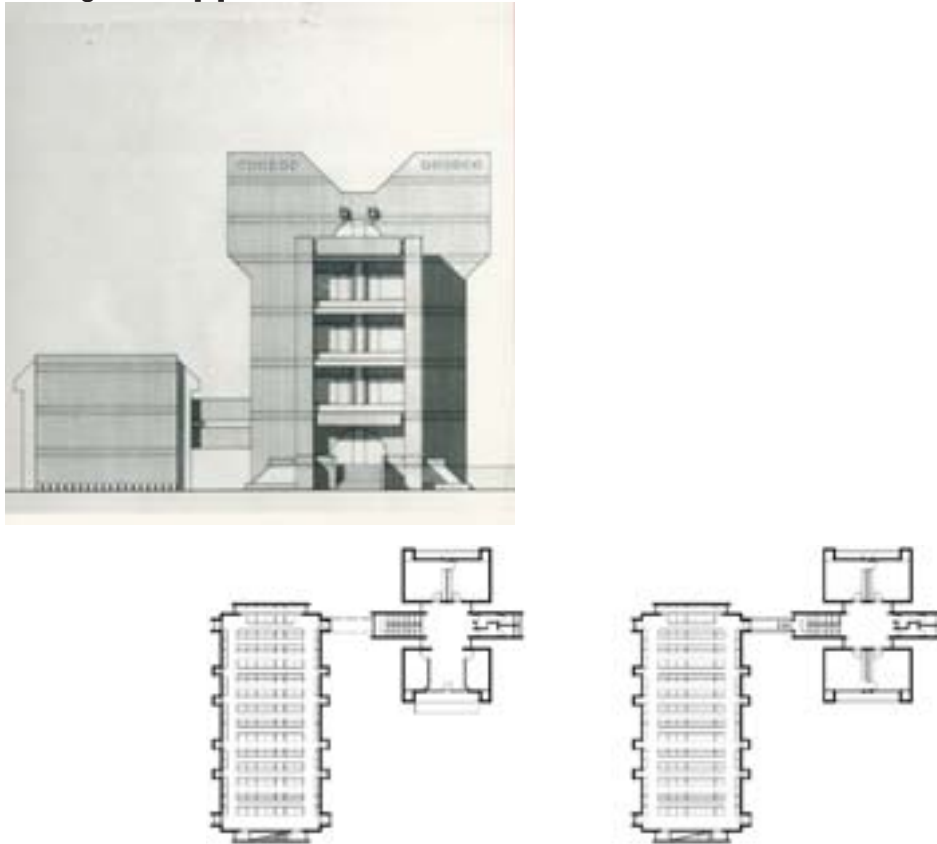
Fig. 5: Georgi Konstantinovski (1972-1976). Archive of Shtip: South elevation, Ground floor plan, First floor plan.

Functionally, the building is divided into two autonomous parts: depot and administration. In a typological sense, the depot is a horizontal part - a hangar; the administration is a vertical part - a tower, to express the technological procedure of processing the material vertically. Both parts are connected by a bridge on the first level. But the tower itself is divided; it has a cruciform base. In one direction, communications and supporting service contents are located as a kind of vertical monolithic plate that cuts the body of the object and separates it into two volumes, on one and the other side of the "pylon". Furthermore, on a vertical plane, this pylon gets a narrative figurative ending: "as if it were spreading its wings over the city and talking about its rich history" [7].

Fig. 6: Georgi Konstantinovski (1972-1976). Archive in Shtip (personal archive of Konstantinovski).

But the zoomorphism of the central pylon of the tower may have another line of association, the necropolis of Bogdan Bogdanović on the Isar hill, above Shtip from 1972 [8]. The elements of the necropolis, the cenotaphs, have the figuration of Minoan sacral objects, a kind of *horns of consecration* [9]. In both cases, the zoomorphic association invokes certain archetypes to which the architecture transforms and/or returns.

3.3 Archive of Ohrid (1974-1979)

It follows the scheme of the Archive in Shtip; in terms of programming, it is divided into a horizontal part (GF+2) depot and a vertical part (GF+4), administration, placed diagonally in a mutual position and connected by a bridge on the first level. In a typological sense, the depot is a closed monumental building with lighting niches and the administration is a tower, which houses the technology of vertical processing of archival material. The tower is vertically composed of successive sequences of octagonal and square bases. Konstantinovski talked about different historical periods, Samoil's fortress, the highest parts of the closed core, the erkers of traditional townhouses, and the modern construction system [10] .
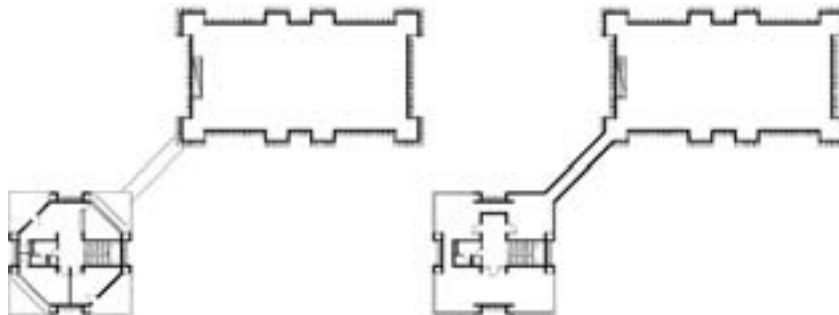
Fig. 7: Georgi Konstantinovski (1974-1979). Archive in Ohrid: Ground floor plan and First floor plan.

Fig. 8: Georgi Konstantinovski, Archive of Ohrid (1974-1979). (personal archive of Konstantinovski, photo: Minas Bakalchev)

4. A comparative review

In the three archives, the primary scheme of dividing the body of the building into two autonomous parts, a tower and a horizontal segment, is repeated. In terms of programming, the distribution of the program in the basic typological scheme differs. In the Archive of Skopje, the depot is the tower, and the administration is at the complex cruciform base. In the archives of Shtip and Ohrid, the administration is in the tower, and the depot is in the horizontal monumental segment. In the compositional sense, the distribution of the parts concerns the principal axials of the structural skeleton. In the first case, the Archive in Skopje, the elements of the building, the cruciform body and the tower, turned by 45º, are sequences along the longitudinal axis of symmetry. In the other two cases, the tower and the horizontal segment are displaced but still connected to the lines of the primary structural skeleton. In the case of the Shtip Archive, the axials of the two bodies connect at right angles. In the case of the Ohrid Archive, the axials of the two bodies are connected diagonally at an angle of 45º.

The elements from which the buildings are aggregated are in themselves a complex form. Thus, the overall configuration of the archives can be reduced to the essential substances, square, cross, octagon, and rectangle.

Fig. 9: Archives: Decomposition of the basic elements and their distribution according to their structural skeletons.

Fig. 10: Archives: Decomposition of elements into their basic figures.

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However, such a reduction to the primary geometric forms is reinforced by their materiality, with the uniform material, the natural concrete (la beton brut), and the processing method, which produces a texture of grooves on the surface. In that way, the objects are perceived as fragments of timeless archetypal compositions, as a deconstruction towards the basic elements of the once integral body. In a similar way is processing of the material, the breaking of the ribs, in order to open visually and tactilely touch the aggregate of the composition of the concrete.

The post-earthquake period witnesses the dismemberment of the body of the once integral architectural objects. We saw the ruins of the city's most representative and monumental works, the Officer's House, the Bank, the Railway Station and many others. But if even the most representative architectural artefacts cannot provide the reference level of architecture, how can it be achieved? Searching for the essential, for the elementary as a resistant form, brings us back to the dismemberment of the once integral body and the possibility of its reassembly. The images of the works from the brutalist phase of Konstantinovski are ambivalent; they bear witness to the breakdown of the body into elementary forms, but at the same time, they generate new possible compositions on that archetypal level with the elementary material, natural concrete.

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Bolzano's war damage and reconstruction

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Abstract

Ruins of public and private buildings, destroyed factories, residential buildings reduced to piles of rubble, squares littered with materials, roads, airport bridges destroyed, barracks, civilians and military personnel under the rubble: these are images that the television brings back violently to our minds and fills us with despair. For the Community, these are images we have seen in 1919, in 1945 and many times since.
Images that bring the destruction to our minds and immediately highlight and suggest the difficulties and struggles of the subsequent reconstruction of a healthy economy and places and spaces to live. Starting from the devastated landscapes of the war, it seemed interesting to trace the reconstruction phase of Bolzano after the Second World War.
Bolzano is a small town in the Alps, founded in 1024 by the prince-Bishops of Trento. Throughout the millennia of its existence, it has undergone progressive growth and several wars have damaged its layout and buildings.
The extensive damage to the original centre of the city because of the bombing during the Second World War has gradually been under repair. Today, almost a hundred years later, the problems of reconstruction are still evident in the image and structure of the city.

Keywords: reconstruction, cultural heritage, cultural memory, recycling

1. Introduction

War has a devastating impact on cities and territories, erasing centuries of history and cultural heritage in a short time. The images of conflicts broadcast by the media show us the level of destruction and human suffering. We realise that peace and stability are fragile achievements that require commitment and mutual respect, and that the heritage of a people can be wiped out in an instant. It is important to preserve the memory of what has been, in order not to forget the horrors of war and to build a future of peace and solidarity.
We often tend to forget it too easily, but in the last century Europe has been the scene of several wars and tragedies; the signs are visible and perhaps can never be erased again. The ruins of buildings have been removed, but in the urban systems and architectures of our cities, discontinuities emerge, bringing out parts of cities or individual disconnected architectures that will never be part of the culture of the place. More and more often it is said that it is important not to forget the past and that we must learn from the mistakes of the past in order to build a better and more peaceful future, and therefore territories, cities and better buildings that are coherently integrated with each other. In this perspective, collective memory becomes a fundamental resource for building the future.
The redefinition of a war-torn landscape has always been a complex challenge, involving cultural, sociological and economic parameters. An interesting example of this process is the reconstruction of Bolzano after the Second World War. During this critical period, the city

faced challenges to restore life and prosperity to a severely damaged urban fabric. The reconstruction was not limited to the repair of physical damage, but also involved the social and economic redevelopment of the local community. The rebirth of Bolzano required coordinated efforts, a strategic vision and a constant commitment from leaders, citizens and institutions in order to build a better future for the city and for future generations.

2.   Bolzano and the reconstruction of the city

Bolzano, a small Alpine city, has an ancient history, having been founded in 1024 by the prince-bishops of Trento (Fig. 1). Over the centuries, the merchant village has experienced constant growth, but being placed on a fundamental communication route between Italy and northern Europe has been the site of several wars that have caused damage to buildings and urban planning.

Its unique geographical position and the succession of historical events have, therefore, shaped the appearance of Bolzano, preserving the traces of its past, reflecting its multicultural identity.

Fig. 1: View of Bolzano in 1649 (Merian). This view shows the area described in the rebuilding plan.

Bolzano, since the early years of the twentieth century, is the union of three municipalities (Bolzano, Gries and Zwölfmalgreien) [1]. The city is therefore the sum of three different entities: Bolzano, the city of commerce; Gries, the agricultural city, later transformed into Kurort; and Zwölfmalgreien, the agricultural-artisan, and therefore industrial, city. Bolzano was a city first conceived with undesigned plans and then from the second half of the nineteenth century with plans by regulators. The tender for the general regulatory plan of Bolzano, called in 1929, represented an extremely important moment of analysis and design synthesis, which provided a series of proposals to develop a city that, in the objectives of the regime, had to reach 100,000 inhabitants. Bolzano was a city studied and planned by the academic Marcello Piacentini (1934), who had been asked to create a great city where cultural, economic, and architectural Italianness were emphasised. The war damage of the Second World War was mainly concentrated in the original centre of Bolzano (southern part), where there were important infrastructures, bridges, a railway station, and a gas workshop) and in the large industrial area, where large factories had been built between the world wars (Montecatini, Falk, Saffa, etc.).

Within a few decades, Bolzano became a modern city; during the Second World War the city was subjected to 13 bombings, the first on 2 September 1943 and the last on 28 February 1945 (fig.2). At the end of the war (5 May 1945), 34% of the city's buildings had been destroyed or damaged [2], with some areas located south of the original centre of Bolzano (railway station, bridge, gas plant, theatre fig. 3, etc.) where more than 70% of the buildings were damaged. The map (fig. 2) of the entire municipal surface showed the level of damage suffered by the buildings (unusable, to be rebuilt, severely damaged -15%, slightly damaged - 39%).

In the South Tyrolean capital, since 1945, the population began to grow due to the wave of migration from other provinces (from Friuli-Venezia Giulia) and from countries such as Libya. The De Gasperi-Gruber agreement and the law on options also favoured the return to the province of numerous people who, during the fascist period, had chosen to move to Germany or Austria. The demographic increase brought the shortage of housing back to the fore. New residents found work but not housing, so the construction of new residential buildings became a priority for Bolzano.

Fig. 2: Reconstruction plan table showing buildings to be demolished and rebuilt. (ASCBZ TAV_H_1_1950).

The reconstruction of Bolzano, as in many other Italian cities, was carried out based on Legislative Decree No. 154 of 1 March 1945 "Rules for the reconstruction plans of the houses damaged by the war". This new urban planning tool, not provided for by the urban planning law 1150 of 1942, was actually a detailed plan, based on a few graphic drawings (based on cadastral cartography), an illustrative report and a brief compendium of building regulations. After approval at the municipal, regional, and national levels (Ministry of Public Works), it was possible to proceed with the expropriations and the reconstruction.

Fig. 3: Teatro Verdi: destroyed in the bombing (ASCBZ 1945F45), remembered today (Maria Paola Gatti)

Before the approval of this plan, the availability of Italian and foreign state funding began the reconstruction of buildings damaged by war damage.

The city of Bolzano [3] was able to benefit from large amounts of funding for the reconstruction, obtained from the Ministry of Public Works, Unrracasa, the Tupini law, the Aldisio law, the Fanfani law and others. In addition, Bolzano was included in the European Recovery Programme (ERP), receiving substantial economic contributions from this source as well.

In the summer of 1946, the municipal council commissioned the architect Erich Pattis to draw up the plan for the reconstruction of the areas of the city that had suffered total or partial damage. To ensure the necessary integration between the reconstruction plan and the studies carried out by the municipal technical office, the architect Guido Pellizzari was then appointed as a consultant. From August of the same year, the two professionals began to jointly produce the drawings. Through this tool [4], we tried to rebuild the city, but also to solve some urban problems, such as ensuring more streamlined and modern accessibility to the original centre.

The plan [5] had to be drawn up with the aim of respecting the spatial morphologies, volumetrics, and language of local architecture as much as possible. Despite the times, cultural memory became a structuring element that had to be necessarily adopted. In Bolzano's particular situation, this objective assumed an important role for the community.

The reconstruction plan provided for the reconstruction of different areas of the city. Here we show the one relating to the southern portion of the original centre of Bolzano, the one in which the railway was located, and which had suffered the most significant damage.

For this sector, rectification and expansion of the roads were envisaged, the layout of the main south entrance was planned, and the alignments and volumes of the buildings were defined. Within the sector, squares and large public green areas were defined. The blocks were delimited by linear buildings for residential and commercial use aligned with the main roads. Office buildings, the theatre and the suburban and urban bus station have also been planned.

Consequently, local technicians (Armando Ronca, Guido Pellizzari, Alois Plattner, Erich Pattis, etc.) designed the private and public buildings of the historical centre of Bolzano (fig. 4,5).

For new buildings, despite the clear objective of the urban plan, neither the traditional architectural language of the porticoed road was adopted, nor that of the historicism of Munich that characterised the buildings built before the First World War, nor the monumental approach typical of the representative architectures of the Fascist regime. In a subtle way, the rationalist grammar that had been adopted in the period between the two wars to create the functional buildings intended to serve modern society has been reinterpreted for the new buildings.

The buildings in this sector consequently adopted simple and repetitive styles, sometimes using modules produced in the workshop, arriving at the industrialization of the traditional building process, from design to construction, through the construction of several similar

buildings with the domino technique, combining identical elements in different ways to constantly generate new structures.

There are numerous examples of architecture of high architectural and technological quality in this sector: the service station of the company Adriatica Petroli, the residential building in Piazza Verdi 12 or the tower house in Piazza Sernesi, as well as the residential buildings of Armando Ronca in Via Alto Adige and Via Marconi.

The service station [6] was designed by the architects Plattner, Pellizzari & Gubiani in 1952, respecting the stability alignments from the construction plan and paying particular attention to both the planimetric and the altimetric solution; in fact, its shape aimed to connect the two axes on the one hand and express modernity on the other.
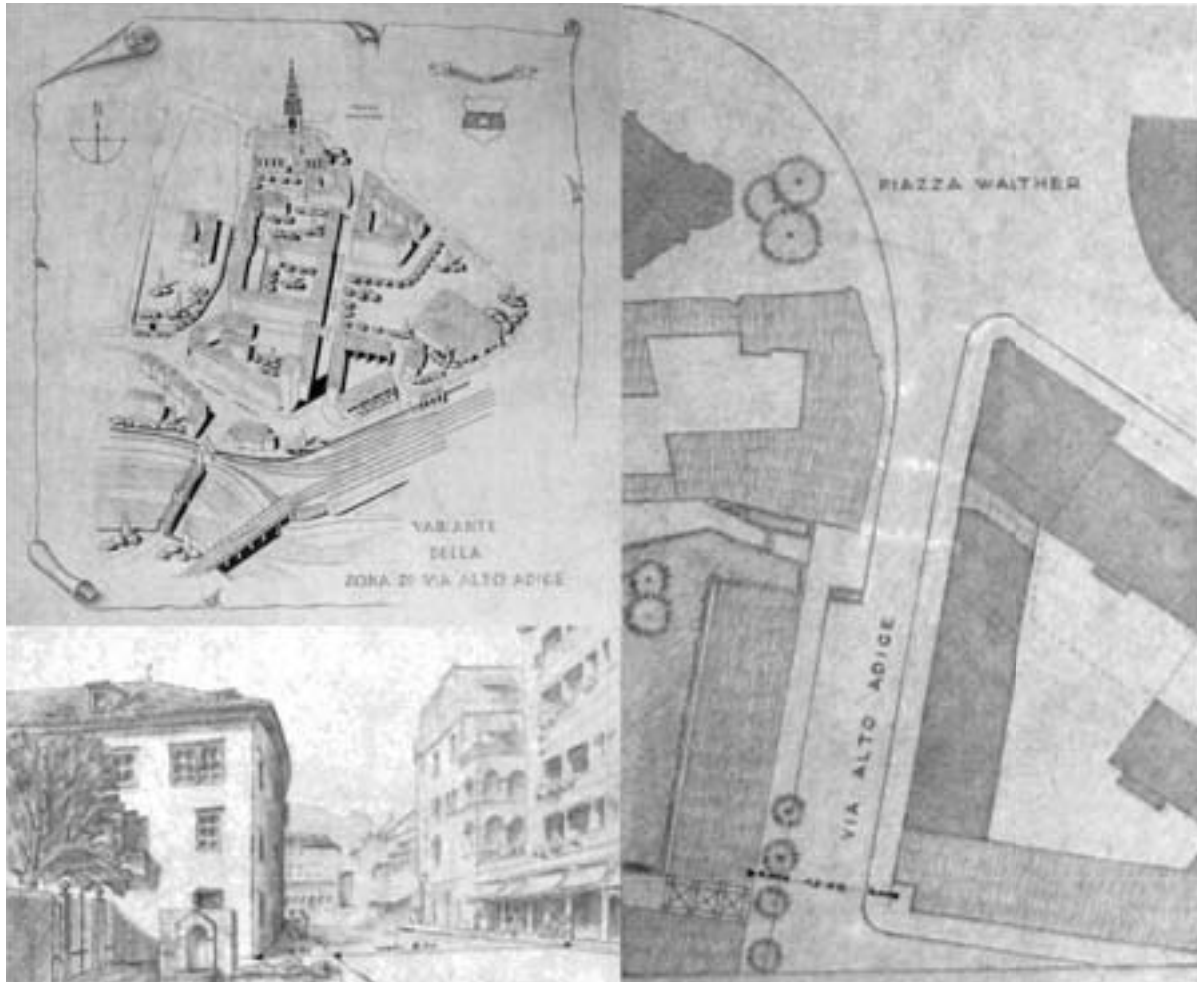
Fig. 4: Plan for the reconstruction of Bolzano, Tav H3, 1953 (ASCBZ TAV_H_3_1953)

The buildings along Via Alto Adige and Via Marconi are also interesting: many of them were designed by the engineer Armando Ronca [7] together with other local professionals (the Alpi hotel was built in 1956 together with the architect Marchi (fig. 6), and the Perathoner complex, 1953–55, with the engineer Sale).

Fig. 5: December 1956: the emptiness of the Via Alto Adige (ASCBZ 1956F5

These buildings, like the contemporary buildings in Via Marconi, represent high-quality results of the experiments begun between the two wars in the field of residential construction, from a planimetric, altimetric and technological point of view. In these works, the professional was able to combine the commercial and residential functions, using the reinforced concrete framed structure to define flexible spaces according to the needs of the users. At a formal level, the engineer adopted a rigorous modular mesh, determining alternations of fills and voids that have distinguished his constructions. The innovative language of the facades was inspired by classical principles, with a base that was often hollowed out to highlight the pillar structure, a noble floor with several floors that are always identical and a crowning, often resolved with a linear solution.
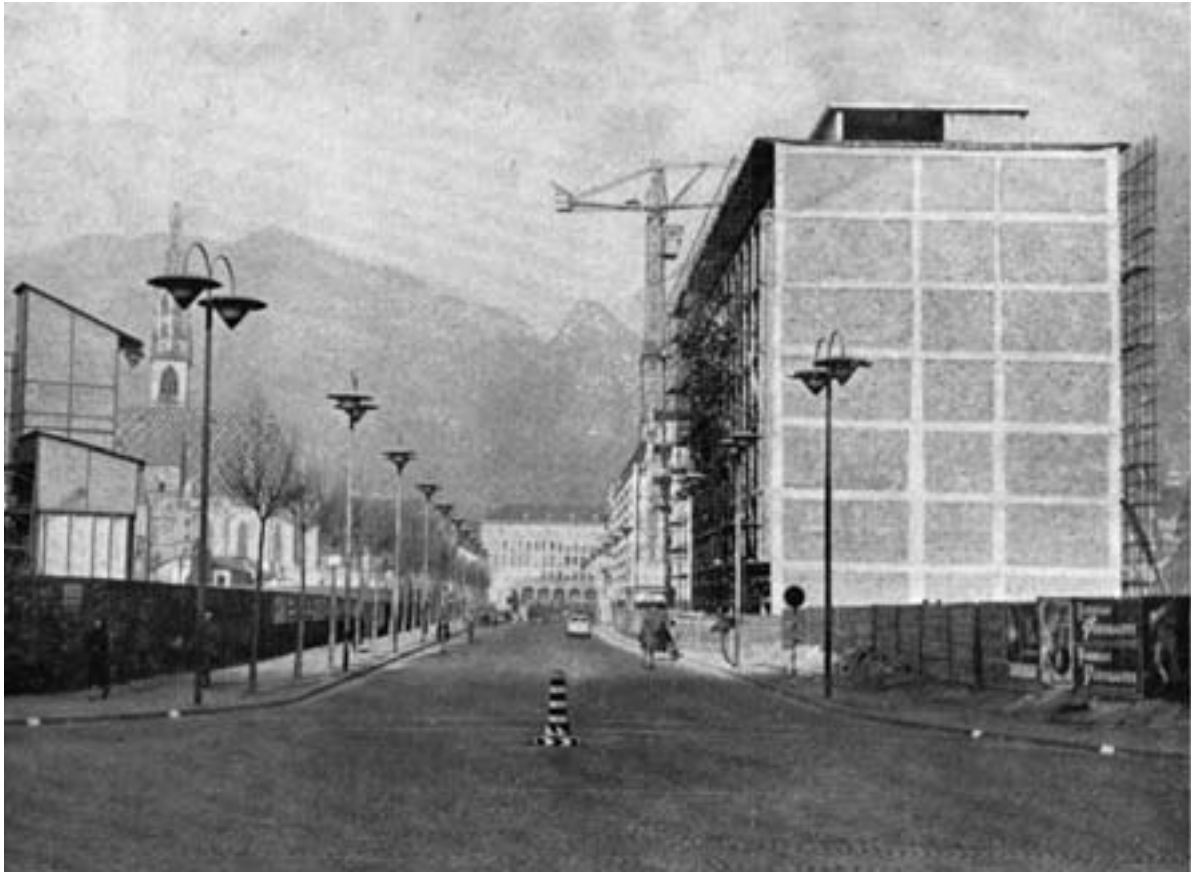
Fig. 6: December 1956: Hotel Alpi built in Via Alto Adige (ASCBZ [2]).

Ronca has used a minimal language for his buildings: he has been able to make his buildings special through openings of different shapes, protruding balconies and sunshades, maintaining a perfect harmony of proportions. As a designer, he has proven to be a careful observer of the European architectural landscape, using the formal grammars adopted by architects such as Le Corbusier, Albini and Terragni.

Bolzano experienced a rapid reconstruction within a few years, with some buildings repaired and others built from scratch. However, the compendium to the south of the original centre of Bolzano has never found a definitive configuration. In the last decade of the last century, the theatre (designed by Marco Zanuso in 1999 [8]), the chamber of commerce and other buildings that have occupied the still empty lots were built. The new buildings, often characterised by glass volumes, ended up determining a fusion between modernity and the existing buildings, the latter also becoming a prospect of the new (fig. 7).

The story of this sector then continued: in 2014, the Municipality approved the Urban Redevelopment Plan (URP) of the sector between Via Alto Adige, Perathoner, Viale Stazione and Via Garibaldi [9].

In 2019, the demolition of several buildings built during the post-war reconstruction began (the Alpi hotel, residential buildings, the bus station, etc.); the architectural project was drawn up and construction of buildings and road infrastructure began.

The construction site for the construction of the new buildings and for the layout of the road infrastructures then begun.

As can be read in the local press, this intervention aims to redevelop and enhance "...an entire run-down district... through the construction of a multifunctional and modern building, as well as the implementation of an innovative transport concept, and squares and parks in the centre of Bolzano....".

Fig. 7: The rebuilding of the town (Maria Paola Gatti)

The Waterpark (fig. 8) sector is expected to give " ... a well-kept, contemporary, and positive appearance and will create new apartments and high-quality office spaces in the central area. The building will also house a city hotel, a shopping centre with a range of shops and restaurants, as well as an innovative system of parking for cars and bicycles.

The quality green spaces will further enhance the district and offer visitors the opportunity to relax outdoors.". The new compendium aims to become "... a catalyst for the development of the historical centre of Bolzano and is also the first step towards the development of the "New Bolzano" ... ".

Fig. 8: Demolishing in the 21st century and densifying the city (https://www.bergmeister.eu/it/project)

3.   Conclusion

The reconstruction of a city after a war must be based on collective memory, i.e. shared by several people who select and reorganise memories [10] in different ways to incorporate them into the design of the new. Decisions must be made according to defined methodologies, but it is also essential to pay attention to and listen to each material testimony, considering its uniqueness.

From the point of view of memory, there is a need for a process of reconstruction based above all on the repair, recovery and restoration of what has been preserved from the devastating acts of war, even in terms of the urban footprint alone (squares, street layouts, types of housing, etc.), avoiding approaches of complete demolition and reconstruction that could lead to the definitive loss of the identifying elements of these "sites of memory".

War, but also catastrophic natural events such as earthquakes or fires, interrupt the "relationship between idea and matter, that is, the state in which the constant equation between the two tensions is annulled: where extreme decay manifests itself as a final state that no longer communicates anything". How can we intervene? Can we work as we did in Bolzano? Are the methods developed for Bolzano still viable?

The conceptual evolution that has taken place in recent decades has led to the definition of several operational strategies: from philological reintegration, based on the repeated use of a traditional linguistic code, to the practice of critically restrained design. It is important to consider the expressive qualities of the pre-existence, to listen to the suggestions through a careful reading of its material-formal data and to insert oneself in tune with it, also in consideration of the consolidated concept of "minimal intervention".

The intervention to reintegrate the fragmented historical fabric must respect the balances achieved by the architecture over the centuries, using a distinctive language that is coherent and integrated with the existing context, also paying attention to the volumes. The aim is to ensure that the new is always in the background, without compromising the figurative unity of the entire structure. The reconstruction must enhance the historical documentation and preserve the memory of the temporal layers that make up the site. An intervention based on careful historical analysis, even if it involves partial reconstructions, in no way diminishes the historical significance of the architecture. Maintaining the link with the past is essential to preserve the identity and beauty of the site through targeted and respectful restoration interventions.

A reflection on reconstruction as an opportunity for rebirth can be made starting from the example of Bolzano, a city that has been able to "re-emerge" after the damage of the Second World War. The city, afflicted by the presence of rubble and a complex political and cultural situation, has found the basis for rebirth in a basic planning tool, such as the reconstruction plan, and adequate funding.

In addition to these tools, the cultural memory of designers and citizens has allowed Bolzano to redefine the urban fabric, introducing new architectures that, although adopting radically different forms from the existing ones, have managed to integrate harmoniously.

The planners have managed to achieve this result as they have studied the place in all its parts and have used this knowledge to build the new one. As Nietzsche wrote, history can be useful, as knowledge of past eras can be used to guide present action.

On the other hand, not understanding the existing era and its history can lead to proposing interventions such as that of the Waltherpark, which instead of "redeveloping and enhancing an entire run-down district", can lead to a further downgrading, since the globalizing architectural and plant principles may not always be sustainable in cultural terms and beyond.

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Toxic heritage. Orphan sites

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Abstract

Industrial pollution has left a legacy of many abandoned heritages and toxic residues. In Italy, the areas to be reclaimed cover over one hundred thousand hectares of land. They represent a health risk, an environmental threat, a space of forced oblivion for communities and landscapes. Added to the areas officially recognized in reclamation plans are the so-called orphan sites, one of the most problematic legacies of the logic of the linear economy, for which the person responsible for the pollution cannot be identified.

When activated, remediation is usually seen as a stand-alone phase in the life cycle of a site, isolated from the before and after, with technical and regulatory autonomy. It stands between the time of productive use and the eventual time of new use. The third time of remediation is mostly a transition governed by health, environmental, chemical, and physical parameters, where the future is often irrelevant, as the past becomes irrelevant in subsequent use.

By integrating the modes of architecture project through landscape, the construction of the necessary artificials blue-green field can interpret wildness and take on the naturalization and adaptive reuse of heritages as regenerative tools of space over time. The pollution of environmental matrices, the insubstantiality of polluters, the marginality of contexts, and the sustainability associated with reclamation processes make orphan sites a field of research particularly available for experimentation with new practices of regeneration architecture design in toxic time-spaces. It is about activating long cycles, projects-processes of compensation and reactivation of heritages and landscapes in regeneration.

Keywords: Architecture, Heritage, Landscape, Orphan Site, Toxic

1. More than human

More-than-human nature cultivates paradoxes that challenge the meaning of phenomena and question us about the emergency conditions caused by our way of inhabiting the Earth. Think of humanity, which has always imagined itself at the center of stellar formations [1]. With the advent of manned spaceflight, space toxicology promises to protect humanity in the hopefully virgin, pristine, healthy new Earths. But this promise reminds us of the only planet we still have and the huge problem of the "toxic commons" era [2]. Since the mid-18th century, the excessive extraction, production, and disposal practices necessary to sustain the perpetual growth of the modern project, particularly the West, along with the exponential use of synthetics in all areas of life [3], have made contamination and pollution the "building blocks of modernity" [4].

We inhabit a new chemistry of life made up of potentially toxic molecular relationships [5] that rewrite the interweaving of nature and artifice. In 1966, Mary Douglas [6] helped develop the understanding of toxic substances and provided the conceptual basis for research on waste, pollution, and ecology. Subsequent studies trace chemicals, molecules, materials, presences, and events associated with toxic substances. It is the construction of the toolkit underlying

contemporary questions about toxic legacy, present and potential future [7]. Theories of dilution, thresholds, and limits of toxicity to humans, air, water, and soil describe risks in terms of capacity, assuming that natural systems can withstand specific levels of harm. Toxic substances, produced artificially, connote brownfields [8], post-industrial landscapes [9], "drosscapes" and contaminated sites [10] and their bodies. It is a "new materialism" that goes "beyond the human" [11], transcends lifespan, connotes spaces, alters the rhythm of time, and interferes with the growth of bodies. Its heritage includes the history of substances, processes, and memories, between the physical and the metaphorical, between the perception of places as value and places as harm.

Toxicity is an anthropocentric concept, related to the way societies have begun to deal with an emergency that directly or indirectly involves humans. However, everything in nature is mixed, in space, in time, in bodies. Nothing can be cleanly separated; everything turns out to be interconnected. The concepts of time and space, which are simultaneously inscribed in human and more-than-human bodies and narratives, re-propose circular, rhythmic, seasonal temporal landscapes of long duration, which we thought surpassed by linear systems. It is the clash between progressive industrial time and the much slower processes of cellular formation or bioremediation, incremental, accretionary.

Toxic architectures and landscapes, with intersectional spatial temporality, retain structural damage and transfer it to bodies through the places themselves. Remediation is imperative, yet by itself it is not enough. Toxic damages go beyond individual sites, transcending physical and regulatory boundaries. Starting from this awareness is essential to attempt a search for meaning about the toxic heritages that encompass us. It means moving from viewing body burdens as isolated impacts to viewing them as interconnected relationships, of environments and societies, heritages, and memories, with the obvious repositionings of design and its attendant gazes [12]. This essay illustrates some the first outcomes of research exploring the tools of regenerative design at the intersection of toxic substances and heritage of architectures and landscapes [13].

2.   Orphan site

Industrial pollution has left a legacy of many abandoned sites and toxic residues. This is a health risk for exposed populations, a threat to the quality of water, soil and air, a space of enforced oblivion in the memory of communities and the history of territories.

In Europe in 2016, 1.38 million potentially polluted sites were identified, concentrated in 11 countries [14]. Once the presence of suspected polluting activities is confirmed, these sites are classified as "contaminated sites." It is estimated that out of a projected total of 2.8 million suspected polluted sites, at least 2 million will be identified once the national registers are completed. Management of historical contamination involves most of the sites in the national registers. Without specific European soil legislation, management of these sites is currently left to national initiatives. As of 2016, 115,000 contaminated sites have been remediated in the EU, corresponding to 8.3 percent of registered potentially contaminated sites. While remediation techniques are continuously improving, the gap between site remediation and land regeneration often results in a disconnect between technical solutions and projects that shows an emergence of soil culture [15].

In Italy, "areas to be reclaimed, poisoned by waste and pollution of all kinds, cover more than one hundred thousand hectares of land" [16]. The history of Italian land reclamation began in 1976 with the Seveso disaster. The 1982 Merli Law represents a first attempt at preventive action, but it focuses on air and water, neglecting soil. It was not until the 1990s that the remediation of contaminated land began to be addressed. In 1997, the Ronchi Decree organically regulated the remediation of polluted sites, obliging the polluter to act, and in 2006 the Consolidated Environmental Act brought together all the previous scattered regulations. The definition of a contaminated site depends on exceeding the Risk Threshold Concentrations (CSRs), determined through an analysis conducted according to the American Society for Testing and Materials (ASTM) Risk Based Corrective Action (RBCA) approach. Sites of National Interest (SIN) and Regional Sites of Interest (SIR) are contaminated areas that require remediation. Added to these officially recognized areas in remediation plans are so-called orphan sites, those where the polluter can no longer be identified and for which the European Union requires the creation of a public funding mechanism for remediation [17].

Fig. 1: The orphan site of Arghentaria, aerial photo (L. Zecchin, 2024).

Fig. 2: The orphan site of Arghentaria, laveria ruins (L. Zecchin, 2024).

Marginal, little known, even more fragile, orphan sites are one of the most problematic legacies of the logic of the linear economy. The PNRR (Piano Nazionale di Ripresa e Resilienza) recently focused attention on the approximately 270 recognized orphan sites in Italy. Investment in "orphan site remediation" aims to "recover the potentially contaminated soil of abandoned industrial areas for which the polluter cannot be identified," encouraging their regeneration and promoting the circular economy of territories [18].

3. PbS-Zn-Ag heritage

In Sardinia, the PNRR has recently identified 7 priority orphan sites for reclamation. These include the former zinc-lead-silver mines of Guzzurra-Arghentaria over an area of about 2.4 hectares. This is an obliterated fragment of Sardinia's ancient mining history, which with its important geomineral resources influenced the island's economy, society, and culture in the intertwining of dependence and exploitation [19]. Divestment affects the architectural heritage that has become landscape, subsoil, infrastructure, settlement, environmental, and social systems [20]. This phenomenon is quite different from that observed in the suburbs of established industrial cities, where divestment can become an opportunity for urban regeneration. The architectural and landscape value, the imposing size, the precariousness of ruined buildings, and constraints on reuse create a complex that is difficult to manage [21]. Added to the emerged heritage is a hidden dimension, the excavated mountains, subsidence phenomena, rising groundwater, and soil and water contamination. These are physicalities sustained by toxicities that freeze an ambiguous fascination [20]. The mine is a mythical place that holds collective memories and identities and, at the same time, is a document of a social history that cannot be forgotten. These manipulated, dramatic, dangerous, damaged places offer us meanings and imaginaries focused on the wounds of exploitation. It is an addiction to condemn, a heritage to preserve, a toxicity to regenerate. They are excesses with an uncertain fate [19], where abandonment is grafted onto marginality due to economic and social crises, environmental degradation, depopulation, and impoverishment of agricultural and pastoral activities. The reclamation of these sites must therefore be signified considering the fragility of inland areas.

The idea of the Parco Geominerario Ambientale Storico della Sardegna [22], in 2001 recognized by UNESCO, is slow to become operational. Reclamation proceeds slowly and with difficulty. In 2015, the Centro di Eccellenza Sostenibilità Ambientale is established, one of whose goals is to close the resource cycle applied to reclamation [21]. Recent European policies on the reevaluation of residual potential in mining basins have rekindled interest in processing waste deposits. Reclamation operations, particularly tailings washing, should therefore extract new value. Such a prospect would activate an economic chain related to the washing of abandoned tailings. However, these are lengthy, uncertain processes, and in the meantime, nature reappropriates toxic assets. This is what is also happening in Guzzurra-Arghentaria.

The Arghentaria underground mine was closed in the late 1920s, after galena had been extracted from the old open-air excavations dating back to Roman times since 1862. The site is located along the southern slope of Bruncu Sa Rezza, in a narrow valley that descends from the slopes of Monte Albo. Small accumulations of barren material located immediately downstream of the main tunnels and the presence of ruins, including laveria architecture along the watercourse, are visible on the slopes. The site contains 3 mining dumps covering an area of 4,929 square meters, with a volume of 9,858 cubic meters (Fig. 1, 2).

The Guzzurra underground mine lies on the slopes of Monte Albo, along two narrow valleys, dominated by the ruins of the old workers' village. By 1867 more than a thousand meters of galleries had already been excavated along the galena seams that also surfaced on the surface. In 1870 one of the first mechanical laveries in Sardinia was built here, the massive ruin of which remains. Abandoned in the late 1920s, unsuccessful attempts were made in the 1960s to resume operations without attention to environmental issues. The effects of mining are visible along the drainage lines, with accumulations of ore processing waste near the mechanical washery, tailings tracking materials, and unprotected tunnel embankments. The site contains 7 mining dumps and 2 sludge ponds, covering an area of 18,491 square meters, with a volume of 36,982 cubic meters (Fig. 3, 4, 5, 6).

Fig. 3: The orphan site of Guzzurra, aerial photo (L. Zecchin, 2024).

Fig. 4: The orphan site of Guzzurra, laveria ruins (L. Zecchin, 2024).

Fig. 5: The orphan site of Guzzurra, laveria ruins (L. Zecchin, 2024).

Fig. 6: The orphan site of Guzzurra, production facilities ruins (L. Zecchin, 2024).

In both cases, the contamination status classifies the site as potentially polluted with priority 1 [23]. Natural processes have initiated what humans have not yet done (Fig. 7, 8). Unstable ruins are expected to be reappropriated by plants and animals. And the attraction exerted on new communities of explorers and walkers and the few knowers of miners' tales, reappropriate some paths through wild development on abandonment. These are the weak operations that foreshadow a different usability of this heritage, signals that indicate the need to distance oneself, to probe a project based on conserved memory, on small pathways, decisive securing, hydraulic and arboreal machines for the reclamation of a landscape in regeneration. These are discrete, measured, processual compositional operations that can become significant project moves.

4. Regenerative reclamation

Exploring the intersection between toxic substances and the heritage of architectures and landscapes requires the use of tools that raise meanings. Assessing the methods of form to unravel toxic relationships calls for a compositional approach sibling to the ecological one [24]. Considering ecological processes of degradation, moisture, materiality, corporeity, and linking the history of forms to the history of society, politics, aesthetics, such composition ranges from objects to interferences, from micro-cells to macro-landscapes, from spaces to times.

When activated, reclamation is usually seen as a phase unto itself in the life cycle of a site. Isolated from the before and after, endowed with technical and regulatory autonomy that lies between the time of productive use and the time, if any, of new use. The third time of remediation is a transition governed by sanitary, environmental, chemical, and physical parameters, where the future is often as irrelevant as the past becomes in the next use. By integrating the modes of architectural design and through landscape, the construction of the necessary artificial "blue-green-fields" [25] can interpret wildness and assume renaturalization and adaptive reuse as regenerative tools of space over time, minimizing basic interventions to fruition, by successive parts, organizing reclamation as activators of long cycles, of projects-processes of compensation and reproduction of places in regeneration.

The pollution of environmental matrices, the inconsistency of polluters, the marginality of contexts, and the sustainability of remediation processes make orphan sites a field of research particularly amenable to experimentation with innovative project practices. This is a project that starts with discovery. The journey through places gathers what is still visible and what remains in collective memory. The purpose is to narrate to restore the logical, yet opaque, thickness of what is meant to last. These materials operate on multiple dimensions, because the toxic heritage remains inalienable to history, environment, landscape, community, within a project-process between unveiling and regeneration.

The Guzzurra-Arghentaria orphan site weaves relationships in space and time that are not easy to interpret. On the one hand, the vastness of the structures and the invisible waste require a rethinking of the design, knowledge, and interpretation toolkit. On the other hand, economic resources, and possibilities for reuse of the places crossed are limited. Starting from this discrepancy, the design of architecture across the landscape will have to focus on security measures, where new functions cannot be introduced, and on the preservation of ruins in artificial nature. It is a search for meaning that aims at discovery with a different accessibility. Micro paths, stops and services will have to emphasize risks and establish inaccessible areas. Partial reuse, consolidation and securing will be able to weld the ruins as witnesses of the past and denunciations of impacts. Landscape devices of hybrid machines for water and vegetation, of "lagunaggio" and phyto-purification, harvesting and washing systems will allow natural cycles to reabsorb contaminating soils [26], accepting the role of humans as observers and the mutability of landscapes as regeneration progresses.

This adaptive approach implies a cultural, technical, and procedural rethinking of reclamation to move beyond traditional sectoral practices, identifying reclamation itself as an indispensable layer of a more comprehensive ecologically oriented project, suggesting inductive and experiential perceptions to help set in motion credible regenerative reclamation.

Fig. 7: The orphan site of Guzzurra-Arghentaria, toxic heritage natures (L. Zecchin, 2024).

Fig. 8: The orphan site of Guzzurra-Arghentaria, toxic heritage natures (L. Zecchin, 2024).

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Motus sine fine

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Abstract
The theme of "waste" as a contemporary finding [Marini, 2010] has been, in recent years, the protagonist of the debate on sustainability. The recent indications of the fashion world on reuse refer to a practice already consolidated [Pilz, 1994] and that is, to date, one of the main objectives of the majors of the most important brands in the fashion industry. There is, therefore, a very close link between the need for fashion business and the world of design due to rethink the space of the show and use it as an opportunity for reflection on issues related to zero consumption and reuse. The theme of this research is therefore the fashion show as the final moment of a long and complex process attentive to sustainability issues. Many brands propose scenarios aimed at highlighting environmental problems and the repercussions that human actions have in creating critical issues, moving away from the objectives set by the 2030 Agenda. The case study focuses on two themes that are considered necessary to really discuss environmental issues such as unfinished architecture and the possibility of rethinking the location of the fashion show as a new condition of the fashion tale. Motus sine fine will be based on a sort of census of existing spaces, enhancing the condition of the unfinished as an aspect of beauty not totally expressed and on a concept of innovative fashion show. The project aims to use what is understood as ordinary and, better to say, ugly [Chesterthon, 1901], as set design for its expressive potential.

Keywords: upcycling, waste, unfinished, catwalk, experience

1.   The sense of the time
The present time describes to us a world that finds itself day by day battling with the theme of the residue, of what remains in all actions of production of goods for man. If for a long period the observation of the phenomenon of consumption understood as a generic action of production was experienced as an immutable condition by now, the awareness of the "ecological necessity" has involved all fields of production which, above all thanks to the control action of the UN and the European Union, they aim at a change of course relating to the way raw materials are consumed, set-ting themselves the goal of considering upcycling as the only possible action, above all for an ethic of sustainable consumption.
By now it is known that the fashion sector is one of the most polluting ones and fast fashion is certainly the area that has to face numerous problems to a greater extent also in the ethical

field - considering the working methods used by the major brands and the locations of the companies - [Niinimäki, K., Peters, G., Dahlbo, H. et al., (2020)]. This approach has involved the fashion sector through consciousness campaigns that have led the best-known fashion brands to totally change their action in the production process.

If, therefore, on the one hand the fashion brands have taken action by imagining sustainable materials and productions, on the other hand one of the events that continues to produce the greatest waste is precisely the one linked to the Fashion Show where set designs are an opportunity to design experimentation also with the signatures of important architects and designers but which inevitably present themselves as a new "consumer product" which will end its function as soon as the event has its conclusion. The reflection on the theme of the place of the fashion show set and their disposable function finds many similarities with one of the main topics related to the consumption and production of CO_2 on the planet which is represented by construction.

Through the Construction and Demolition Waste of 2018, the European Union established rules for the circular use of construction waste materials and each EU country then adopted its own guidelines which set the goal of zero demolition. The theme of the residual, abandoned, incomplete built has generated academic research that has brought to light a phenomenon that Alternazioni Video and Fosbury Architecture have declared in a Manifesto in the book Incompiuto. The birth of a style. The aim was to bring out all the unfinished works in the Italian territory and show them as a real monument, the "true Italian style". Starting from the condition of the present, this work proposes to work through an action that merges two recognized criticalities in the presence of forgotten architectures and the continuous production of set designs considering them as a new way of accumulating material that will then be destroyed. The research focuses on a series of abandoned places that may no longer be used or that have never completed their design process, islands scattered in the landscape that will have the task of containing a sustainable, modular and reproducible set design, aiming to standardize a process that has also turned into a collector of disposable elements.

2.   Little atlas of lost mysteries
2.1   IWalk system

The first action of the project lies in the choice of how the space can be the ideal set design for Motus Sine Fine. Within some structures that will be analysed later and that will serve as useful examples for the research, a system of moving walkways will be inserted in different ways and will describe a new system for discovering the body, as well as the dress.
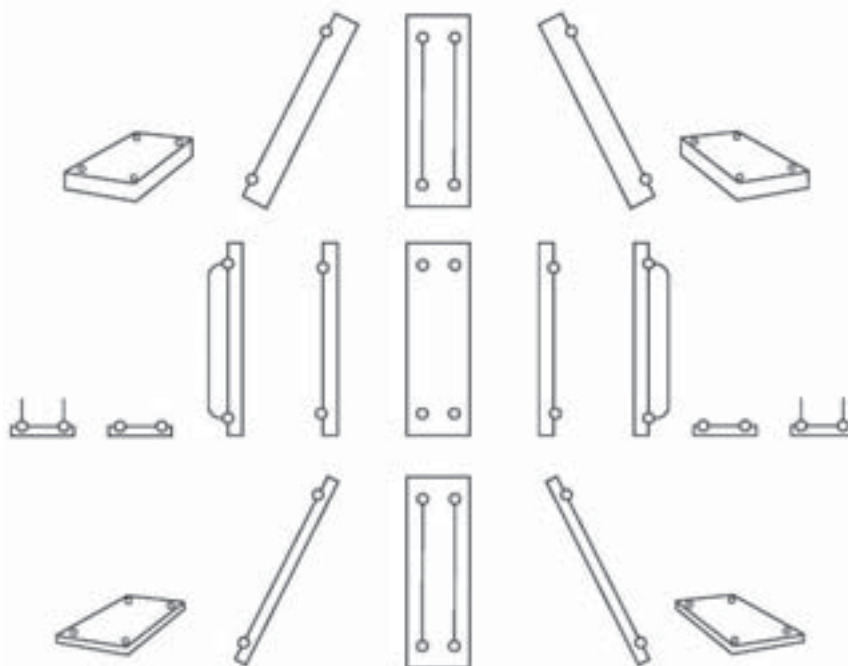
Fig. 1: Diagram of the Motus Sine Fine system

This is how we will be able to witness an idea in which during the fashion show it will not be the model who moves and continues towards the chosen path but the moving walkway that will lead her towards the Motus Sine Fine experience. The present modality starts from the analysis of the system engineered by the TKE company which has included among its design products of the IWalk company, a modular system which, not requiring excavation, is easily trans-portable and allows for the construction of "site specific" scenarios always different.

2.2   The Spheristerium in Naples

A rectangular plan for games that had the sphere as the protagonist is transformed into the casket that contains the first experimentation of the "Motus Sine Fine" system. In Naples it was built in the 1950s and was dedicated to the game of pelota or tambourine [Tortorelli, 1991]. Monumental architecture, completely in tuff with a marble base, today it appears as a beautiful relic in its devastation that abandonment has given it. We observe the framework, the determined geometry and the beautiful bas-reliefs that recall the sporting activity that was practiced. A building seventy meters long and thirty wide and multiple cuts of vertical light where today nature is clearly taking over from anthropic, now left as a trace in the landscape. The spheristerium can be considered a place that seeks its identity through an enhancement that allows it not to distort the charm of abandonment but which itself becomes the scenario from which to start.
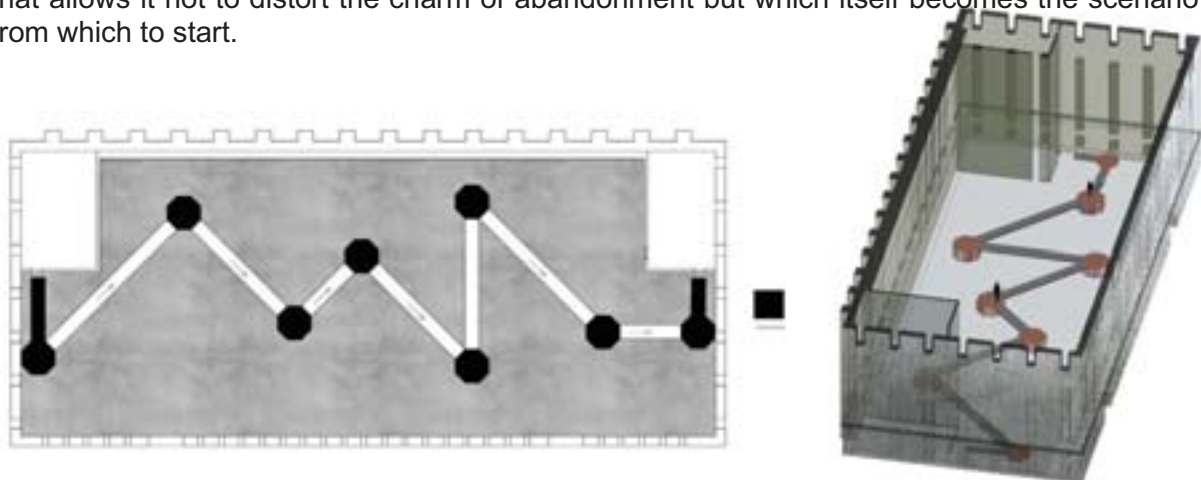
Fig. 2: Plan diagram of the Motus Sine Fine system on Sferisterium. The Axonometric view showing one of the possible combinations.

2.3   The abandoned sheds of the Northeast – Italy

Here all that remains is to wrap oneself around the landscape/turn one's back here [Zanzotto, 1951], wrote Andrea Zanzotto in his poem by now. The interest in the strength of the image of the Veneto landscape by the poet from Pieve di Soligo per-meates all his texts which, over the years, have described that ever-changing landscape and its nostalgia for what it had been. The 12% of industrial buildings that told of a productive and fertile land are now the mirror of the failure of industrial and social policies. In this framework that appears only disparaging of a given condition, Motus Sine Fine proposes to use the spaces of the sheds as a contemporary archeology, a small secret place in which to immerse oneself in the luxuriant and productive nature and in the one that has taken possession of the abandoned places.
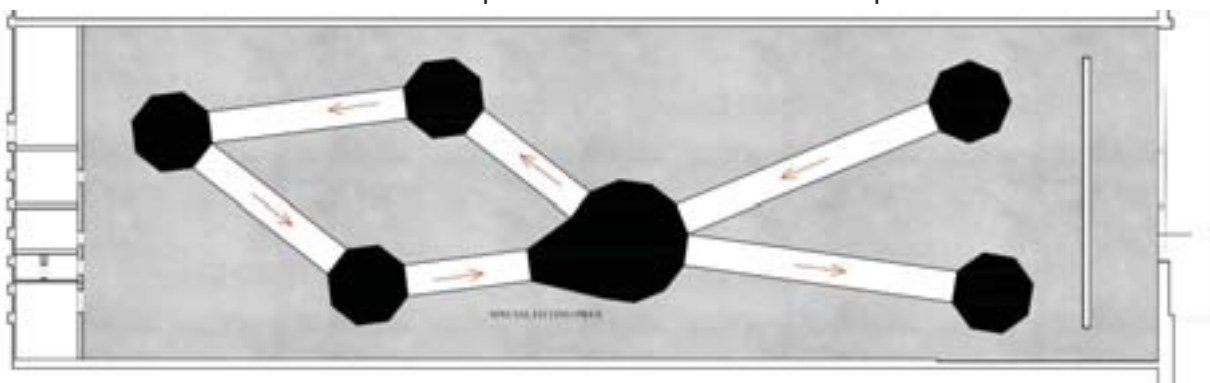
Fig. 3: Plan diagram of the Motus Sine Fine system on abandoned sheds
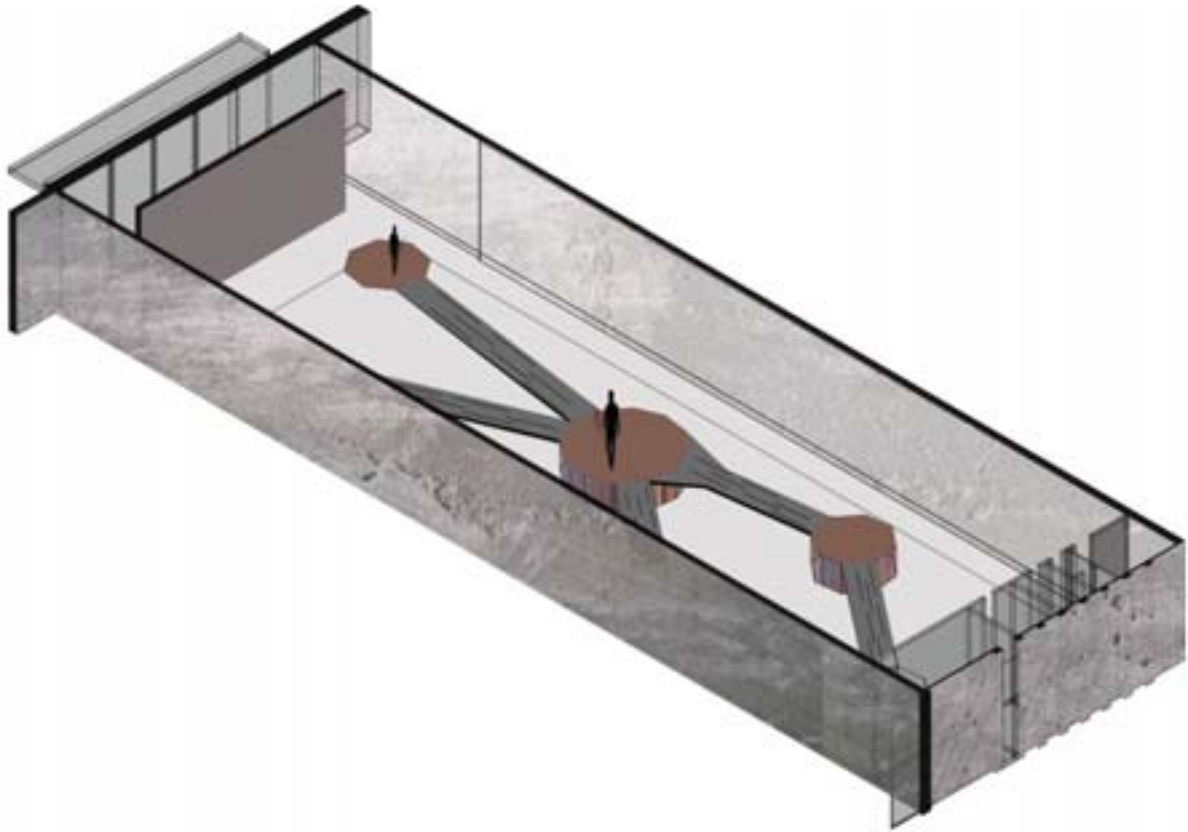
Fig. 4: Axonometric showing one of the possible combinations of the Motus Sine Fine system on abandoned sheds.

2.4   The swimming pool of Giarre

In the Sicilian hinterland there are countless unfinished public buildings that have not completed their design process [AA. VV., 2019]. Bureaucracy rigged tenders or "simple" illegality have made the unfinished buildings a symbol of decay but also a fascinating scenario in which to imagine a second life that enhances the Motus Sine Fine even more strongly. The project is part of the degree thesis of the student Mariapia Traetta who, starting from the choice of using an abandoned place, transforms the Giarre swimming pool from a place of abandonment into a creative and imaginative space. Through the IWalk system, she uses the
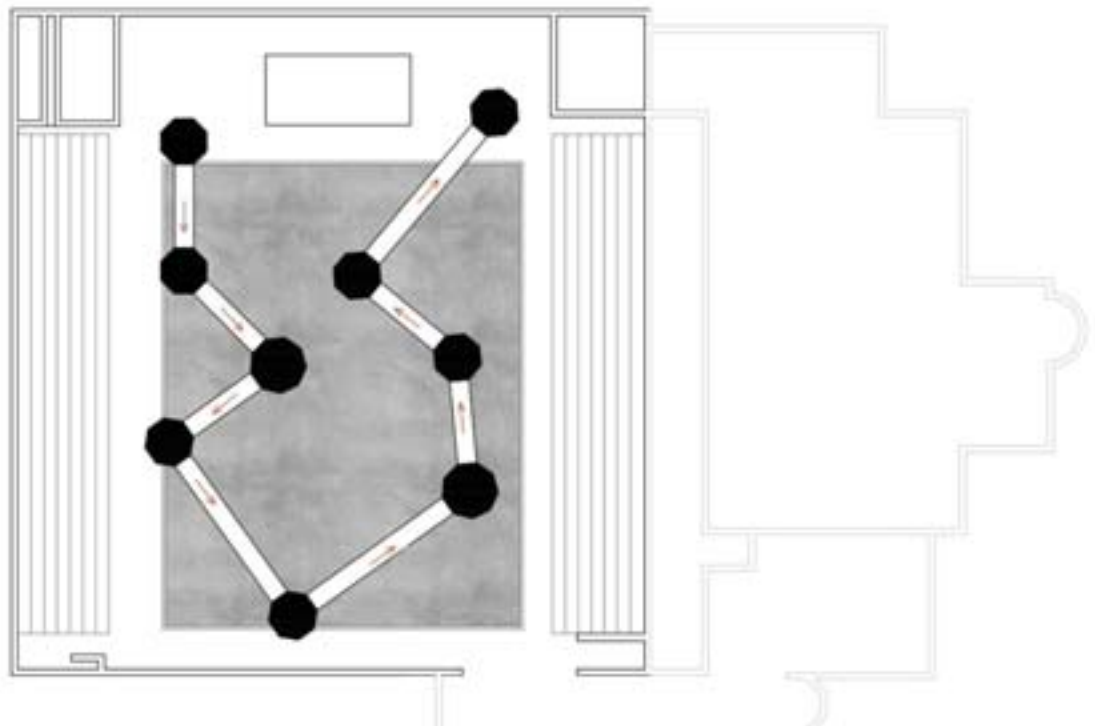
Fig. 5: Plan diagram of the Motus Sine Fine system in the swimming pull of Giarre – Scheme 1

space of the swimming pool as the basis of the fashion show process by inserting the carpets interspersed with "stations" of different shapes and recycled materials that allow the fashion show to be a performative place.
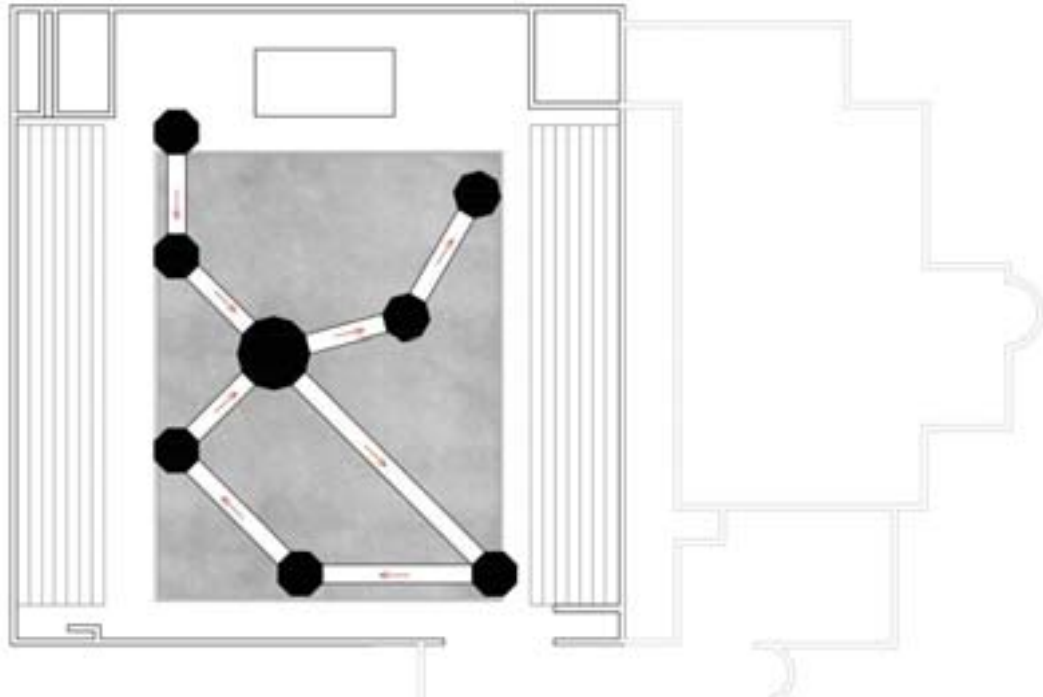
Fig. 6: Plan diagram of the Motus Sine Fine system in the swimming pull of Giarre – Scheme 2

Fig. 7: Axonometric showing one of the possible combinations of the Motus Sine Fine system in the swimming poll of Giarre – Scheme 1

Fig. 8: Axonometric showing one of the possible combinations of the Motus Sine Fine system in the swimming poll of Giarre – Scheme 2

3.   Conclusion

The tale of drawings and signs of Motus Sine Fine proposes a mode of action in the space imagined to be reversible and modular, a system in which objects of elementary shapes can be composed on a cyclopean scale that bring us back to the action of infinite assembly. The cases analyzed are possible design strategies that are based on themes that can be summarized in objective 12 of the 2030 Agenda, in point 12.5 which underlines how by 2030 it is necessary to reduce the production of waste through prevention, reduction, recycling and reuse. The urgency to reinterpret even the most common actions cannot exclude what may appear to be a plus in terms of environmental impact as can be understood in the case of fashion shows but, as has been clear for some time now, production actions and then disposal of set de-signs have an impact on many sectors of production. The decision to introduce a system of modules with easily transportable and reusable catwalks enables each show to be unique precisely because of the flexibility of the system itself. Even the very action of the fashion show does not translate as a path in the conventional sense but as a performative action that allows the brand to translate their products into unusual scenarios. Furthermore, the decision to insert Motus Sine Fine in buildings that underline abandonment aims to focus attention on the need to rethink places considered as residues of anthropic action. The theme of zero demolition is closely linked to the need to re-read spaces which, without an innovative idea of reuse, rep-resent only a future pile of rubble which will only increase the problems relating to waste disposal, another element for which the legislative actions of the European communities have, for many years, established both a cultural and a social process.

Motus sine fine is an opportunity to make the space always new, unique, and sustain-able without losing the magic of the fashion show, an exercise in combining pieces of a giant order that can be used in unlimited compositions.
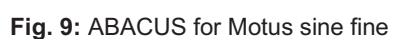
Fig. 9: ABACUS for Motus sine fine

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Cities in Emergency: Practices of Sustainable Urban Regeneration in Spain and the United Kingdom

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Abstract
The processes of metropolitanisation have triggered a complex urban crisis, characterised by the confluence of environmental demands linked to the climate crisis and deeply rooted socio-economic shortcomings. Within this framework, the new Leipzig Charter (2020) delineates three perspectives for sustainable urban development in cities facing emergencies, namely, "just", "green", and "productive".
In this context, the contribution, which is part of a broader research project (funded within the PNRR) of the PDTA Department at Sapienza University of Rome entitled "New rules, parameters, indicators, operational references of the urban plan for an eco-sustainable approach to urban regeneration" (PI Laura Ricci), aims to construct an interpretative framework of significant European best practices, at a local scale, adopting an ecological-environmental approach to urban regeneration.
Specifically, an analysis of the British and the Spanish contexts is proposed to highlight how the local planning of the analyzed territorial contexts supports such an ecological-environmental approach to urban regeneration, with the aim of delineating exportable guidelines capable of implementing, in subsequent phases of the research, Italian local planning tools within the triple perspective outlined by the new Leipzig Charter.

Keywords: Sustainable Urban Regeneration, Sustainable Urban Planning, Urban Resilience, Local Plan, climate change

1.   "Equitable", "green", and "productive" cities to address the environmental and socioeconomic challenges of the contemporary cities

The difference between the current urban crisis and the one that originated in the second half of the last century is the emergence of environmental concerns related to the climate crisis, which add to the socioeconomic issues. We are not witnessing two separate crises, social and

environmental, but rather a single socio-environmental crisis, which requires an integrated approach to urban complexity [1].

The importance of integrating socioeconomic and environmental needs is underscored by both the United Nations [2] and the European Union, which has long been implementing policies aimed at creating sustainable and inclusive urban communities, following the priorities of the *European Urban Agenda* [3]. Indeed, the *European Green Deal* aims to make the EU a zero-emission society by 2050, balancing environmental and social dimensions [4].

In this context, the *New Leipzig Charter* of 2020 [5] emphasizes the need for sustainable urban transformations, aimed at achieving three main goals:

- "Just" cities, which focus on social equity and reducing disparities;
- "Green" cities, oriented towards environmental sustainability and mitigating climate change;
- "Productive" cities, which foster economic growth and innovation.

The contribution, which is part of the research project (funded by PNRR) *"New rules, parameters, indicators, operational references of the urban plan for an eco-sustainable approach to urban regeneration"* (PI Laura Ricci),[1] aims to build an interpretative framework of sustainable urban regeneration practices – in European context – focusing on the local planning level, in order to highlight models, procedures, and virtuous tools useful for innovating, in future developments of the research, the local Urban Plan in the triple perspective outlined by the new Leipzig Charter.

2. Sustainable Urban Development: from Strategic to Regulatory Dimension

The document underlying this investigation is a 2022 report from the Italian Chamber of Deputies – Study Service Environment Department, in collaboration with the CRESME Research Institute, titled *"Urban Regeneration Policies: Perspectives and Potential Impacts"* [6]. This report provides a comprehensive overview of the legislation and policies on urban regeneration in Italy, with particular attention to the socioeconomic and environmental implications. It offers a detailed framework of existing regulatory measures, fiscal incentives, as well as regional and national urban regeneration policies, providing an exhaustive overview of current challenges and opportunities in the Italian urban context.

Although focused on the national context, the document also analyzes urban regeneration initiatives in the United Kingdom, Spain, France, and Germany to provide a comprehensive and diversified analysis of urban regeneration policies and practices in Europe, allowing for comparison of various experiences and strategies adopted by different countries.

Specifically, for the purposes of this research, it is interesting to understand how local planning tools in the United Kingdom and Spain (the French and German contexts will be analyzed in further research studies) support strategic initiatives aimed at sustainable urban regeneration from both environmental and socioeconomic perspectives.

Regarding the United Kingdom, the reception of the national initiative *"High Street regeneration"*[2] [7] at the urban level will be examined, along with the tools at the local planning level supporting its implementation. For this purpose, the case of London will be presented.

Regarding Spain, the reception of the guidelines outlined in Component 2 of the *"Recovery, Transformation, and Resilience Plan"* [8], specifically *"Housing Rehabilitation and Urban Regeneration Plan"*,[3] will be examined at the urban level. The tools supporting its implementation at the local planning level will also be investigated. For this purpose, the case of Madrid will be presented.

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[1] PNRR Project: ESC00000024 – Rome Technopole; Project Title: Flagship Project 2 "Energy Transition and Digital Transition in Urban Regeneration and Construction" (PI Fabrizio Tucci); Thematic Line 4: "New Rules, Parameters, Indicators, Operational References of the Urban Plan for an Eco-Sustainable Approach to Urban Regeneration" (Co-PI Laura Ricci).

[2] A long-term government plan to support the evolution and regeneration of main streets.

[3] It is the Component 2 of the *Plan de Recuperación, Transformación y Resiliencia* (equivalent to the Italian *Piano Nazionale di Ripresa e Resilienza* - PNRR) and promotes the enhancement of the building heritage.

2.1 Healthy Streets in London

The current local urban plan of London is the London Plan 2021 [9], structured into 12 chapters, each of which includes in-depth analyses and specific sectoral regulations referred to as "policies".

The local implementation of the "High Street Regeneration" initiative is found in Chapter 10 "Transport", under "Policy T2 Healthy Streets".

In the strategy description, it is explained how the London Plan 2021 supports the "Healthy Streets" program conceptualized by Lucy Saunders [10] with the aim of significantly increasing walking, cycling, and public transport journeys throughout London to make the city more accessible, inclusive, safe, and welcoming for all, as well as to limit CO_2 emissions.

The approach promoted by the Plan identifies 10 indicators to determine "healthy streets", each of which is classified based on three parameters: "Health", "Fairness", "Active travel" (Fig. 1).

Fig. 1: The ten indicators of the *Healthy Streets* Program: Pedestrians from all walks of life; Easy to cross; Shade and shelter; Places to stop and rest; Not too noisy; People choose to walk, cycle, and use public transport; People feel safe; Things to see and do; People feel relaxed; Clean air. Source: The London Plan (2021).

To make these indicators a concrete tool for urban regeneration, the plan adopts an interactive checklist, applicable to all urban contexts, called the "Healthy Streets Check for Designers". This checklist defines 31 specific and measurable sub-indicators, enabling comparison between the current situation of a street and the outcome that could be achieved following the implementation of the proposed design. Essentially, it is a method to pre-evaluate whether a design proposal can meet the criteria required by the Plan (Fig. 2). The methodology involves comparing the current state with the projected state, allowing for the evaluation of improvements made for each of the 10 indicators (Fig. 3).

Fig. 2: *Checklist for Designers*. Source: The London Plan (2021).

Fig. 3: Comparison of indicators before and after an urban regeneration intervention that has taken into account the checklist. Source: The London Plan (2021).

2.2 The Bosque Metropolitano of Madrid

The Municipal Administration of Madrid, in line with the goals of the *Spanish Urban Agenda* (2019), the *Madrid 360 Environmental Sustainability Strategy* (2019) [11], and within the framework of the financing of the *Plan de Recuperación, Transformación y Resiliencia* (2019) [8], has launched the *Bosque Metropolitano* ideas competition aimed at gathering contributions for the creation of a green infrastructure spanning over 75 kilometers in the city of Madrid. This infrastructure will contribute to the rebalancing of the city, the reduction of CO_2 emissions, the fight against climate change, the ecological and landscape restoration of degraded areas, and the increase in the availability of pedestrian and cycle paths, as well as benefiting the health of the population.

The ideas competition involved the articulation of five thematic areas (Fig. 4) – each with specific goals – located in green areas already identified in the current Local Urban Plan (1997) [12] (Fig. 5):

1. "Entre Montes Naturales" with the dual objective of connecting the El Pardo mountain with Valdelatas and Casa de Campo and ensuring the continuity of the Manzanares River axis;

2. "Uniendo Parques Urbanos" aiming to connect the system of metropolitan green spaces, Valdebebas, Fair, O'Donnell's Corner, Vicalvarada, Valdebernardo, and Cerro Almodóvar with the New Eastern Hub;
3. "El Anillo Verde Del Sureste" aiming to enhance the system of southeastern green spaces, from Cerro de la Herradura to Cantiles del Manzanares;
4. "Los Parques Fluviales Del Sur" aiming to connect the river systems of the Manzanares River and the La Gavia stream by integrating peripheral green spaces in Entrevías, La Atalayuela, Mercamadrid, and Butarque;
5. "El Anillo Metropolitano" aiming to integrate Casa de Campo into the southwest metropolitan system (Getafe, Leganés, Alcorcón).

The implementation of the project involved the definition of a *Plan Especial de Protección y Mejora de la Infraestructura Verde Bosque Metropolitano* [13] for each of the 5 themes, aligning the objectives of the *Bosque Metropolitano* with the existing urban planning provisions outlined by the Local Urban Plan.

The realization involves a dual scale of interventions:

- Metropolitan level, for which the five themes shaping the project have been defined;
- Urban level, through the definition of specific design actions contextualized within the five themes. Each action aims to achieve various goals, including improving air quality, mitigating the urban heat island effect, adapting the city to climate change, and preserving biodiversity.
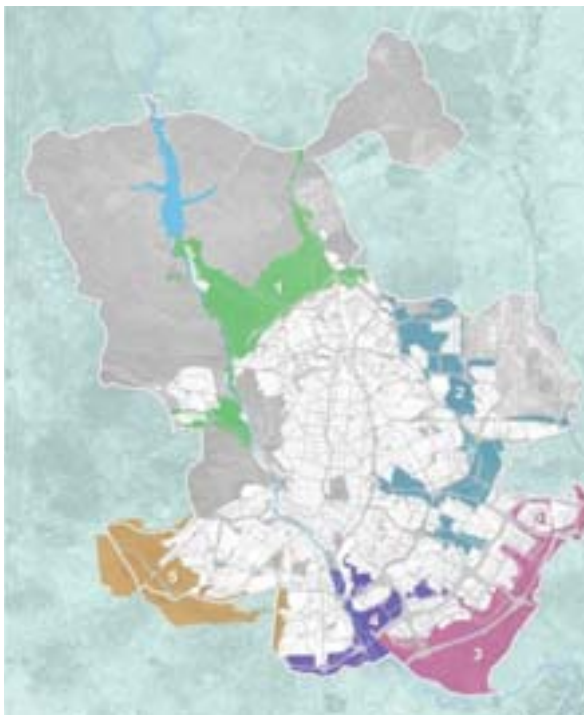
Fig. 4: Location of the five themes of the *Bosque Metropolitano* project. Source: Bosque Metropolitano, Área de Gobierno de Urbanismo, Medio Ambiente y Movilidad.
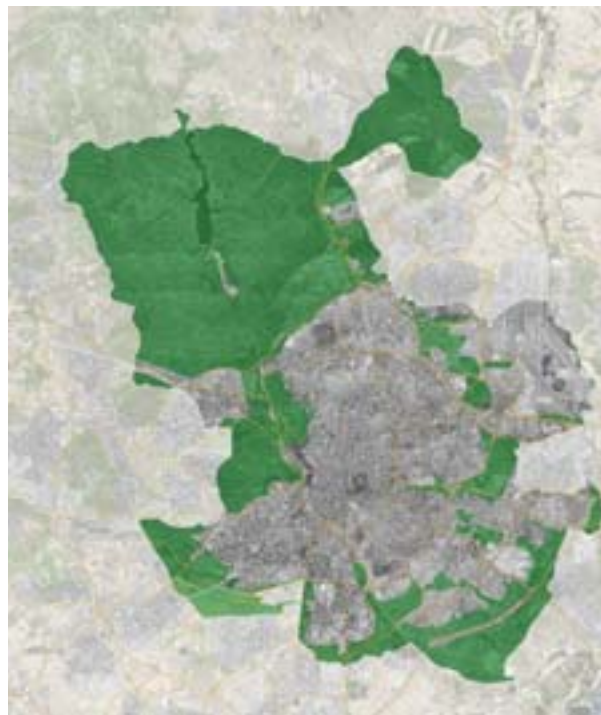
Fig. 5: Green areas already identified in the Madrid Urban Plan of 1997. Source: Plan General de Ordenacion Urbana de Madrid (1997).

3. Conclusions

The two case studies analyzed provide, on one hand, a framework for how it is possible to adapt national strategies of international or community derivation at the local level, and on the other hand, how these adaptations can be incorporated into local urban planning tools to ensure their implementation. In this regard, both programs find placement within the Local Urban Plan of the two cities analyzed, a tool that not only confirms itself as the most effective for managing long-term urban transformations, but also unifies individual projects, governing the urban and metropolitan dimension in a systemic perspective.

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Climate-proof urban regeneration and cultural heritage. The case of the "Saxa Rubra" Urban and Metropolitan Centrality in the Municipality of Rome

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Abstract

In order to contribute to the debate on the relationship between climate-proof urban regeneration and cultural heritage, the illustrated study tries to understand how the provision of new multi-scalar and integrated planning tools based on sustainable and resilient strategies can ensure high levels of urban and environmental quality, energy efficiency, and resource circularity, while counteracting the effects resulting from climate change and the degradation of historical, architectural, and identity heritage. Beginning with an analysis of the complex socio-political framework and some design and regulatory references that integrate a new model of an ecologically oriented city into planning, the contribution identifies climate-proof urban regeneration as the approach that can improve biodiversity, foster twin transitions, promote the recovery and reuse of common goods, and restore with natural solutions the quality of the environmental matrices air, water and soil. Through the application of an iterative and interscalar methodology to the Urban and Metropolitan Centrality "Saxa Rubra" falling within the Municipality of Rome and subject to the Urban Project procedure, the contribution proposes design strategies capable of building sustainable energy cycles, within scenarios of morphological reconfiguration of urban fabrics and public spaces. In this perspective it highlights potentials and limitations of the proposed experimentation related, both to the innovativeness of the design solutions and possible evolutionary lines, and to the lack of clear institutional governance that is limiting project implementation.

Keywords: Climate-proof urban regeneration, cultural heritage, resilience, urban project

1. Govern crises

The current political, socio-economic, health and environmental situation and exogenous *shocks* design a rapidly changing picture on the planet full of uncertainties and alarming prospects. "International crises" in addition to causing, destruction and death, are having strong repercussions on trade and the cost of energy goods. In recent years, the world's economy and the population have grown at a constant rate; climate-changing gases [1], the loss of biodiversity, land consumption, pollution-related diseases [2], and the degradation of cultural heritage and landscapes have increased. Environmental risks caused by *global* warming such as floods, deforestation, fires, heat waves, droughts, and melting glaciers [3] [4] [5] have increased.

This is a concomitance of conditions and events that call for «a comprehensive and revolutionary approach, where economic efficiency, sustainability, politics, profits, finance, and corporate social responsibility must be rethought» [6]. What is needed is a paradigm shift, an ambitious and coordinated action on the part of governments, businesses and citizens, of

individual and collective behaviour, to reverse the effects of the current crises [7], before «the window of opportunity to ensure a liveable and sustainable future for all» [8] closes for good. The many obstacles before us call for a unified, integrated and interscalar strategy of public governance [9] that assumes environmental regeneration and social and cultural enhancement as pivotal goals of contemporary city governance, capable of countering increasing inequality and spatial, social and cultural polarization [10], fostering resilience for future challenges [11]. Concrete and immediate responses are needed, centred on the transition to a climate-neutral and fair economy, based on the elimination of waste and inefficiency, on the decarbonisation of the energy system [12] [13], environmentally sustainable, free of toxic substances and completely circular by 2050 [14]. It is essential to place cultural heritage, in its broadest sense, at the centre of regeneration processes and one of the driving forces for experiencing European identity in all its diversity [15]. New cognitive and design approaches that, supported by innovative governance tools and funding channels [14] [16], are able to contribute to the regeneration of fragile or degraded contexts, enhancing their economic, social potential and cultural.

2. Cultural heritage as an engine of regeneration
Around the world, cities and territories guard an immense cultural heritage, material and immaterial, artificial and natural. Historical-monumental, architectural and archaeological heritage, historic centres, urban peripheries, marginal, abandoned and disused spaces [17], urban voids [18], practices, expressions, knowledge, and techniques, question us on how to enhance and reactivate them physically, socially, economically and culturally. In this context, reflection on the possibility of promoting innovative strategies that attribute to cultural heritage «an iconic and regenerative capacity [...] a determinant vector of urban form and sociality» [19], an educational tool capable of promoting social cohesion and identity formation, constitute today the most advanced fronts of experimentation and disciplinary debate. The focus on the role that cultural heritage can play in urban regeneration processes is a distinctive element and a powerful economic, social and cultural catalyst that can ensure inclusive and sustainable development [20].

An approach that, starting from the recognition of the historical-cultural identity defined by the dynamic iteration between individuals or groups and formed on common cultural values and belonging [21] and of the form as a cognitive and planning tool [22], is able to oppose the processes of removal of historical memory, to enhance the preservation and transmission of ethical, symbolic and cultural values, to express local development planning while preserving the recognisability of its constituent features.

The exploration of new models of urban regeneration, guided by a profound understanding of cultural heritage, promotes the reactivation of processes of collective re-appropriation of the commons, consolidates the morphological features of fabrics, protects and enhances historical-documentary emergencies and architectural landmarks [23], stimulates innovation and creativity, opposes the processes of gentrification and population loss of historic centres, and experiments with new identities and possible uses for the landscapes of decommissioning and waste.

3. Climate-proof urban regeneration
Within this framework, climate-proof urban regeneration explores innovative strategies and technologies to build more inclusive, sustainable and climate-resilient cities by integrating aspects of sustainability, energy efficiency, cultural and architectural heritage management. It implies the integration of multiple disciplinary fields, making theoretical-methodological and operational approaches interact [24], incorporating the most innovative digital technologies (Cloud computing, digital twin) that allow monitoring and optimising energy efficiency to verify the climate impact of different design solutions, at the building and neighbourhood scale.

An approach that requires a rethinking of the city and contemporary territories, of existing fabrics as well as of urban voids, to oppose the effects of climate change such as 'Urban Heat Island', extreme weather phenomena, sea level rise, water resource management and to achieve climate neutrality objectives in line with the European Green Deal [14].

Since the 1990s, the urgency of promoting sustainability and resilience has given impetus to the experimentation of new forms of intervention called 'eco-districts' [25] [26], designed to

increase energy efficiency, encourage resource recycling, minimise land consumption and individual transport, and respond to the challenges of climate change by creating the conditions for a reduction in the impacts of human activities on the environment. More recently, important European and American cities have promoted climate change adaptation projects to cope with floods, hurricanes and extreme weather events. Similarly, the integration into planning of 'green and blue infrastructure' (GFIs) [27], now present in numerous national and EU strategies or frameworks [28], as crucial components of climate-proof urban regeneration, can provide numerous Ecosystem services (Es) contributing to urban resilience and community well-being. In recent years, moreover, to respond to the effects of atmospheric pollution and the impoverishment of Es, in Italy, many cities have developed 'urban reforestation' projects [29] in order to increase the ecosystem functionality of the GFIs and improve the health and wellbeing of citizens, placing natural capital as a characterising element of the urban landscape. Thus, climate-proof urban regeneration integrates the latest approaches to building inclusive, sustainable and resilient urban systems to meet future climate challenges by improving biodiversity, the quality of key resources (air, water, soil), natural capital, energy efficiency and the quality of life of inhabitants.

4. Urban and metropolitan centralities and the Urban project in the Prg of Rome '08

Among the experiences of local planning characterised by a high degree of theoretical-disciplinary innovation, the General Regulatory Plan (Piano Regolatore Generale - Prg) of Rome approved in 2008 constitutes an emblematic case «of anticipation, confluence and actualisation of the most significant elements of disciplinary elaboration of the last twenty years» [30]. The Plan, it reorganises the settlement system around a polycentric urban structure made up of 18 centralities, places characterised by relevant features of identity, accessibility, functional integration and a high potential to develop transformation processes. For the purposes of their implementation, the Prg subdivides the Centralities into 10 "Centralities with defined planning" and 8 "Centralities to be planned".

While the former concern areas for which executive urban planning instruments have already been approved, the latter refer to areas to be subjected to the "Urban Project" (Up) procedure to be initiated through the preparation of a "Preliminary Planning Scheme" (SAP), which verifies the environmental, morphological-functional and economic-financial feasibility of the intervention with particular reference to the effects induced on the settlement and environmental context, to the qualification of the public space system, to the public transport network and to vehicular, bicycle and pedestrian mobility [31]. On the basis of the Sap, of the participatory contributions, of the adhesions of public and private subjects, and of the possible observations and prescriptions, the Up is drafted in its final form [31].

5. An Urban Project for the "Saxa Rubra" Centrality

5.1 The study area

The UMC "Saxa Rubra", one of the 8 "Centralities to be planned", is located in the northern suburbs, inside the Great Ring Road (GRA) about 9 km from the city centre. The area, which measures a Land Area (LA) of 65.57 hectares (ha), is included within a much larger study area characterised by the alternation of large open spaces of historical-environmental and urban value (Veio Regional Park), now disused mining activities, settlement fabrics of spontaneous and/or unauthorised origin (Tomba di Nerone, Sacrofanese) and by legal neighbourhoods built in implementation of the 1931 Regulatory Plan (Corso Francia, Tor di Quinto) and the 1962 General Regulatory Plan (Olgiata).

The Centrality, lying between Via Flaminia, the Roma - Viterbo railway and the Italian Radio Television (RAI) production centre to the west, the Tiber river to the east and the GRA to the north, is characterised by an environmental context strongly altered by disused mining activities and some pre-existing buildings of historical-documentary interest. Testimony of one of the main historical industries of the Capital linked to the production of bricks, the Mariani brickworks is located in the area. Built in the 1940s along the right bank of the river to exploit

the clay found in abundance on the site and decommissioned in the 1970s, it is now in a state of serious decay and abandonment.

A very large part of the area that extends from the characteristic kiln jetty to the south for a surface area of approximately 30 ha is, in fact, characterised by an abandoned former clay quarry that has led to the degradation of the landscape and profoundly modified the hydrography and morphology of the terrain, giving rise to small lakes and wetlands during rainy periods.

To the south of the central area, covering an area of 4.9 ha, is the 'Saxa Rubra' urban and metropolitan interchange, where a number of urban bus lines and numerous extra-urban lines serving the municipalities to the north of the province of Rome and the entire province of Viterbo stop. In the eastern part of the interchange, from 2011 to 2016, there was the 'Gran Teatro', an important temporary structure for entertainment (3,040 seats), no longer existing, which played a significant role in the development of culture in the city.

5.2 The Urban Project

The Up of the Centrality was developed in the Urban Design Laboratory of the Faculty of Architecture in Rome (A.Y. 2023-2024) held by the writer, which proposes an integrated and multi-scalar approach, aimed at producing high levels of urban and environmental quality, energy efficiency and circularity of resources. Specifically, the in-depth project elaborated by the students, Federica Pellegrini, Lorenzo Piccoli and Giulio Maria Rocchi, provided the opportunity to concretely experiment disciplinary innovation with particular reference to the recomposition of the cultural, morphological, infrastructural, landscape and environmental components of the intervention area.

The Up focuses its attention on the start-up of a process of regeneration of the site considered in its close relationship with the surrounding territory in which the centrality could play the important role of catalysing element and flywheel for the start-up of a process of valorisation of the historical-architectural and archaeological assets present inside and above all, outside the Centrality along the Via Flaminia (1). In this perspective, the *first phase* of the Up, designed at the scale of the Municipality, aims at the network construction of the environmental system with particular reference to the creation of a naturalistic-environmental and archaeological park along the Via Flaminia and the Tiber as an extension of the Veio Regional Park (Figure 1).

The *second phase* of the Up, designed at the neighbourhood scale, focuses on the design of the centrality as defined by the Prg '08. In relation to the system of services and infrastructures, the Up envisages the insertion of multifunctional and adaptive services for work, culture, tourism, entertainment, environmental education and social inclusion; the redefinition and enhancement of the entire network of road network of access to the Centrality; the upgrading of the Rome-Viterbo railway line and the construction of the new Flaminio-Montebello underground line (Line F1) running underground with a stop in the centre of the new university campus; the construction of the Saxa Rubra-Cinecittà (T2) ring-road public transport corridor the reconfiguration of the Saxa Rubra interchange with the re-designing of the area formerly occupied by the 'Gran Teatro' for performing arts activities, and the provision of an ecological island; the construction of two pedestrian and bicycle bridges over the Tiber. The project places great emphasis on pedestrian, cycle and pedestrian paths, car, scooter and bike *sharing* parking, and refuelling columns for electric vehicles.

With reference to the environmental system, the Up is characterised by the prefiguration of a large public park area, located in the area of the former quarry, which designs an organic weave of green areas and wetland surfaces (2) conceived as multifunctional spaces, interspersed with pedestrian and bicycle paths, areas equipped for sports and leisure accessible to persons with disabilities, as well as the Mariani brickworks to be recovered and reused for cultural purposes. The project is characterised by the provision of ecological-environmental devices related to the urban water cycle, such as bioswales and water squares (Figure 2). In order to reduce the environmental impact and promote energy sustainability in the context of climate change, the project envisages, outside the Centrality, an "Ecological District" (ED) aimed at starting new circular and *green* economies.

With reference to the morphological settlement system, the Up pays particular attention to the relations with the surrounding area in terms of consistency with the existing settlement lines, the quality of open spaces and the permeability of urban morphologies. The design of the

settlement structure is developed to the south and east of the RAI production centre through the design of two large blocks subdivided into sub-isolates by the continuation towards the project settlement of some of the RAI centre's road axes, with the aim of mending the morphological links, increasing the functional *mixity* and typological variety. The settlement morphologies intended to host a university pole, commercial functions, private services, tourist-receptive, individual *(social housing)* and collective (student halls of residence, colleges, etc.) housing, allow for the formation of large green spaces characterised by distribution avenues, paved areas and garden areas that dialogue with the outdoors.
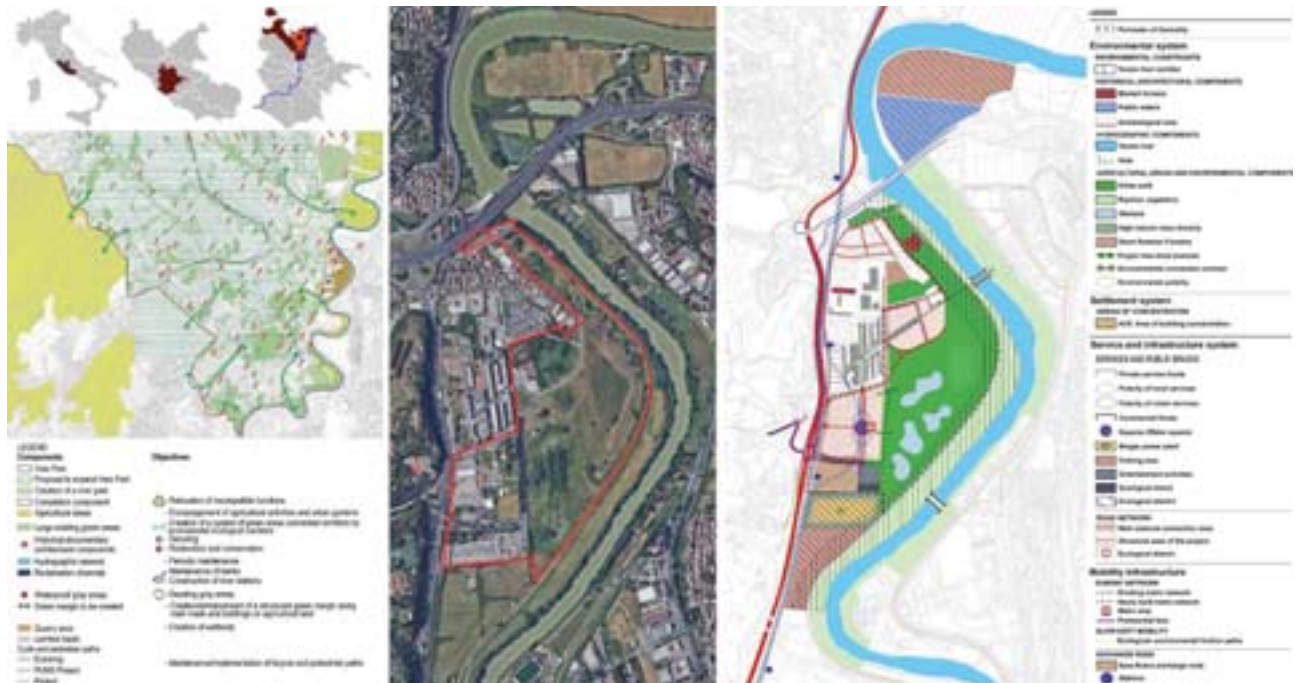
Fig. 1. Urban Project "Saxa Rubra". Left, Environmental System: Objectives. In the centre, satellite view Source: https://www.google.it/earth/. Right, Preliminary Planning Scheme (SAP). Source: elaboration by Federica Pellegrini, Lorenzo Piccoli and Giulio Maria Rocchi.

Fig. 2. Urban Project "Saxa Rubra". From left to top, Service and infrastructure system, Environmental system, Equalisation distribution, Settlement system. Right, Morphological verification. Bottom, Section A1 - A1. Functional destinations: 1 University campus. 2 Student residence. 3 Media library. 4 Performing arts activities. 5 Interchange node. 6 Ecological island. 7 Social housing. 8 Reception centre. 9 Cultural centre. 10 Former Mariani furnace. 11 Urban gardens. Source: elaboration by Federica Pellegrini, Lorenzo Piccoli, Giulio Maria Rocchi and Francesco Crupi.

Table 1. Urban Project "Saxa Rubra". Composition of public destinations obtained through free transfer (hectares). Data as a percentage of ceded areas and total territorial surface.

Public green	Public services	Green street furniture	Bioswales, waters squares and wetland	Urban gardens	Car parks (*), pedestrian paths, and streets	Area of public Concentration of Buildability (ACB)	Totale
27.0	1.7	1.3	13.7	1.1	6.7	5.9	57,4
47,0%	3,0%	2,3%	23,9%	1,9%	11,7%	10,3%	100,0%
41,2%	2,6%	2,0%	20,9%	1,7%	10,2%	9,0%	87,5%

(*) Public car parks for non-residential use have been provided underground.

6. Results

Starting from the need to prefigure a morphological-functional, socio-economic, environmental and cultural reorganisation of the intervention area, the first phase of the Pu envisages the extension of the Regional Park of Veio for an area of approximately 150 ha with the recovery of the historical-cultural and archaeological components, a careful design of the green and service areas, cycle paths, and accessibility infrastructures, capable of enhancing the site and integrating it into the urban and landscape context. With reference to the second planning phase the Up envisages a Gross floor area (GFA) equal to 33,166 square metres (25.0% of the total GFA of 132,666 square metres) for a total of 884 inhabitants to be settled and the remaining part of the GFA, equal to 99,500 square metres, for non-residential uses, university campus, media library, cultural centre and a receptive pole, as well as the construction of approximately 440 *social housing* units.

This articulation of fabrics for a total of 9.10 ha, including Areas of Concentration of Buildability (public ACB and private ACB), is matched by a patrimony of public areas or areas of public use, obtained through free transfer equal to 57.4 ha, about 87,5% of the LA (65.57 ha), of which 27.0 destined to public green areas, 1.7 to public services, 1.3 to Green street furniture, 13.7 destined to environmental devices *(bioswales, water squares, wetland)*, 1.1 to urban gardens, 6.7 to car parks, pedestrian paths and roads, 5.9 to public ACB (Table 1), 5.6 km of

bicycle paths, in addition to the area of the interchange of 4.9 ha as reconfigured by the project. The Up envisages, as mentioned above, the establishment of an Ecological District (ED) of a total of 40 ha destined for activities related to waste cycle management and the production of energy from renewable sources. Consisting of two sectors, to the north and south of the Centrality, it is composed of a biogas-fuelled co-generation plant of approximately 3.5 ha, unproductive and/or abandoned agricultural areas destined for productive energy crops (SRF) for a total of 23.8 ha, as well as some existing lamination basins located to the north along the river near the Castel Giubileo hydroelectric power station for a surface area of approximately 9.6 ha.

7. Concluding remarks

The contribution set itself the objective of highlighting how the construction of the CUM "Saxa Rubra", supported by new design metaphors, in coherence with the processes of technological innovation and interdisciplinary integration, can ensure the ecological quality of urban environments, safer, sustainable and efficient transport, waste disposal and recycling, the preservation of the territory from extreme climatic events, activating processes of collective re-appropriation of common goods, restoring biodiversity and the quality of fundamental resources with *nature-based solutions*.

However, despite the substantial elements of disciplinary and procedural innovation contained in the approach to regeneration outlined by the Prg '08, the absence of clear institutional governance, sufficient public funding and a hypertrophic bureaucratic apparatus are hindering the implementation of the Centralities. In this context it should be noted that, in view of the need to provide for a radical streamlining of bureaucratic and urban-planning procedures and to promote new organisational and management models capable of avoiding the inefficiencies of the past, in 2022 Roma Capitale set up a specific 'Strategic Planning and National Recovery Plan' Department that coordinates and manages direct European funds, structural funds, and NRRP leaving the implementation of investments to the individual structures concerned. This is an extremely interesting signal that could bring about a change of step and promote also for other projects, such as the 'Saxa Rubra' centrality, the start-up of culturally-based regeneration processes capable of contributing to the construction of an inclusive, sustainable and resilient climate-proof city.

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Notes
(1) Such as the ancient Mausoleum discovered in 1988 during the construction of the RAI centre, the Villa of Livia to the north, Castel Giubileo to the east, the tombs of Fadilla and Nasoni and the Mausoleum of Marcus Nonius Macrinus (so-called 'Gladiator's Tomb') to the south.
(2) Among ecological-environmental devices, wetlands are spaces that can take on different ecological, economic and social roles, fostering biodiversity and the growth of numerous Es of extreme importance for humans and the environment. They create a favourable environment for many species of migratory birds, terrestrial and aquatic flora. If designed as 'laminating bacins' they promote hydraulic and hydrological balance as they help dissipate water energy during rainy periods by acting as natural barriers, filtering water and reducing runoff to surrounding areas and receiving water bodies. Wetlands provide recreational spaces of cultural value and can be used for irrigation of green areas, food and fibre production, fishing and ecotourism.

The urban religious archaelogy
A sustainable socio-cultural vision

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Abstract

"The urban Religious Archaeology" represents a transition from the religious to the cultural dimension, highlighting the decline of specific residential and industrial urban areas in contemporary cities. While abandoned industrial spaces can be successfully regenerated, the situation is more complex for sacred places, where a sense of cultural belonging can generate conflicts, exacerbated by the growing digital communication. The emerging phenomenon of Religious Archaeology involves unused churches managed by traditional clergy, and new sacred places often lack vitality. A reconsideration of sacred spaces in new dimensions and urban contexts, such as shopping centers or parks, is suggested to encourage interaction and socio-cultural enrichment. The question of demolishing or repurposing religious archaeology, along with new parish centers, requires a realistic and sustainable approach, transcending the traditional direction of religious architecture toward mere construction. A pause for reflection, a "biological standstill," is proposed to regenerate both clientele and designs.

Keywords: Urban, archaeology, urban regeneration, sacred, cultural place

Section

The socio-cultural and economic changes that inevitably occur in contemporary cities contribute to the phenomenon of abandonment of certain urban areas, both residential and industrial, with a consequent prospect of decay. Just think of the areas of former factories, with their spaces and buildings left to neglect, which no longer shock us, and indeed, are categorized within the realm of industrial archaeology. It has been recognized that these repulsive places can, in fact, become attractive and represent an opportunity for urban development through their regeneration, involving communities in participating in the project of change.Among the various themes that must be considered in the elaboration of urban regeneration is also archaeology, a fundamental analysis for territorial and socio-cultural identity, considered and analyzed in its declinations, such as:

Socio-cultural: exchanges, social relations, migrations, invasions, within a phenomenon of cultural diffusion.

Historical-artistic: for the development of a more conscious, democratic, and inclusive society.

Urban: to study the history of an urban settlement.

Industrial: historical period, economic, technological, social, constructive, architectural, engineering around the testimonies related to the process.

Climatic: analysis of climate changes caused by man since the industrial revolution.

Energy: analysis of discoveries and applications of energy resources by man.

Experimental: to verify archaeological interpretations through the formulation of experimental protocols with controlled parameters.

In addition to these, especially for a culturally fragmented territory like Italy, there is one that we will call **religious archaeology**, which encompasses a summation of the mentioned directions focused on the religious sphere: monasteries, charterhouses, abbeys, cathedrals, churches, chapels, parishes, and related activities.

It is implicit that a very different approach must be used in dealing with places of worship, the so-called "sacred places," (if used for worship it is more appropriate to define them "Santified Space")[1], where a sense of belonging, more cultural than religious, can generate social conflicts in case of transformation and reuse, especially in the era of free digital communication. There is outcry if they are decommissioned or repurposed, but it must also be highlighted that, likewise, there is no renouncement despite the enormous number of ecclesiastical buildings to the construction of new ones, most often empty boxes that induce static liturgies, examples of formalism in its pure state, relegated to the margins of urban development plans, scarcely used.

We are therefore faced with a new phenomenon: Religious Archaeology. Churches, convents, chapels no longer used which no longer arouse interest, especially among the young, managed by a clergy still tied to pre-conciliar thought and little inclined to contemporaneity. Today, the sacred places are others, and this generates confusion in the socio-cultural language, just think of the stadium understood as the "temple of soccer," with the consequent "hand of God" by Maradona or "faith" for a team. (Fig 1)

Fig. 1: Hand of God by Michelangelo Buonarroti e Diego Armando Maradona

Today, artistic language uses the "sacred" ingredient as an attractive component of art-making, the new generations create and perceive "sacred" as a qualifying element of an expressive language, usable in every context, just think of the graffiti artists who operate in degraded urban areas. (Fig 2) Contemporary art, compared to religions, over the centuries, has been able to combine the depth of the message with the use of new materials and technologies, for example, cinema, theater, music, dance, literature, but especially the research on man and his interiority, his relationship with the sacred and spirituality.

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[1] Sanctus refers to people: kings, magistrates, senators (pater sancti) and from these to the divinities themselves

Fig. 2: New artistic languages: Street art uses the "sacred" to communicate discomfort and protest against the ongoing cultural cleansing.

Religious Archaeology, the Archaeology of Absence, the Archaeology of Ideas, the Archaeology of Becoming, are other themes to consider, to have new elements for a deeper and more accurate reflection capable of suggesting more relevant future approaches for future generations.

A spontaneous question arises: what sense does archaeology, in this case, religious archaeology, have in a post-post-postmodern society, in continuous evolution, where everything seems to be already known? It can certainly help to reinterpret and to share new knowledge, but also to trace or to confirm the roots of a culture and a territorial identity.

In an era of cultural fragmentation like the present, places of worship, whose primary function is to aggregate and unite people through faith, could become, through a work of restoration and requalification, new secular aggregational spaces, where to find a new sense of belonging and community.

Religious archaeology, therefore, is not only a study of the past but also a possibility of updating the cultural and religious heritage in a contemporary key, transforming it into a resource for the construction of a collective identity and for urban regeneration. The enhancement of abandoned or underutilized places of worship could represent an opportunity to reactivate the social fabric and promote intercultural and interreligious dialogue, promoting coexistence and mutual respect.

Furthermore, religious archaeology can be an important tool for better understanding the past and present of the different religious traditions present on the territory, favoring interreligious dialogue and mutual knowledge. This can contribute to promoting peace and understanding among peoples, countering the ignorance and prejudice that often fuel conflicts and divisions.

In conclusion, religious archaeology can play a significant role in the contemporary context, contributing to the enhancement of cultural and religious heritage, urban regeneration, and the promotion of intercultural and interreligious dialogue. Through the study and enhancement of places of worship, we can rediscover and preserve the roots of our collective identity, while promoting peaceful coexistence and respect for diversity.

The question arises: what to do with religious archaeology? Demolish or reconvert it? And what about the "new" parish centers, underutilized and lacking in quality? Our cities are no longer uniform seats of Catholic communities; they no longer need oversized religious structures. A more realistic approach envisages sustainable projects distributed in the most attractive positions of the metropolis, offering spaces suitable for different beliefs, fueling the hope for peaceful coexistence and socio-cultural enrichment.

For too long, religious architecture has been directed only towards construction; a pause for reflection is advisable, a sort of "biological stop" would undoubtedly help to regenerate both clientele and designers.(Fig. 3)

Fig. 3: Biological stop for change of mentality

It allows for the recovery of cultural diversities on the one hand, abandoning the now arid and obsolete international style from both an architectural and urbanistic point of view, adapting cities to new standards of use by citizens, involving them in change, returning to the use of city streets as places of socialization and commerce, replacing asphalt with green by planting trees with sustainable mobility.

The challenge is to reconcile respect for tradition with the creativity needed to interpret and satisfy the needs of an ever-evolving society, without prejudice. The diversification of the uses of religious spaces, from their conversion into cultural centers, exhibition spaces, areas for social gathering, or demolition if necessary, could not only prevent their degradation but also stimulate a constructive dialogue between past and future, sacred and profane, identity and innovation. This transformation process requires sensitive and inclusive management that considers the potential tensions and diverse expectations of the involved communities.

The concept of Knowledge-Based Urban Development (KBUD)[2] offers an interesting framework for reimagining disused urban spaces, including those of a religious nature, as resources for sustainable development and social cohesion. Integrating cultural and religious heritage into the fabric of the contemporary city could help create more livable, inclusive, and resilient spaces, enriching urban life with new dimensions of meaning and belonging.

In conclusion, reconfiguring disused sacred spaces presents complex cultural, ethical, and practical challenges. However, by addressing these challenges with a creative and collaborative approach, it is possible to find innovative ways to preserve religious and cultural heritage while enriching the urban context and community life. Reflection and dialogue among all stakeholders[3], including architects, art historians, theologians, public administrators, and citizens, will be essential to navigate the complexities of this transformation process, triggering urban regeneration (Puzzle design)[4], involving events with citizens to inform and engage them in these ongoing changes.

The cities of the future, whether built from scratch or renovated, must transform into Fitopolis[5], as theorized by Stefano Mancuso, places where the relationship between plants and humans is harmonious, radically changing the current concept and use of the city, planting trees instead of roads to help reduce pollution, already beyond the planned minimum threshold, as well as urban planning, architecture, and art, including places of worship, designers, and clients must also seriously consider the ongoing social changes and the believers who use them. Nothing is more important than these issues for the future of

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[2] The concept of Knowledge-Based Urban Development (KBUD) emphasizes the importance of scientific and technological knowledge in the planning and management of urban development

[3] According to the definition appearing on Investopedia, "a stakeholder is a party that has an interest in a company and can either affect or be affected by the business. The primary stakeholders in a typical company are its investors, employees, customers, and suppliers."

[4] Quaderni 'Abitare la Terra/Dwelling on Earth' (A Class international magazine) Puzzle design, Between Vision, Speed, Design and Sustainability Roma: Gangemi editore 2023 ISSN 1592-8608

[5] Mancuso Stefano, Fitopolis, la città vivente, Gius.Laterza & Figli Spa 2024

humanity: "Generation Alpha" and "Generation Beta"[6] in particular, foremost among them, will inherit our reckless way of managing and utilizing environmental resources.

To achieve results in the medium and long term, it is indispensable to speak of Faith, Culture, Society, Community, Truth, Politics, Urban Planning, Architecture, and Art not in the singular but in the plural, as only cross-pollination leads cultures to becoming Culture and to peaceful coexistence, since closures, as historical archaeology teaches us, lead to conflicts and murky ignorance.

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Marine Cultural Heritage as a Bridge of Concord: Portolan Cartographies

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Abstract

The Giménez Lorente Foundation, a key reference for Mediterranean cartography, houses a valuable collection of originals, facsimiles, and reproductions donated in 2003 to the Universitat Politècnica de València. These resources are invaluable for students, researchers, and enthusiasts. Portolan charts, used from the Late Middle Ages to the 17th century, evolved from rudimentary texts into illuminated art, reflecting their origins in Portugal, Spain, and Italy. The Mediterranean, a cultural crossroads and vital trade route, influenced migrations and exchanges. This research examines these routes through portolan charts, advocating cultural heritage as a tool for harmony, promoting tolerance and respect in line with UNESCO's 'Culture of Peace.'

Keywords: Cultural dissemination marine heritage, portolan cartographies, Mediterranean Migratory Routes

Section

Since its inception, UNESCO has been an unwavering advocate for the essential role of Culture, with a capital C, in promoting world peace. The evolution of contemporary conflicts highlights the increasing need for this "soft power," as termed by Director-General Irina Bokova; a power that serves as a bulwark for both the protection of human lives and the preservation of cultural heritage. These elements are inseparable, as violent actors target not only people but also cultural agents such as educators, schools, and tangible (monuments and sites) and intangible (family traditions) cultural heritage, seeking to undermine and destabilize the societies they wish to control.

The United Nations Security Council Resolutions 2199, 2354, and 2347 constitute a historic recognition of the importance of protecting cultural heritage as a fundamental aspect of global security. The solution to threats rooted in ignorance and erroneous interpretations of history cannot rely solely on armed force; it must also be waged in the educational and cultural realms. Peace can only be achieved through "good weapons" like education, culture, and science, which fortify the defences of peace in our minds. Artistic expression from any era is one of the greatest assets, as it promotes intercultural dialogue and builds bridges to the world's cultural diversity.

Following this path, the Ocean Art project by the UNESCO Forum Chair at the Universitat Politècnica de Valencia, Spain, aims to disseminate the rich maritime cultural heritage inherited from our ancestors among our youth. This heritage is used as a teaching and awareness tool for the necessary care of our seas and oceans and the heritage linked to them. Thus, it not only teaches historical aspects but also raises awareness of the importance of preserving and disseminating this historical legacy, which calls us to maintain a culture of peace. This means promoting a transition from a culture of violence and imposition to a culture of peace and tolerance.

To carry out this task, a research line focused on the study and dissemination of medieval Portolan charts was initiated within the project. This research has developed various aspects, with the history of migration in the Mediterranean being one of them. This is a current issue that has reached an intolerable situation. Fortunately, to achieve our study and dissemination goals, we at the UPV have the Giménez Lorente Foundation, an essential reference for the study of historical cartography of the Mediterranean.

Ecumene. Ptolemy's Cosmography. Facsimile of the codex from the University of Valencia, predating 1458. Giménez Lorente Foundation UPV. Photo: Vivancos

The Giménez Lorente Foundation houses a highly valuable carto bibliographic collection that includes original maps and an exceptional selection of facsimiles of Portolan charts. These were donated in 2003 to ensure their preservation, dissemination, and to foster

their study and research. Since then, it has become an invaluable heritage tool for students, researchers, and lovers of ancient cartography.

Portolan charts, or portolans (a word derived from the Latin "portus" meaning "port"), are a type of navigation or nautical charts used during the Late Middle Ages, with their use extending roughly until the 17th century. Based on their production centers, they can be grouped into Portuguese, Spanish, and Italian portolan charts. What initially began as rudimentary texts with annotations evolved, with advancements in cartographic representation techniques, into true illuminated works of art, sparking a passion for their collection.

Since ancient times, the Mediterranean has been a crossroads of cultures and a vital communication route for trade and expansion. It has witnessed conflicts and alliances over the centuries, where control of maritime trade routes was strategic in the competition among nations. These maritime routes, represented in Portolan charts, have influenced population migrations, contributing to the interconnection of regions and cultures and facilitating the exchange of people, ideas, and goods. These movements

Hundreds of thousands of people migrate across the seas in search of a better life, fleeing from wars, climate crises, or political persecution. © Adobe Stock.

were influenced by factors such as economic opportunities, conflicts, persecutions, and changes in the geopolitical environment.

These charts, along with the development of ships and navigational instruments during the 15th and 16th centuries, allowed two countries (Portugal and Spain) located at the edge of Europe to launch maritime expeditions in search of new trade routes and new territories beyond the known world. These expeditions led to new migration flows not only in the Mediterranean but also to newly discovered territories in America, Asia, and Africa.

Undoubtedly, the history of maritime routes has played a significant role in shaping the contemporary migratory landscape. Today, migratory movements are driven by various factors, with armed conflicts and the effects of climate change unfortunately being predominant in these times.

The Mediterranean, in particular, has been an epicenter of human migration for millennia, with people moving in all directions across this sea. Specifically, since the mid-1990s, countless individuals have crossed the Mediterranean annually in boats from the coasts of North Africa and Turkey, seeking asylum or a new life in Europe. Additionally, other

less regulated migration routes include sea crossings from Africa to the Canary Islands in Spain, from the Comoros to Mayotte (a French territory), as well as land routes crossing from Greece into Turkey and through the Balkans toward Europe.

The main migratory routes in the Mediterranean are divided into three key areas:

A. Central Mediterranean Route: This route involves crossing from North Africa to Italy and, to a lesser extent, Malta. Migrants on this route typically aim to reach the Italian coast, departing from various North African countries bordering the Mediterranean Sea. Although in previous years the majority of migrants departed from Libya, which serves both as a destination and a transit country, there has been a proportional increase in departures from Tunisia, Egypt, and Algeria.

B. Western Mediterranean Route: This historic crossing between North Africa and Spain includes several sub-routes, such as maritime journeys from Morocco and the western coast of Algeria across the Strait of Gibraltar and the Alboran Sea, as well as overland
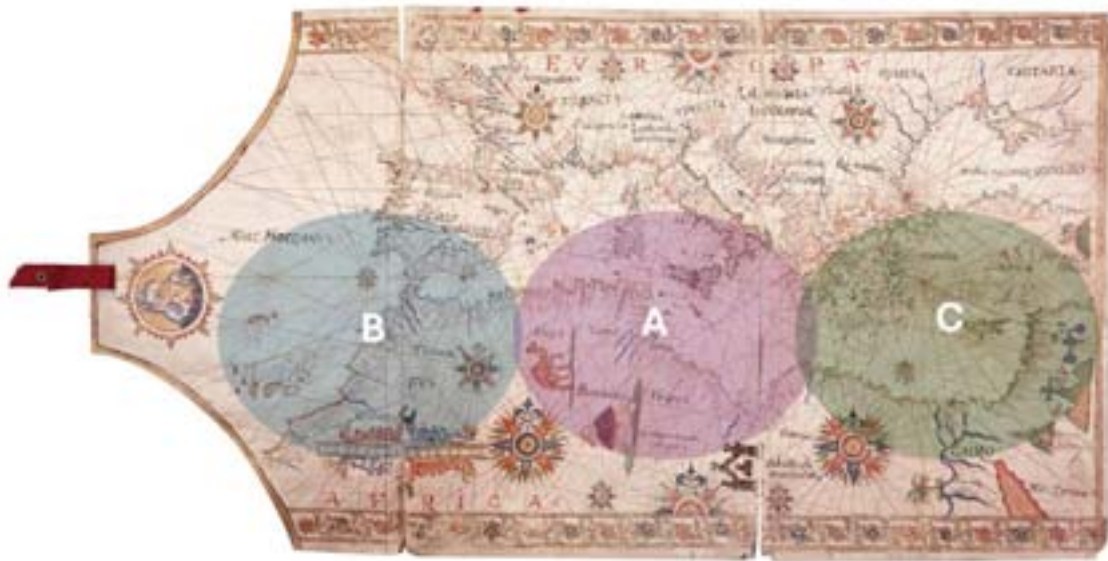
Nautical chart of the Mediterranean, the Black and Azov Seas, and the Atlantic coasts of Europe and North Africa. Anonymous, attributed to the workshop of Plácido Caloiro-Oliva. 17th century. Facsimile from the Giménez Lorente Foundation, with the original located in the National Library of Spain.

Detail showing the representation of the island of Lampedusa, one of the Mediterranean islands most affected by migratory currents. *Mediterranean route and Atlantic coast*. Caloiro and Oliva, Plácido. Estimated between 1600 and 1699. Manuscript cartographic material. © *National Library of Spain.*

C. On the other hand, the route of the Western Mediterranean has been a migratory corridor between North Africa and Spain for millennia. This route includes multiple sub-routes, spanning maritime crossings from Morocco and the western coast of Algeria to Spain through the Strait of Gibraltar and the Alborán Sea, as well as land routes to Ceuta and with the resources provided by the Giménez Lorente Foundation, a set of educational materials is being developed for students in the numerous educational centers of the Valencian Community. These materials not only seek to inform young people about what portolan charts are and the relevance these nautical charts had in the development of humanity, but also graphically show them how migratory movements and the representation of the world have evolved to the present day.

As part of this initiative, a comparative study has been conducted examining current migratory routes and how they were graphically represented by cartographers over five hundred years ago. This analysis allows students to better understand historical cartographic techniques and their impact on our perception of the world, thus linking the past with contemporary global dynamics. This educational approach not only enriches young people's historical and geographical knowledge but also makes them aware of the ongoing importance of maps and cartography in understanding migratory and cultural phenomena over time.

Current migration routes in the Mediterranean depicted on the portolan chart by Mateo Prunes. 1563. ©Naval Museum.

In conclusion, it is important to emphasize that in this research, we reflect on these Mediterranean migratory routes through the ancient and beautiful portolan cartographic representations. This allows us not only to appreciate the work of the cartographers and the significance of their contributions to the evolution of humanity but also to advocate for cultural heritage to be considered as a valuable tool for harmony and understanding. We hope that the study of these maps can help us comprehend the diverse cultural and geographical perspectives that existed in the past, thereby promoting tolerance and respect for different ways of viewing the world. This aligns with UNESCO's ideals of fostering a "Culture of Peace," where cultural heritage serves as a bridge to connect people and societies across time and space.

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The "Tires School" in Khan al-Ahmar, a symbol of resilience, hope and redemption of a marginalized community.

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Abstract
Near the Bedouin village of Khan al-Ahmar, located within area C of the West Bank, stands the so- called "Tire School", a structure without foundations and built with waste materials and raw earth, to overcome the limitations imposed by the Israeli government which prohibits any construction activity within this area. The school is an interesting example of bioclimatic architecture capable of guaranteeing an adequate level of indoor comfort in an area characterized by extreme climatic conditions.
The school offered the children of the local Bedouin communities the opportunity to access primary education, which was also severely compromised by the isolation of the villages. Despite its temporary characteristics, the school was the subject of a sequence of clearance and demolition orders, never carried out thanks to the support of international diplomacy, and over the years it has become a symbol of resilience in defense of the right to education and of the rights of the Bedouin communities residing in the area.
But the violent military operation launched by Israel against the Palestinian civilian population, following the Hamas attacks on 7 October 2023, risks putting a definitive end to the troubled history of the school and the communities.
The contribution analyzes the environmental, social and legal aspects linked to the construction of the school, its feared destruction and the implications connected to it.

Keywords: Bioclimatic architecture, resilience, temporariness, tire school, Palestine.

1.   The Bedouin villages in the Jordan Valley

According to the 1993 Oslo agreements, signed by the Israeli prime minister Rabin and the Palestinian leader Arafat and further defined in 1995, the West Bank is "temporarily" divided into three zones: zone A (18% of the territory) is entrusted to the full control of the ANP; zone B (22% of the territory) is co- managed by Palestinians (for civil aspects) and Israelis (for security); Zone C (60% of the territory) is under full Israeli control. Area C includes most of the agricultural land, natural resources and available land.
Today the Palestinians of the "West Bank" are around three million, distributed in 165 isolated communities scattered in areas A, B and C. Area C is the most critical area, because it has the greatest concentration of Jewish settlements and outposts [1] who continue to perpetrate human rights violations through acts of violence, harassment and intimidation, with the aim of forcing Palestinians to abandon their homes.
The Palestinian villages of Area C are mainly made up of communities of farmers and nomadic shepherds, including the Jahalin Bedouin tribe, originally from the Tel Arad district, an area on the edge of the Negev desert. In 1949 the Israeli authorities began a forced evacuation campaign against the Jahalin, recognized as refugees by UNRWA. Part of them

settled along the Jordan valley, on the route that connects Jerusalem to Jericho, giving life to stable communities whose subsistence was based on the breeding of sheep and goats.

The entire area is dotted with archaeological sites and monastic settlements which fuel the economic interests of the Israeli settlers who have occupied much of the territory. The ancient historical route also known by the biblical name of "Maaleh Adummim" or "climb of the red (rocks)", is today partially bordered by Route 1, an important transit route that connects Jerusalem with the colonies of Ma'ale Adumim and of Kfar Adumim.

This is a strategic area as it is located right in the center of area C and for this reason it is the subject of growing interest from the Israelis who for decades have been trying to occupy the entire area by building their colonies right next to the Bedouin settlements, with the intent to clear the territory to allow their expansion and interrupt the continuity of Arab settlements in the West Bank. Surrounded by Israeli settlements, excluded from any basic service, the Bedouins live in conditions of extreme marginalization.

Fig.1: On the left, the subdivision of the West Bank after the 1995 agreements, https://www.internazionale.it/video/2023/09/20/resistenza-palestinesi-coloni. In the center, the route that connects Jerusalem to Jericho, http://www.giovaniemissione.it. On the right, Route 1 near the settlement of Ma'ale Adumim in Section E-1 of the occupied West Bank. (Photo: Ohad Zwigenberg).

Strengthened by the fact that any construction activity is prohibited for Palestinians in Area C, all the structures built in the Bedouin villages are considered illegal and therefore subject to demolition. This allowed the Israeli settlers to demolish the shacks, although built with sheet metal, waste materials and plastic sheets, destroy the water tanks and remove the solar panels, donated by humanitarian associations and the only source of electricity supply. Many abandoned their villages, others continued to resist, thanks to international support and donations from European missions. But after the massacre of the kibbutz on 7 October, Israeli retaliation against the Palestinians of the West Bank has multiplied and the Bedouin communities are those most attacked and deprived of protection and assistance because even humanitarian organizations are no longer able to reach the now surrounded villages.

2.   Khan al-Ahmar

Khan Al Ahmar is one of the Bedouin villages that arose along the route that connects Jerusalem to Jericho. The settlement takes its name from the nearby archaeological site identified with the ancient Byzantine monastery of Saint Euthymius the Great, dating back to the 5th century AD. and known as Laura or Lavra of Euthymius. After its final abandonment, in the 13th century, the structure was converted into an inn for travelers or caravanserai (khan) [2] and became known as Khan el-Ahmar, the "red caravanserai". The term ahmar (red), attributed to the construction, is due to the color of the limestone characteristic of the Judean desert, containing iron oxide, and with which the wall structure was built.

Fig.2: On the left, the evocative ruins of the Monastery of St. Euthymius (5th century AD), author Bonfils Félix, Khan-el-Ahmar, Palestine, 1870– 1885, https://www.lombardiabeniculturali.it/. In the center, Lavra of St. Euthymius, later Khan al-Ahmar, https://commons.wikimedia.org/wiki/File:Euthymius_Monastery1009_(9).jpg. On the right, aerial view of the site, https://www.biblewalks.com/euthemiusmonastery/.

Caught in the grip of the two Israeli settlements of Ma'ale Adumim and Kfar Adumim, which are in full development, and flanked by Highway 1, Khan al-Ahmar is home to around 38 families, camped inside poor sheet metal shacks, which are also unlivable given the conditions extreme climates, lit by generators and with heavy water supply difficulties.

Fig.3: On the left, Location of Khan al-Ahmar between the two colonies of Ma'ale Adumim and Kfar Adumim, https://www.al-monitor.com/originals/2023/05/israel-court-denies-bid-force-demolition-west-bank-village. On the right, the village bordered by Route 1, https://www.al-monitor.com.

The settlement has for years been at the center of a bitter dispute between Palestinians and Israelis who have called for the evacuation and demolition of the houses, which have been declared illegal. The reasons for this persistence are many, first the strategic position of the village, located near the E1 corridor, an area that the Israelis would like to use to connect Jerusalem with the Jordan Valley and the settlement of Ma'ale Adumim, definitively interrupting the continuity of the Palestinian territories.

The expansionist aims of the Israeli settlements also include a tourist promotion activity, implemented by online booking agencies that offer offers for trips and trips to the desert in Bedouin tents, near the Israeli colonies [3]. The tourist center of Kfar Adumim, located less than two kilometers from the village of Khan al-Ahmar, is one of the most publicized sites as it is constantly expanding, with new neighborhoods and luxury homes increasingly closer to the Bedouin village.

Israeli authorities have offered the village residents two options for their relocation: one proposal concerns a site near a sewage treatment facility, near Jericho. The second site, about 12 km away from the current village, is in the locality of Jahalin West, near the urban settlement of Abu Dis and close to the former municipal landfill of Jerusalem. According to what was declared by the Israeli authorities, the plots of land intended for the Bedouins of Khan al-Ahmar are equipped with water and electricity connections and each family has been allocated 250 square meters. The Israeli authorities have also committed to building a school suitable for welcoming all the children from the neighboring villages. Both proposed

sites are unhealthy and do not suit the needs of the Bedouin people. The size of the assigned lots is insufficient to allow the grazing of the flocks, an activity that characterizes the existence of the Bedouin people which is based on breeding and pastoralism. Furthermore, the new land intended for the inhabitants of Khan al-Ahmar has been confiscated from the Palestinian owners of Jahalin West who oppose the transfer by threatening to sue in the Palestinian court.

3. The "Tires School"

Khan al-Ahmar is also the site of a school, designed by Studio Arcò of Milan and built in 2009 by the Italian NGO Vento di Terra, with the contribution of the Italian Cooperation, the Italian Episcopal Conference CEI and a network of Lombardy local authorities, as part of the "Architecture of Peace" project.

The structure has allowed around 150 children, some of whom come from some nearby Bedouin villages, to resume studies interrupted due to the dangers they encountered while traveling to school in the city of Jericho. The little students had to walk every day along a dangerous and busy road along which some of them died, hit by passing cars, while others were left disabled. During the long hours of walking to school, the scorching sun exhausted the little creatures. For this reason, the inhabitants of Khan al-Ahmar had decided not to send their children to school anymore.

The project, originally developed on an area of 350 square meters, has expanded over time and today consists of classrooms and spaces intended for toilets, management, secretariat and teachers. The volumes overlook a common central courtyard.
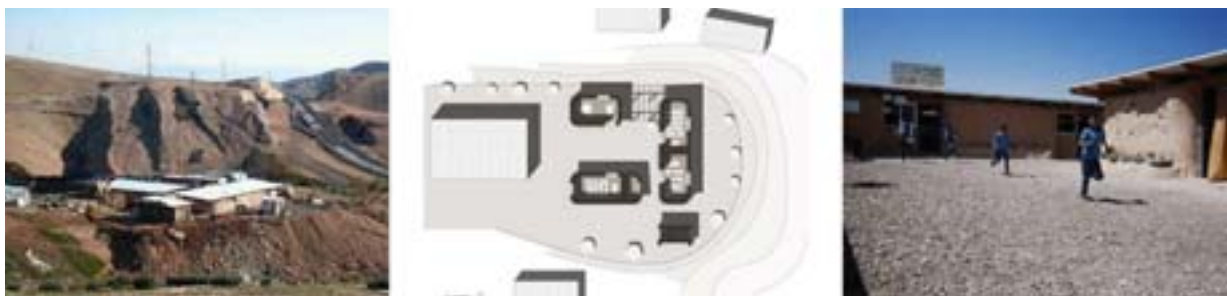
Fig. 4: The school in Khan Al-Ahmar: panoramic view, floor plan and internal courtyard, http://www.ar-co.org/it.

The limitations imposed by the Israeli government on construction activity in Area C, which only allow"temporary locations", have influenced the choice of the construction system and the materials used. The school was in fact conceived as a temporary structure as it had no foundations, self-built, usingwaste materials and natural materials, under the guidance of the designers who also drew up aninstruction manual. The 80cm thick walls were built with around 2000 used tires, recovered from landfills, stabilized with earth, and positioned in staggered rows. The wall structure was then plastered with asand and clay mortar, to protect the rubber from overheating due to strong solar radiation and theconsequent release of harmful substances. The system adopted allowed for rapid construction of the system; furthermore, the elastic and structural characteristics of the tires, together with the stability andthermal inertia of the earth, have guaranteed a high static and thermal performance of the structure.

Fig. 5: Left and center, construction phases of the wall structure, http://www.ar-co.org/it. On the right, laying of the clay plaster, https://www.ventoditerra.org.

The ventilated roof is made with a double frame of wooden beams, covered with sandwich panels. The openings in correspondence with the roof allow correct passive ventilation as well as cooling of the internal environments during the hottest hours.

Fig.6: On the left, the installation of the sandwich panels. On the right, cross section with diagram of passive ventilation, http://www.ar-co.org/it.

The wise use of materials and the correct application of design strategies appropriate to the context have made the school an interesting example of bioclimatic architecture capable of guaranteeing an adequate level of indoor comfort in an area characterized by extreme climatic conditions. Furthermore, thanks to the contribution of the Italian Cooperation, the school has also been equipped with a photovoltaic system which guarantees complete energy autonomy.

Fig. 7: Diagram of the functioning of the bioclimatic strategies adopted for indoor comfort, http://www.ar-co.org/it.

The school was built in two months, at a cost of eighty thousand euros, but already during the construction works it was attacked by the Israeli authorities who tried to raze it and the entire village to the ground. This did not stop the completion of the structure which offered the children of the Bedouin communities present in the area the possibility of accessing primary education, which was strongly compromised by the limitations imposed by the Israeli authorities and by the isolation of the villages. In August 2009 the Palestinian Ministry of Education officially recognized the building by including it in the primary educational program. Subsequent interventions, started in 2015, have made it possible to improve the school's performance in terms of safety and health, considering the different needs of boys, girls and school staff. The renovation project involved increasing the number of classrooms and improving the hygienic and sanitary conditions of the toilets and internal spaces. The interventions also involved the arrangement of the external areas intended for recreational activities.

Fig. 8: Exteriors and interiors of the school photographed in September 2017, after the renovations started in 2015, https://www.assopacepalestina.org and http://www.ar-co.org/it.

The project was presented in 2010 at the XII Venice Architecture Biennale and was the subject of extensive media coverage. Perhaps, also for this reason, the Israeli authorities' ferocity towards the village of Khan al-Ahmar and its school has become increasingly incisive. The school, despite its temporary structure, constitutes the only structure with an appearance of solidity that arose among ephemeral shelters and the fear that this could be the first of a series of new, more stable and permanent buildings pushed the settlers to ask the army intervened several times to destroy the entire village.

Thanks to the support of international diplomacy and UN agencies, the destruction of the village was postponed from year to year by the Israeli authorities citing reasons related to the country's security and its foreign relations.

The current conflict risks putting a definitive end to the troubled history of the school, its students and the Bedouin communities forced to live in uncertainty and precariousness. The most recent news reports that the school is closed, and teachers are prohibited from entering the village, but the situation is evolving from one day to the next and there is no certainty of the current situation and the existence of the structure. All this has made the school a symbol of resilience in defense of the right to education and in defense of the rights of the Palestinian Bedouin communities residing in Area C.

The events that involved the tire school gave the strength and courage to all the Palestinian students not to give up and resist, as was the case for the pupils of the Isfey primary school in Masafer Yatta, in the south of the West Bank, demolished by the Israelis and on whose rubble a tent was erected in which the children continued to study. But after a few days, the tent was also confiscated by the Israeli authority.

Fig.9: Left, Isfey school before being destroyed. On the right, the tent donated by the Palestinian Ministry of Education before the confiscation, https://www.aics.gov.it.

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[1] A settlement is authorized by the Israeli government while an outpost is built without government authorization. Outposts can range from a small core of a few people to a community of up to 400 people.

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About Steinort Castle Intervention

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Abstract

The Count von Lehndorff family, the last German owner of the Steinort, is one of the oldest and most important noble families in East Prussia. Today, Steinort Castle (in Polish: Sztynort) is German heritage outside the state borders, in the part of Prussia governed by Poland. Heinrich von Lehndorff was the key figure in the attempted coup against Hitler on July 20, 1944, paying for the failure with his life, which inspired several works of art, consequently making the story widely known. The intervention on the buildings was urgently required due to the extensive wood decay as well as for the organizational reasons i.e. limited visitors' access. The wooden beam ceilings of the oldest part of the manor have extremely large spans, which was enabled by outstanding quality of structural wood which was locally available. The size makes the beams dominating the interior. In addition, the beams are decorated with unique polychrome paintings in the style of Northern-European baroque. Therefore, the essence of the intervention was about wood – the concept, the decision-making, the treatment and realization. The other important challenge was making peace between the central part of the manor, built in baroque style, with the wings built in the style of late neoclassicism. In this paper, we discuss intervention on the Steinort in the context of structural demands, heritage theory, regional characteristics of style, and their current understanding of priorities and values of heritage.

Keywords: heritage preservation, timber structures, ceiling, strengthening, structural bonding

1. Introduction

The Count von Lehndorff family was the one of the oldest and most important noble families in East Prussia. Today, Steinort Castle (in Polish: Sztynort) is German heritage outside the state borders, in the part of Prussia governed by Poland. Heinrich von Lehndorff was the key figure in the attempted coup against Hitler on July 20, 1944, paying for the failure with his life, which inspired several works of art, consequently making the story commonly known. The Steinort castle was home of the von Lehndorff family for more than 400 years [1] [2]. Masuria

is nowadays a popular tourist area, rich in forests and glacial lakes, situated in the north-east of Poland bordering with Belarus and Lithuania.

The intervention was urgently required due to the extensive wood decay as well as for the purposes of arranging visitors' centre. The process started in 2010 after the change of the ownership and the value of the investment exceeded several million euros.

The main building is considered an example of baroque architecture, with neoclassical extensions, and it is a rare case of completed and generally well-preserved palace in the region.

Prerequisite of the baroque in Masuria was arrival of catholicity, which happened with Teutonic Order in early 14th c. Later the area became Prussia of the Teutonic order (1466-1525). After secularization, emerged Prussian Duchy (1525-1657). It was prosperous land which was opened for culture and science, if it is to be judged after its most famous member of its clergy - Nicola Copernicus. In 1701 monarch declared that this area is part of Prussia and belongs to Brandenburg [3]. Popularity of Baroque coincided with the period of the reign of the first Prussian King Frederick I and with the initial raise of the House of Brandenburg. Soon, Masuria became unusually multiethnic and multicultural. With the economic rise, came a cultural blossoming which was emphasized by presence of "the universal polymath" Leibniz at the royal court of Queen Sophie-Charlotte [4]. The favourite architect Frederick I, at that time, was Andreas Schlüter who left his mark in the architecture of the northeast Europe all the way to Russia (with Russia including). [4]

The essence of the intervention was about wood – the concept, the decision-making, the treatment and realization. The other important challenge was making peace between the central part of the manor, built in different styles. In this paper, we discuss intervention on the Steinort in the context of structural demands, heritage theory, regional characteristics of style, and their current understanding of priorities and values of heritage.

Fig. 1 The Steinort castle - Location and aerial view of the site [1]

2. Background and methods

The baroque core of the building (in German: Kernbau) was constructed between 1689 and 1693. In the 19th century the basic baroque building was extended with two late-neoclassical wings (1829) and three towers (1860-1880). At the end of the 1930s, the castle underwent a thorough renovation. Steinort is believed to be the last complete big estate in East-Prussia, such which included "the manor, stables, barns, storages, workshops and housing estates for the farm workers". [4]

Undoubtedly, important historic figures visited Steinort or resided there. The Foreign Minister Ribbentrop's field quarters occupied one of the wings in 1941, because the estate was only 17 km off Hitler´s headquarters „Wolfsschanze". In the same period, Count Heinrich von Lehndorff lived in another wing of the castle with his family, until the Red Army arrived in January 1945. The building was used for variety of purposes until 1985 when all of the activities stopped. In 2010 PNF foundation, of German-Polish ownership, bought it and subsequently started transforming it into academy, a museum and a hotel. In 2017, the Steinort festival was established by cultural anthropologist Hannah Wadle, so marking another milestone in revitalization of Steinort.

Lehndorff-Gesellschaft Steinort (LGS) joined Polish conservation foundation (PNF) and its German sister-foundation (DPS) in the venture to save and give the site new use, taking support of Polish Program „Kultura" at the Norwegian Fund [2].

Längsschnitt

Turmanbau West

Turmanbau Ost

Westturm   Westflügel   Kernbau   Ostflügel
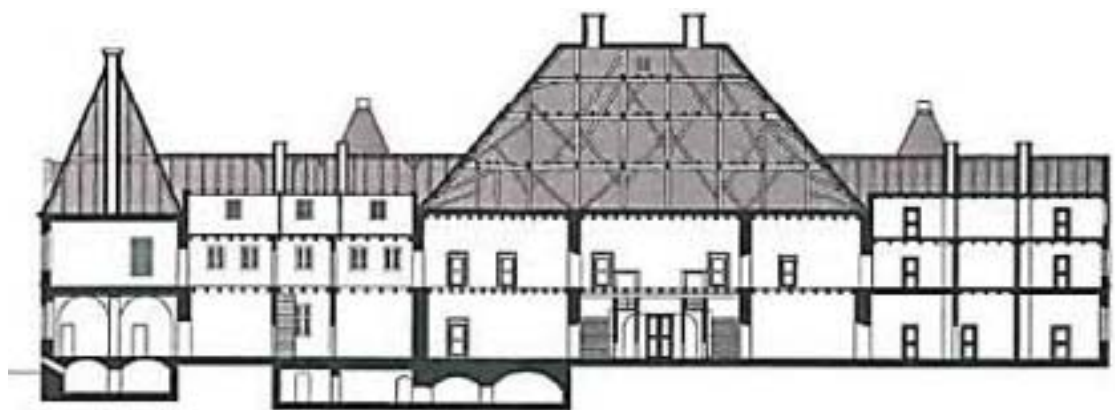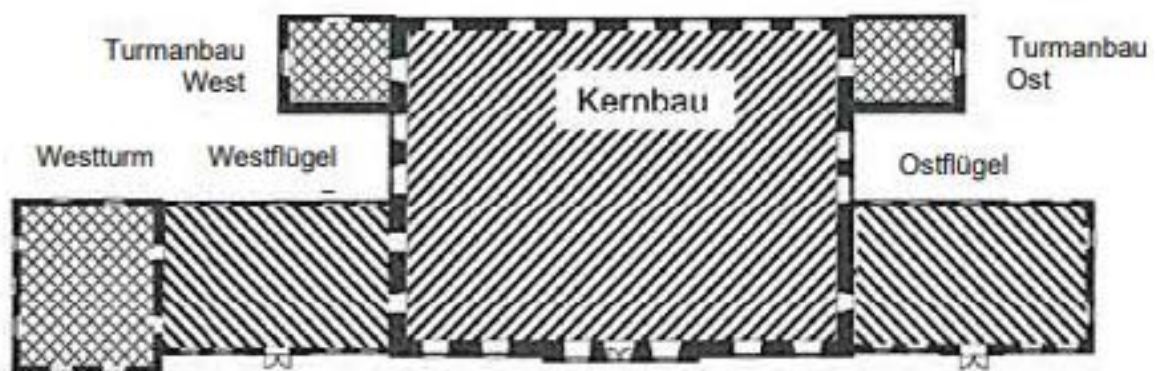
Fig. 2: The Palace Steinort/Sztynort before WWII

Fig. 3 Palace Steinort/Sztynort in 21st c

3. Values and the intervention

Considering that the key value of the building is considered to be historical, and the re-use necessary for salvage, some changes in organisation of floor plan were required.

The general appearance of the building has been preserved - the central part of the manor stayed in baroque style, and the wings in the style of late neoclassicism.

The interventions on the façade walls were mostly routine, however some radical changes were made, as well. The openings on the backyard façade were enlarged and some doors added, for better connection between inner space and the garden.

The strategy of intervention, which required change of purpose, included full reconstruction of the main-entrance hall. They included reconstruction of the staircase which was originally not properly designed, including change of geometry of stair flight. The reconstruction was executed using the same type of wood, and similar details, however, with respect to new public use and current standards.

Undoubtedly, baroque in the Eastern Prussia had much more moderate form than it can be expected from the reputation of the term. Consequently, the decorations on painted wood, which are considered to be fully baroque in East Prussian interpretation of style, were originally applied directly on construction element. The most valuable ones in the Kernbau were inseparable from the structural elements. The Kernbau has polychromatic painted ceiling beams with a span of 10m. They have been well-preserved, and important because beams reflect traditional Masurier craftsmanship (Fig. 3).

Original ceiling construction has an area of 1400 m², and therefore it is unique in size, originality and completeness. The ceiling was the central point of the intervention considering that the wood decay was the main reason for intervention.

Structural requirements were not in line with the rule of minimal intervention. A method that was applied for strengthening the ceiling beams is based on transforming the rectangular beam (Fig. 4a) into a T-beam. The former filler made of loose organic material is replaced by a glue-laminated timber over a rectangular cross-section, so that a T-cross-section can be created (Fig. 4b). That was necessary to meet the current safety standards. The height adjustment plank was glued to the bottom and top with a melamine-urea resin adhesive. That created a T-section with significantly larger load-bearing capacity. The necessary tests have been carried out by Prof. W. Jäger´s team at the TU Dresden [5] [8].

The volume of the building was preserved.
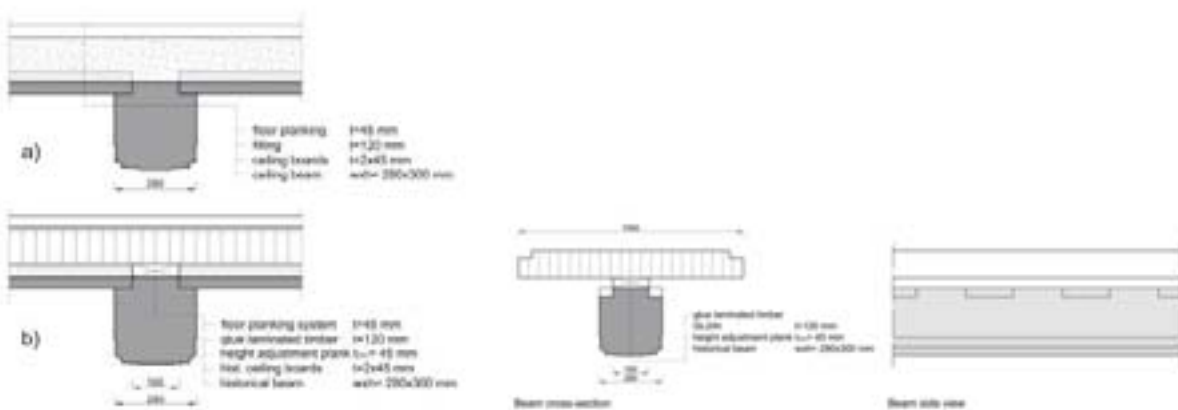
Fig. 4 Ceiling beams a) historical b) reinforced [5]   Cross-section of a T-beam [5]   The glue-laminated timber panels must be screwed together.

Fig. 4 and 5 show a section of the ceiling. The historical boards could have been pushed in from below.
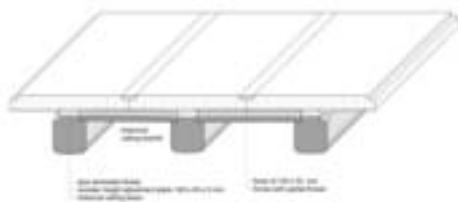
Fig. 5 Section of ceiling [5],[6]

4.   Discussion and Concluding Remarks

This goal-oriented approach of heritage interventions is nowadays frequently masked by the term "integrative approach" and substantial loss of authenticity is silently approved as necessary. Example of Steinort is such and that has several theoretical implications.

From structural point Steinort intervention was executed consistently and technically well. A lot of attention was given to respect of standards and safety. This can be considered expected as typically German approach, however – it is not only because it is similar nowadays in other European countries. "A renewed focus on safety issues in many areas of life has recently led to the creation of new regulations and standards, which have been inspired by the prevention of fatalities. New stringent Codes have been published in many parts of Europe on fire safety rules, security on building sites, and general safety conditions at workplaces. In many cases, this was after major disasters" [5].

Conservation of timber is recently widely discussed in scientific literature. There are evidences that it is crucial for success of many projects [6] [7], Steinort including.

For analyses of intervention digital models of intervention and management were used. They were used for structural analyses, BIM (HBIM) and visualisation proving that it becomes standard [6] [7]. Digital simulations are nowadays used comprehensively in decision-making process. It was applied in this case, giving better results than otherwise.

Then, although most importantly, there is a question of values, understanding and interpretation of them, which in these cases proves that they can be very subjective and understood only within certain context. That particularly refers to aesthetical values and question of style. Climate conditions (e.g. short summer), and much harder living conditions than e.g., in Italy or Central Europe, as well as, both the limitations and advantages of local technics and technologies of construction, may explain simplicity of northern European baroque in wooden architecture with moderate shapes and decorations. Calming modesty of Prussian Protestants, which were numerous in the area, also may have had important impact. By executing the intervention, a shift in value emerged, following the loss of authenticity. [9] Such shift, nowadays typically appear and it seems that we do not have instruments to keep full control over it [8], [12].

Finally, project Steinort is very important for German national identity from several viewpoints. It shows heroic and just side of it, contrary to typically negative connotation. It is nowadays far out of German borders and represents valuable evidence of today's East Prussia disintegrated community and culture. Probably that may explain need for gentrification during intervention. Profit tourism, does it too. Nevertheless, this approach inevitably meant losing authenticity while adding to the overall functionality.

We do not have proper answer to this problem in heritage doctrine, and we are waiting for comprehensive heritage theory which may have consistent and clear instructions. In that sense, complexity of Steinort interventions proves complexity of heritage protection in general.

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A land factory for preserving, developing and innovating: the Arco terraces.

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Abstract

The landscape bears witness to a historic culture that developed innovative technologies to meet the dual needs of food production and environmental sustainability, using available resources in simple and ingenious ways. Today, the agricultural landscape is of great value, both for its cultural significance and for its strong visual impact on the surrounding area. The construction of the landscape has created a system that needs to be preserved, managed and improved in order to maintain its aesthetic qualities, agricultural vitality, ecological balance, cultural and historical significance and local identity.

The terraced agricultural landscape of Arco will be studied. An area that overlooks the northern part of Lake Garda and that for over a century has been the catalyst for efforts to enhance and preserve its environment.

The aim is to exploit the potential of the present, trying to reactivate landscapes through visions capable of combining agriculture and tourism in a conscious relationship with nature and quality, to generate new well-being for people.

Keywords: cultural heritage, agricultural landscape, sustainable development, architecture

1.   Introduction

Landscape is the set of characteristic and distinctive elements of an area and derives from the indissoluble interaction between natural processes and human activities. In every historical period, the landscape has been influenced by the modifying action of humans, who has adapted it for their own needs.

This process of transformation has been gradual and has led to changes in the landscape, making it unique in its forms. In Trentino the human community has constantly worked on the soil, marking rural landscapes and producing the signs of its culture [1].

The adaptation of the physical layout of a site to different crops favored food self-sufficiency and created a natural landscape that continually changes over time and the seasons.

The variety of vegetation in the landscape offered a polychromatic spectacle that represented the changing beauty of nature and enriched the perceptive experience of the inhabitants.

The landscape was further enriched by built elements that integrated harmoniously into the surroundings context. Buildings, dwellings, stables, agricultural warehouses, together with infrastructure, terracing and boundaries, roads, paths and irrigation canals, formed the integral pieces of the landscape mosaic. Terraces are a distinctive aesthetic and cultural element of the rural mountain landscape.

The dry-stone walls, an integral part of this scenario. Maintaining the local identity and original features of the land, both in terms of preservation as well as management and design, involves both opportunities and responsibilities.

To manage terraced landscapes, today it is crucial to exploit new opportunities, search for hybridisation and promote the growth of tourism activities in connection with agricultural activities, in the nature.

Landscape represents the main element of individual and social well-being.

Designing and promoting sustainable tourism activities could be a sustainable way to ensure the conservation of terraces and encourage their enhancement for the community.

By considering slow tourism as a new economic dimension, we can help preserve places of unique and scenic beauty, maintaining them active and making them accessible to all.

With these aims, the territory of Arco, a small municipality on the northern shore of Lake Garda, Trentino, was observed.

In recent years, the community of Arco has sought to maintain a balance between economic development and environmental protection in order to ensure a more sustainable future for future generations.

This sensitivity to the environment has allowed Arco to become an example of good practice in promoting a harmonious coexistence between man and nature.

The enhancement of the Arco terraces (figure 1) represents an opportunity not only for the conservation of the natural and man-made environment but also for the development of forms of tourism that are respectful of nature and local traditions.

Fig. 1: The Arco landscape (2020, Maria Paola Gatti).

2. Arco and landscape beauty

Arco's landscape value can be seen in a series of views painted by famous and not so well - known artists, from the view painted by Albrecht Dürer [5] in 1494, to the map [6] inserted in Book LVII preserved at the Historical Archives of the Municipality of Arco, to the paintings of the local artist Alessandro Lutterotti (Figure 2, 3).
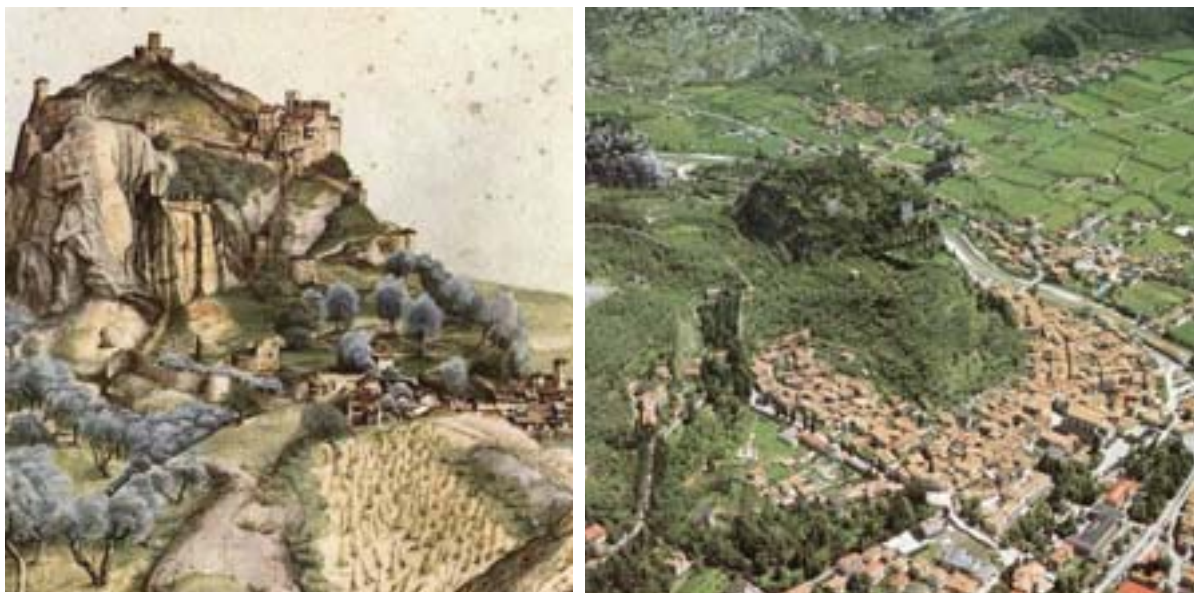
Fig. 2: The Arco landscape in Albrecht Dürer's watercolour (1495, [5]) and today (2020, Maria Paola Gatti).

Fig. 3: The rural landscape of Arco on the map of Francesco Santoni, 1723-1795 (Historical Archive of the Municipality of Arco, Book LVII, [6]).

Artists such as Giovanni Segantini also depicted the bucolic beauty of the landscape, which also emerges in tourist guides written between 1880 and 1910 (Emilio Vambianchi [7], Max Kuntze [8]), in the letters of Franz Kafka and in the essays of Alois Riegl.

In the different representations, what emerges is a landscape vision, and the process of its transformation.

The cultural and economic transformation at the end of the 19th century was able to integrate itself into the territory in an optimal way, without affecting the rural landscape; in fact, the beauty of the countryside was used to bring new vitality to the place.

During the Habsburg domination (from 1815 to 1919), a new part of the town was formed next to the agricultural village of Arco.

New residential and service buildings have been integrated into the territory with great respect for the surrounding landscape.

The Kurort compartments for the nobility (Austria, Germany, Czechoslovakia, Hungary) and wealthy bourgeoisie from northern Europe did not physically connect with the original nucleus, but with the surrounding territory. Many cultivated areas have been transformed into modern and rational green areas for health and leisure.

3.   Future: the affirmation of slow tourism

After the Second World War, industrialisation, mass tourism and modernisation, similar to many other realities, accelerated the process of abandonment with the consequent marginalisation of agricultural territories.

The agricultural surface area process also in Arco has been reduced significantly and quickly.

The most marginal areas, including terraces, which are by their very constitution unstable if not maintained, or the poorly productive areas, difficult to work and to access, have been progressively abandoned. In most cases, they are rural landscapes where mechanisation may prove difficult and, in some cases, even impossible to introduce.

After a period of unsettled options and uncertain strategies, the municipal administration and the community, understanding the need for landscape conservation and enhancement, have seen in the shared use and participative practices the road to define new policies that can also positively affect the economy.

In the current context, the shared interest in the environment and environmental issues are directing choices towards the development of forms of slow tourism immersed in nature that can be positively juxtaposed and contaminated with sports tourism, which became widespread in the 1990s, while at the same time rediscovering: authenticity in visiting places and enjoying the cultural heritage; sustainability in respecting the environment, reducing speed and preferring mobility by means that minimise environmental impact; the possibility of enjoying the beauty of nature and the landscape, but also of socialising with local people; slowness that has the potential to change the perception and attitude

towards places and nature; finally, the appreciation of emotions in discovering different territories and cultures, thus aiming at sustainable tourism [9,10,11,12].

The policies implemented or ongoing by municipal and territorial institutions have confirmed and are working to implement this vision to respond to the urgent environmental challenges, through strategies that maximise sustainability and this passes through the encouragement of the protection of terraced agricultural areas.

The Municipality of Arco has implemented some tools to activate sustainable landscape regeneration. We achieved that what happened between the end of the nineteenth century and the beginning of the twentieth century, if adapted to the new cultural and economic vision, could again lead to the definition of strategies to enhance, conserve and innovate the agricultural landscape (figure 4,5).

Fig. 4: The Arco agricultural trail network (Maria Paola Gatti)

The municipal administration also prepared a 'Study aimed at the eco-friendly enhancement of the Arco olive grove strip' (elaborated by Giulia Matteotti in 2008) to update the use of the territory, making it accessible to various activities, including tourism. The initiative aims to transform the area into an accessible and attractive place, promoting economic growth and improving the quality of life for residents and visitors. The strategy adopted includes the enhancement of local resources, the conservation of the environment and the creation of opportunities for sustainable development, thus helping to create a new face for the community.
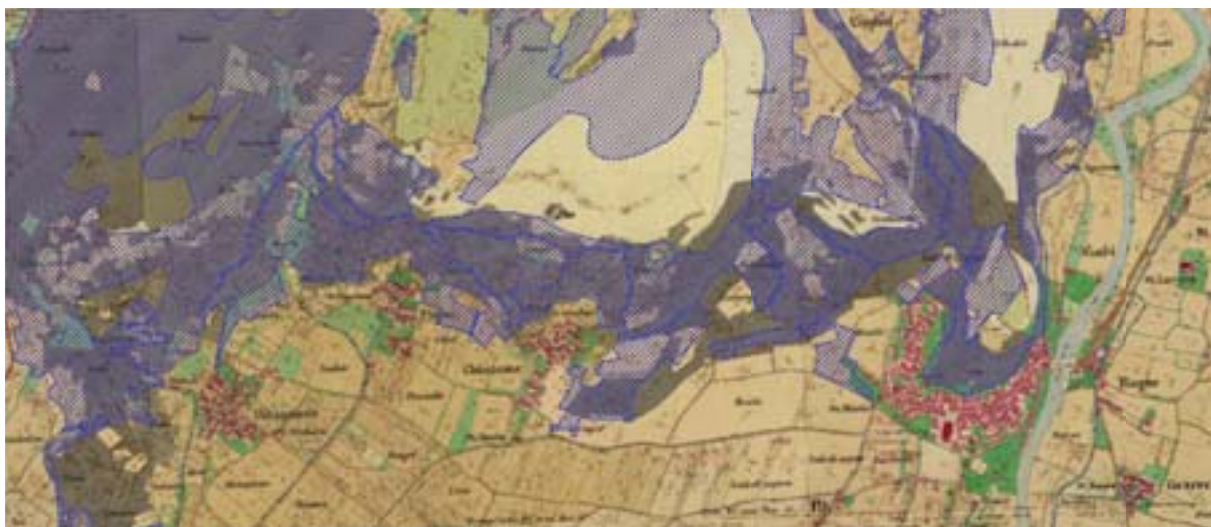
Fig. 5: Graphical reconstruction of the wooden boundaries existing in the current morphology, related to the historical cartography of Arco (processed and mapped in QGis environment by A. Zaniboni).

By identifying the potentialities and criticalities of this part of the territory, a series of functional routes for olive cultivation have been defined on the terrace, to favour accessibility to the area and thus facilitate and partly mechanise cultivation (figure 6).

These paths can also be used by visitors to go to monumental architecture such as the castle or other places of special scenic value.

The study also proposed the inclusion along the paths of microstructures that can be used by farmers who cultivate olive trees, by citizien and tourists.

Although the study has only been partially implemented, it is clear that the general strategy to be adopted to preserve and enhance the terraced landscape is to define and systemize several elements, i.e. agriculture, nature tourism and sports tourism. Tactics will refer to connection actions, on the road and path network, and through other minor interventions, such as small temporary architectures, able to develop and strengthen landscape values.

Fig. 6: Slow tourism infrastructure project in the olive groves (Technical archive of the Municipality of Arco, TACAR, 2008).

4. Contaminations Inventions for terraced lands.

An innovative and sustainable model of development can be proposed to improve landscape quality. In a quality landscape, experiential and emotional dimension is combined with a cognitive dimension, in which space gives us back a memory, a correspondence with our being that is fundamental to our well-being. Acts of dynamic contamination of the terraced landscape are undoubtedly the way forward: contamination ensures that a rewriting does not close itself within the limits of mere conservation, as a repetition of the same structure or forms, but can become generative by its very capacity to recognise and design new differences, to reconstruct the relationships that human beings have with their unique territory, with cultivated and agricultural landscapes and their wider social environment [13]. FAO 2018

In this perspective, smart land innovations such as the construction of good architecture or the recovery of agricultural artefacts are fundamental strategies for local development [14]. and slow tourism, both in terms of general sustainability and concerning the valorisation of zero-km agricultural supply chains capable of creating new economies.

From these considerations, terraces are fundamental elements to strengthen the landscape framework and to accommodate micro-architecture in the physical and cultural enhancement of places.

The observation of the context, the mapping, the unveiling of the thematic elements of the rural mosaic of Arco, are fundamental tools for the identification of spaces, relations, and new projects in relation to the existing, to improve the capacity of the landscape to be interesting, and for the strengthening of accessibility and the multi-sensorial use of places.

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Agri-tecture: towards a collaborative architecture.
Public spaces and urban agriculture for ecological and resilient transitions

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Abstract
By 2050 the global population is projected to reach 9,7 billion. The pressure on cities, along with the crises linked to climate change, drive us to imagine new urban metabolisms to achieving the SDGs of UN 2030 Agenda.
As part of the RESO PON Project, a demonstrator of urban agriculture will be built in Matera, showing how transformations of public spaces in favor of biodiversity can be achieved through the collaborative forms of the architectural project in a more resilient and productive city.

Keywords: resilience – climate change – architectural design – SDGs – nature-based solutions

1.   Introduction
In the face of mounting global challenges, human society finds itself at a critical juncture. Extreme natural events, due to climate change, intertwine with the intensification of conflicts, health crises, economic instability and social tensions, revealing how fragile and vulnerable are the (eco)systems we inhabit.
The consequences and the complexities of these interdependent crises draw our attention to the urgent need of coordinated efforts on a global scale. As «the magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation action» [1], it is crucial to understand the multifaceted dimensions of these challenges and to devise innovative and sustainable strategies to address them effectively, tracing the path to just and resilient transitions.
The Earth has been subjected to an unsustainable level of pressure due to the overuse of its resources and this is evidenced by the data. Earth Overshoot Day (EOD) marks the date when humanity's consumption of ecological resources and services surpasses the Earth's capacity to regenerate them. According to the Global Footprint Network, we reach EOD earlier every year, and in 2023, it fell on August 2nd [2]. This means that for the rest of the year, we maintain an ecological deficit.
This trend needs to be considered in relation to the world's population growth: by 2050 it will

reach 9,7 billion and almost seven out ten people are projected to live in cities [3].

Ensuring «sufficient, affordable and nutritious food within planetary limits» [4] means to achieve an economic, social and environmental balance for the creation of sustainable food systems, questioning how they can shape the city.

Nature-based solutions (NbS) play a crucial role in improving resilience and sustainability by integrating natural elements and processes into urban areas. They emerge as valid design tools applied at the local level, yet their effects must be considered on a larger scale, taking into account their global impact on the environment and society [5]. Additionally, NbS can help in achieving the Sustainable Development Goals (SDGs) of UN 2030 Agenda [6].

Fig. 1: Serra Venerdì Dreamin', collage by Enrica Gaia Consiglio, 2024.

2.   Urban Agriculture

Cities become open laboratories of ecological transition, in which is possible to explore new shapes of community through the collaborative forms of the architectural and urban project.

The COVID-19 pandemic has shown the need for a proximity space and a resilient food system, making us aware of the «inextricable links between healthy people, healthy societies and a healthy planet», as highlighted by the Farm to Fork Strategy, an essential part of the European Green Deal [7].

Within the framework of these policies, Urban Agriculture (UA) represents a multifaceted issue that provide answers to a growing demand of social resilience in the neighborhoods [8]: it goes beyond food security, encompassing broader goals such as social cohesion, equity and resilience to extreme events[9].

UA has to be considered as a part of a city's green infrastructure and it usually refers to farming practices conducted in confined urban areas. Indeed, many examples demonstrate how community gardens take root in what can be defined as 'junkspace': spaces of the city that remain «after modernizations has run its course» [10]. 'Solid' elements in a 'liquid modernity' [11].

These residual spaces, which have escaped fast-paced urbanization for multiple reasons, remain inside the city waiting for a new meaning. In this sense, community gardens are the key to understand urban recycling: residual spaces find a second life in the creation of a green space able to activate new replicable urban metabolisms linked to the vision of a Continuous Productive Urban Landscape [12].

Public space design becomes a participatory process, in which citizens are directly involved into city decision-making, favoring their self-empowerment process. This leads beyond the dichotomy between public and private spaces, generating a deeper concept: that of collective

space [13], where different actors work together on its design, implementation and maintenance, shaping at the same time, a 'collective consciousness'. Participatory design is one of the keys to exercise the 'right to the city' [14]: a collective right of urban dwellers to transform the urban environment and their own way of experiencing it, according to their needs.

As a NbS, UA contributes to improve sustainability through its three pillars: a) from an environmental perspective, UA facilitates a connection with nature, while contributing to the mitigation of climate change effects and the preservation of biodiversity; b) from a social perspective, UA promotes social cohesion, integration and education, fostering a sense of belonging to the spaces; c) from an economic perspective, UA generates micro-circular economy systems and it contributes to self-production of food. UA actively contributes in making cities and human settlements inclusive, safe and sustainable, helping achieve SDG 11. However, its effects extend beyond this directly linked goal to impact other SDGs as well.

2.1 Case studies: Red de Huertos Urbanos (Madrid, ES) and OR.ME. (Turin, IT)

Two case studies are selected based on their similar approach to the organizational structure. Specifically, the presence of two organizations, *Red de Huertos Urbanos* (Madrid, ES) and OR.ME. (Turin, IT), emphasizes the necessity of UA practices to be integrated on a network. It is important to underline the effectiveness of such organizations in:

a) giving visibility and practical support to existing and emerging practices of UA;
b) acting as intermediaries between administrations/stakeholders/associations;
c) fostering communication and cooperation among associations;
d) having a systemic vision.

Within the framework of replicability, their presence could also facilitate data collection, making it accessible and useful for evaluating the impact of the activities. This could ensure that successful practices can be implemented in other contexts in order to achieve similar benefits.

A 2013 study [15] conducted by Urban Networks identified 573 urban voids as negative, empty and no human interaction [16] within the central area of Madrid, with a total surface area of 630,000 m^2: an incredible hidden treasure, where incompleteness holds a promise [17]. Starting from these voids and understanding the value of emptiness, it is possible to envision new possible futures for a resilient and productive city through UA [18].

Fig. 2: *Esta es una plaza* in Madrid, ES. Photo by Enrica Gaia Consiglio, 2018.

To explain the growing interest in UA in the Spanish capital, it is useful to focus on the context of Madrid. In pursuit of «a dream of solidarity, participation, and creativity in cities» [19], the City Hall (especially during Manuela Carmena's administration) promoted policies aimed at addressing climate change and increasing public awareness of environmental issue [20].

The Municipal Urban Gardens Program was established in 2014 through an agreement between two associations, FRAVM and the *Red de Huertos Urbanos de Madrid*. It promotes and supports non-profit associations in the development of sustainable UA projects, giving them the tools to start their own project [21]. It has facilitated the implementation of specific regulations concerning urban gardens, setting criteria for the allocation and management of urban voids.

Through the Municipality's online geoportal, it is possible to access to a constantly updated database. April 2024 data reveals an upward trend in UA practices in the Madrid Metropolitan Area with a total of 216 school gardens, 57 community gardens and 45 healing gardens [22].

The second case study, located in Turin, is OR.ME. [23]. It was founded as an informal network in 2017 by 7 local organizations. In Italy, according to 2017 ISTAT data [24], there

has been an increase in the presence of urban gardens (+4%), totaling 2 million square meters circa across 77 capitals. This trend has been further amplified by the COVID-19 pandemic, as indicated by Coldiretti/Ixe [25].

Fig. 3: *Orti Generali* in Turin, IT. Source: https://www.ortigenerali.it

The vision of OR.ME. is linked to the production of natural and sustainable food through participatory processes, aiming to create resilient communities and solidary networks to guarantee the access to nourishing food. In 2021, it became a second-level association with a new mission: to connect and to leverage the experience in UA of its members for the benefit of local stakeholders, associations and the entire community. OR.ME. embarked on a field research to map existing UA practices, creating structured frameworks that simplify monitoring and management processes. This initiative, although operating on a smaller scale, reflects the organizational structure observed in the Madrid case, highlighting the importance of coordinated networks to establish a systemic vision of UA practices.
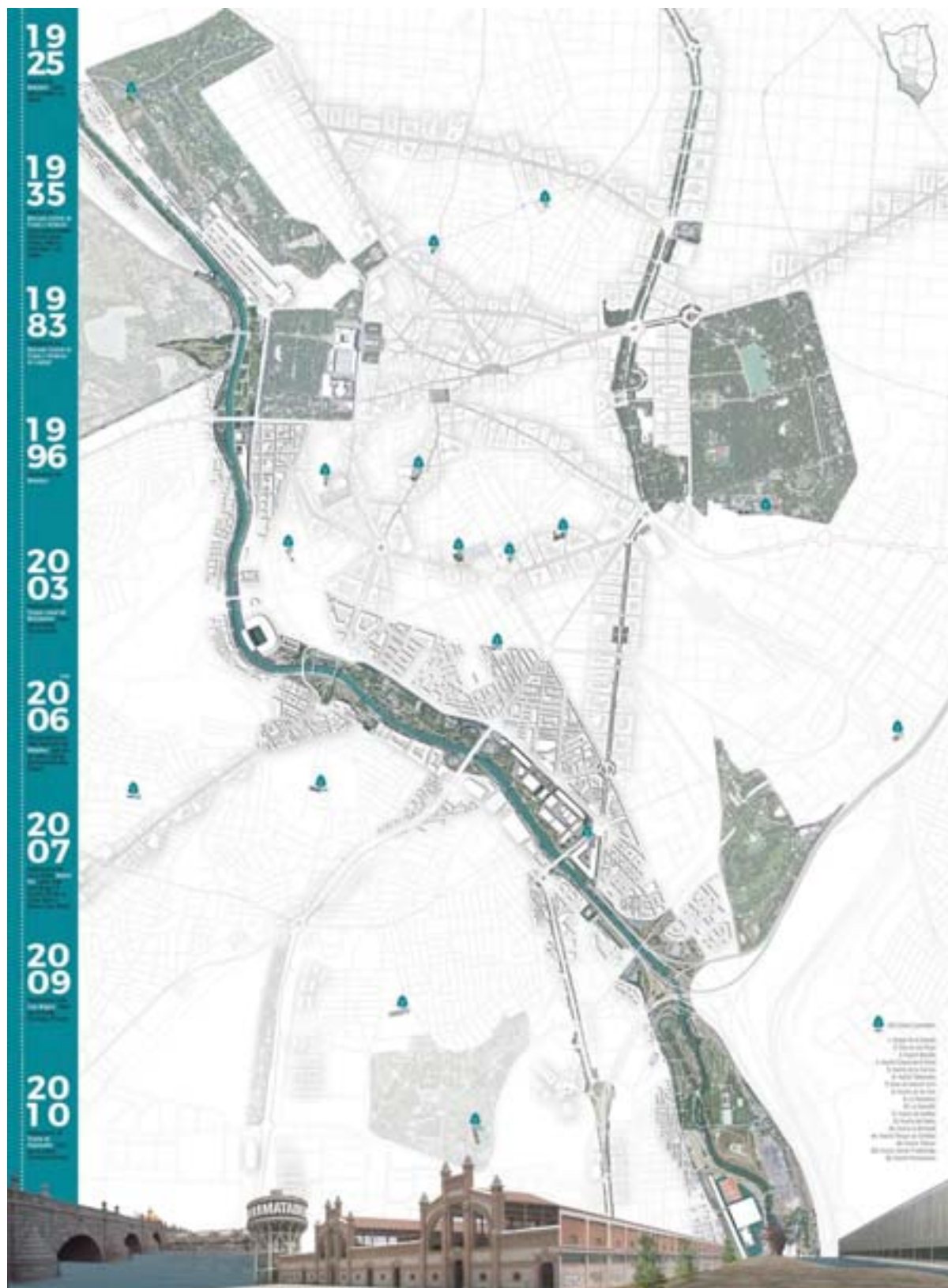
Fig. 4: Madrid's infrastructure systems. Source: CONSIGLIO, Enrica Gaia. *Recycling through Agri-tecture. Madrid 2030: Future Hybrid Factory in Legazpi*. Master's Degree Thesis, University of Palermo, tutor Renzo Lecardane, 2021.

3.   RE.SO. through Agri-tecture

RE.SO. (Resilience and Sustainability of the fruit and vegetable and cereal supply chains to valorize territories) is a PON Project promoted by University of Basilicata in collaboration with other 18 public and private partners. It focuses on the challenges of the agrifood area of the Southern Italy Regions (Basilicata, Apulia, Calabria and Campania) with the aim of promoting sustainable development through the innovation of processes, products and services, while preserving natural capital.

One of the final outcomes is to build a 'demonstrator' of an UA laboratory as a prototype of NbS platform that explore the role of food «as a cultural 'form of process' and creative invention produced by the relationship between space and society» [26].

The exploration of this relationship, through the notion of community, was deeply rooted in the design principles of Matera's historic neighborhoods, developed as a consequence of the 1952 urban renewal law for the *Sassi* [27]. Among these neighborhoods, Serra Venerdì has been selected as the site to hostthe demonstrator.

Serra Venerdì, planned by Luigi Piccinato and Luisa Anversa (1953-57), is described as the 'village- neighborhood' [28] by Piccinato himself. Inspired by the typology of a Lucanian hillside village, the urban project aimed to integrate buildings and streets into the morphological context, trying to emphasizes the value of *Sassi*'s community. In addition, green spaces would have ensured a high level of sustainability,creating a human scale city.

The original urban layout is still recognizable today. However, it is worth noting that the gardens, originally intended to be a source of sustenance for each household, are now almost entirely absent from the urban landscape.

Fig. 5-6: The productive function of the gardens has largely disappeared over time, as seen in the comparison between the original project (source: RESTUCCI, Amerigo. *Matera, I Sassi*. Turin: Einaudi, 1997, p. 289) and the current situation (elaboration by Enrica Gaia Consiglio, 2024).

In recent years there has been a renewed desire to reconnect with nature in Serra Venerdì. Since 2020, Noi Ortadini, a non-profit association, has been taking care of an abandoned urban green area that was previously used as waste dump.Today, it is a community garden where events and workshops on gardening, ecosystem restoration, outdoor education for children and debates on climate change and sustainable lifestyles take place.

Their efforts led them to win the New European Bauhaus 2023 Prizes in the 'rising star' category under the 'reconnecting with nature' section [29]. The one of Noi Ortadini is an example of how to use natural resources in an urban environment in a healthier way, promoting a better understanding and educationabout food production.

Sharing the same vision, we have chosen them as our stakeholders and co-developers of the project.

Fig. 7: Green area in Serra Venerdì adopted by Noi Ortadini. Photo by Enrica Gaia Consiglio, 2024.

The demonstrator will be built in the green area adopted by Noi Ortadini, aiming to create a favorable food environment that facilitates the choice of healthy and sustainable diets, ultimately benefiting consumers' health and quality of life.

The methodology for our ongoing co-design project consists of four main 'horizontal' phases: a) research (data collection, exploration of the area with an interdisciplinary University team, interviews, case study identification, analysis); b) association dialogue (creation of a common framework, development of strategy for social engagement); c) community engagement (public discussions, walkabouts, lectures);

d) project (development of an overall urban strategy and local scenarios). Transparency, communication and coordination are crucial elements of this interdisciplinary process and they ensure its effectiveness. A feedback mechanism among all the actors throughout the process is essential for continuous improvement and refinement of the outcomes.

Fig. 8: Walkabout and co-design session in Noi Ortadini's green area. Photo by Nicla Pisciotta, 2024.

At its core, there is the idea of initiating a process to conceive spaces that connect us to the environment by engaging in a dialogue with the 'living material' through an understanding and acceptance of its natural 'genius' [30]. Architecture becomes this way Agri-tecture.

Fig. 9: Scenario of the demonstrator, exploring the concept of micro-landscape (elaboration by Enrica Gaia Consiglio, 2024).

4.   Conclusions

The contribution explores the multifaceted role of UA besides food provisioning, recognizing its wide- ranging benefits across the three pillars of sustainability. Viewed as a crucial component of a city's green infrastructure system, UA can be one of the pathways to achieving SDGs of 2030 UN Agenda.

The analysis of the selected case studies highlights the necessity of a systemic vision, which could be facilitated by the presence of networks, to monitor and support UA practices.

A multidisciplinary research-based approach is guiding us in the creation of a demonstrator as a UA laboratory in Matera. The participatory design has to be seen as a process undertaken through in-depth analysis, acting as a catalyst for expanding and enriching the project itself. Thanks to the involvement of experts from various disciplines, this process becomes 'enzymatic', introducing from time to time, complexity. The architectural drawing, «at once descriptive, synthetic, critical» [31], is the tool to move from complexity to synthesis. In this context, the architect plays the role of a director, orchestrating the various competencies and transforming them into an organized spatial vision, shaping and structuring ideas to make them visible. The role of architecture, as we perceive it, is deeply rooted in the philosophy of Giancarlo De Carlo: contemporary architecture tends to produce objects, while its true purpose is to generate processes. This narrow focus confines architecture to a limited spectrum, exposing it to the risks of subordination and megalomania and leading to social and political irresponsibility. The transformation of the physical environment involves a sequence of events: the decision to create new organized space, resource acquisition, organizational system definition, formal system definition, technological choices, use, management, technical obsolescence, reuse and physical obsolescence. Each of these events is interconnected and their intensity varies according to circumstances and context. Architecture is involved in the entirety of this complex process, as the project it expresses initiates a long-term processwith significant consequences [32].

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World Heritage and Dwelling on Space
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Le Vie dei Mercanti

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Community connections. Project hypothesis for cable car connections in the municipalities of the Lucanian Dolomites.

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Abstract
The Lucanian Dolomites represent a fragile territory of the Basilicata Region, in need of a new infrastructural arrangement capable of solving connection problems between the municipalities and the main road infrastructures. Within the MITIGO Project (Mitigation of natural risks for safety and mobility in the mountainous areas of Southern Italy – "FESR, PON Research and Innovation 2014-2020"), co-financed by the European Union, a cable car connection project has been designed between the municipalities of Pietrapertosa, Castelmezzano and the S.S. 407 Basentana road axis. The project aims to solve the problems of landslides on existing road links and their difficult accessibility. The project master plan identifies three "hubs" in the territory where the cable car stations are located, which also serve as community gathering places. The architectural project, focused on the need to guarantee a direct and safe connection, presents an opportunity for the redevelopment of urban and landscape areas that are currently not fully valorised. The architectural forms, materials, and position in the area respond to technical requirements and define a new landmark in the landscape, becoming a tourist attraction. The project of a cableway connection system is a valid tool to respond to the impact of natural ecological disasters, such as landslides, in the inland areas Basilicata, where many municipalities are isolated and without adequate road infrastructure.

Keywords: Inland areas, Community connections, architecture, landscape, infrastructures.

1. Introduction

The aim of this study is to define a new infrastructural connection between the municipalities of Pietrapertosa and Castelmezzano (Fig. 1) and the S. S. 407 - Basentana road axis. The study is part of the MITIGO project (Mitigation of natural hazards for safety and mobility in the mountainous areas of Southern Italy), co-financed by the European Union - "ERDF, PON Research and Innovation 2014-2020", and is outlined within the Realisation Objective 7 (Innovative Mobility Solutions) [1].

With the goal of contributing to the improvement of social and economic conditions in Southern Italy (with particular reference to the territory of Basilicata), the MITIGO project proposes mitigation solutions for hydrogeological and seismic risks for road connections and strategic structures in mountainous urban areas affected by landslides and earthquakes, lack of services, mobility difficulties and depopulation phenomena. Through an interdisciplinary approach, models of investigation and intervention on a territorial and local scale were proposed, also investigating synergic systems of safety interventions.

In particular, this study is delimited to the area of the Lucanian Dolomites, an area characterised by inadequate infrastructural standards, long and difficult road/elevation paths and slopes affected by landslides and hydrogeological instability. In the Basilicata Region, difficult mobility and the high risk of isolation, also caused by the poor condition of the road infrastructure networks, contribute to the current depopulation [2].

Fig.1: Aerial photos of Pietrapertosa (top) and Castelmezzano (bottom).Photos taken from https://www.volodellangelo.com.

With a view to proposing improved solutions for the mobility system, numerous geomorphologic and economic analyses were carried out, which made it possible to identify, alongside solutions to improve existing road sections, the solution of aerial mobility by means of a cableway system.
The architectural design, alongside the technical issues, seeks to respond to the needs of the

places and the inhabitants, representing a starting point for territorial regeneration, not only in terms of infrastructure and connections, but also in terms of the community.

2. Analysis and preliminary studies

Starting from the Realisation Objectives of the Mitigo project and the technical analyses related to risk assessment and their resolution, a set of design actions was outlined for the cableway connection between the municipalities of Castelmezzano, Pietrapertosa and the SS. 407 (Basentana) road infrastructure. The design, technical and dimensional study, proposed by the University of Trento group [3] on the Lucanian Dolomites Cableway, is the basis for the continuation of the proposed architectural project (Fig. 2).

The multidisciplinary analysis of the various study groups within the project led to the typological choice of the cableway system, favouring a Funifor system [4] This choice was made due to the many strengths identified, including the automation of the system, the independence of the cabins on the lines, and their great stability. This stability is determined by the possibility of having much shorter suspensions than other types of systems, resulting in lower stations and less impact on the landscape [5].
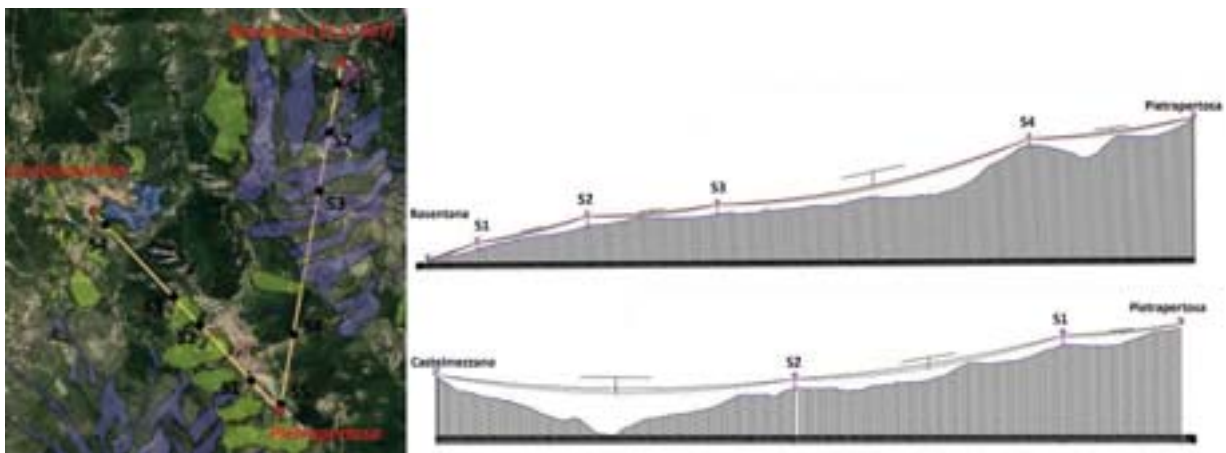
Fig.2: Diagrams of the Lucanian Dolomites cable car, arrangement of pylons and ropes. ©Belluati Carlo.

The outputs determined by the MITIGO project analyses allowed the identification of the most suitable places and areas to insert the cableway stations and related services within the Lucanian Dolomites landscape. The opportunity to situate the project within a context that is strongly characterised from an environmental and naturalistic standpoint, and to serve two communities - Pietrapertosa and Castelmezzano - with growing tourist activity, allows for the conception of these stations as focal points. These stations serve as condensers of functions for the entire Lucanian Dolomite community, becoming real HUBs for the area.

3. The Lucanian Dolomites cableway project

The elaboration of the master plan (Fig. 3) emphasises that the cableway connection between the three locations does not solely consider volumetric, formal, and technical issues. Instead, it is capable of implementing concrete actions for the requalification of existing areas, not only on a tangible level but also on an intangible one, preserving their intrinsic qualities, such as those of a landscape nature, and implementing functional ones linked to transportation and tourist reception.

The precise location of the stations in the Dolomite landscape integrates functions beneficial for the daily lives of local communities and for tourists during peak periods. From this perspective, the architectural and functional aspects of the stations, including technical aspects, interchange car parks, open areas, and connections with the urban center, were analysed to initiate a broad process of redevelopment in the involved areas.

Fig. 3: Master plan of the Lucanian Dolomites cableway project

The elaboration of a SWOT analysis was of fundamental importance. Thanks to this, a strategic framework was outlined, which was used to assess the strengths, weaknesses, opportunities and threats of the project with respect to the pre-existing urban and landscape features. Following the technical indications of the infrastructure project, the geometric and dimensional characteristics of the areas subject to intervention were determined.

3.1 HUB1 Basentana station

The station, located near the S.S. 407 - Basentana, allows a direct and linear connection with the village of Pietrapertosa, which is currently almost impossible due to the numerous landslides affecting the road link. The station's positioning was determined in accordance with the cableway's supports, avoiding landslide areas along its route.

In addition to guaranteeing a fast and safe connection from the Basentana to Pietrapertosa, a station with appropriate multifunctional spaces constitutes a strong asset for the town's community and for the tourist community visiting in the Lucanian Dolomites.

As mentioned earlier, the establishment of a cableway installation would promote the regeneration of the entire area, allowing for the redevelopment of existing road infrastructure and associated areas.

The architectural project (Fig. 4) utilises the site's morphology to define terraces upon which new volumes are constructed, echoing the forms and materials of the surrounding landscape. The spaces and pathways adhere to accessibility criteria.

From the S.P. 13, visitors reach the interchange parking area where photovoltaic canopies/carports have been installed. These complement potential installations of the Lucanian Renewable Energy Communities [6], which could supply the energy required for the cableway's operation. The introduction of new infrastructure may thus initiate discussions regarding the Basilicata Region's energy plan.

To blend the new volumes with the landscape, it is planned to enhance vegetation in the immediate vicinity of the new buildings by planting medium and tall trees of the same species found in neighbouring areas.

Fig. 4: HUB1 project, location of the functional areas and station renderings.

3.2 HUB2 Pietrapertosa station

HUB2 (Fig. 5) is located in a peripheral area of the town of Pietrapertosa, in what is now known as the "camper van parking area", which is currently underutilised. In analysing this area, it became clear that careful attention must be paid to pedestrian and vehicular routes, given the not inconsiderable distance between the station's location and the historic centre. The decision to locate the Pietrapertosa cableway station in the vicinity of the camper van area was derived from geomorphological considerations, since there are no landslide points in that context. Additionally, the choice was motivated by the desire to distance the station from the rock formation that surrounds the town, which serves as a distinctive symbol of the village, thus minimising its impact on the landscape.

Due to the particular morphology of the territory, the project envisages the relocation of the arrival station from the Basentana and the departure station for the Castelmezzano in two separate points.

The design solution also involves the redevelopment of an entire area, currently neglected, by integrating elements into the landscape that respect both the urban and natural context. The project features a skywalk, an elevated path connecting the two stations and creating new visual perspectives on the territory, while also establishing a new landmark for the Dolomite town.

Fig. 5: HUB2 project, location of the functional areas and station renderings.

3.2 HUB3 Castelmezzano station

The station that characterises HUB 3 (Fig. 6) is located in continuity with Piazza Giovanni Paternò, one of the main squares in the municipality of Castelmezzano. The decision to locate the station in this site derives from the possibility of placing it below the street level, seamlessly

integrating it with the square and blending it into the urban and natural boundary of the area. The architectural sign, although present, have a limited impact. The station's strategic location is positively influenced by the services already available on site, such as the covered car park and the car park in the square area. Its proximity to the historic centre enhances the opportunities that the direct and fast connection with the town of Pietrapertosa brings, especially in the context of tourism. The ease of access between the historic core and the station not only enhances the visitor experience but also accentuates the potential for tourism development, offering a more attractive link between the area's cultural heritage and the new infrastructure.

As in the case of Pietrapertosa, the station would become a new gateway to the Lucanian Dolomite town. With this in mind, it appears necessary to enhance the context by redesigning the square and surrounding areas, dedicating more space to community places.
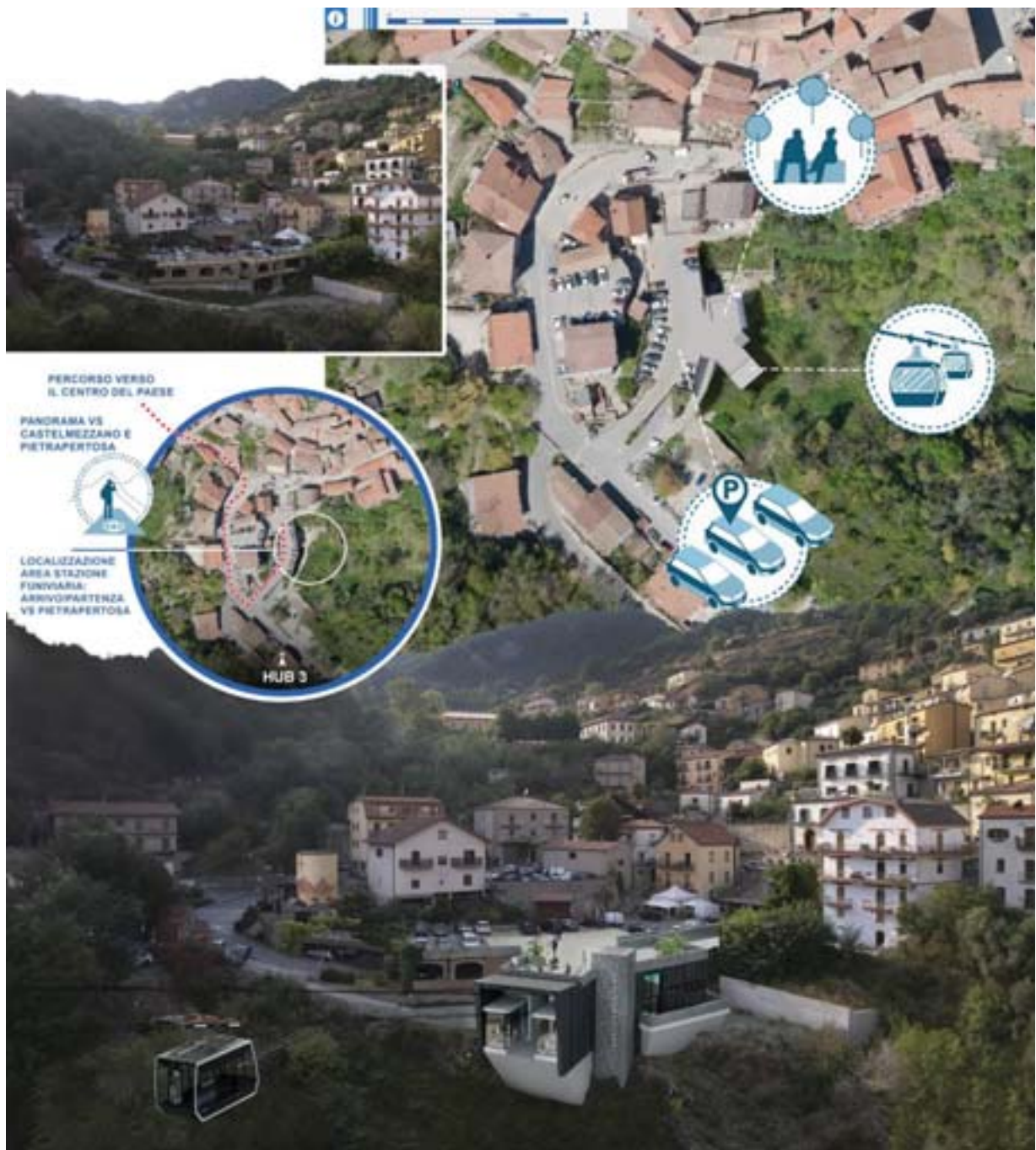
Fig. 6: HUB3 project, location of the functional areas and rendering of the station. Top right: pre-project status of the square.

4. HUB3 Castelmezzano station

The introduction of a cableway in these places could represent an important form of sustainable transportation, aiding to improve mobility and reducing the risk of isolation for local populations. This would not only facilitate daily movements for residents but could also stimulate tourism development, attract visitors, and stimulate the local economy, serving as a countermeasure against depopulation.

As previously mentioned, the introduction of a new form of mobility could encourage the development of complementary services and infrastructure, leading to the regeneration of spaces and the community, with clear positive social and economic effects.

From a regional point of view, a cableway connection could strengthen territorial cohesion, favouring exchange and collaboration between different countries and promoting the balanced development of the entire territory.

A cableway-based infrastructure system can play a significant role in improving mobility, environmental sustainability, economic development and community resilience, whether in urban, rural or mountainous areas.

Author Contributions

All authors contributed equally to the research and the writing of this manuscript. All authors have read and agreed to the published version of the manuscript.

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Climate Heritage between threats ad opportunities. Matera and its Sassi as a Design-oriented Prototype for Nature-based Climate-Adaptive Regeneration

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Abstract
Heritages, and in particular UNESCO sites, are powerful means to deal with a changing climate. They show how vulnerable heritage is to climate change's effects but also the role they can play to proactively pursue adaptation and resilience. Recently, climate heritage has emerged among heritage studies and the international debate as a promising concept that tries to integrate climate action into consolidated heritage management practices. By taking advantage from adaptation processes and enhancing overall resilience to present and future vulnerabilities, adjectify heritage as climatic could have a crucial role in addressing the Agenda 2030's Sustainable Development challenges and update current methodologies and practices. Although climate heritage innovative potential has been recognized, conceptual and procedural gaps that limit its operability still exist. The research aims to identify principles and procedures to operationalize, through a design-oriented approach grounded on transdisciplinary, the concept of climate heritage. Inside this qualitative methodology, a co-design experimentation will be presented. This experimentation, by leveraging the potential of the water heritage of the Sassi and its connection with the contemporary city, envision a possible Nature-based Climate-adaptive regenerative process for one of the Matera's modern neighborhoods.

Keywords: Climate Heritage; Adaptation; Nature-based Solutions; urban regeneration; Modern neighborhood

1.   Changing perspectives: from climate change to Climate Heritage

Heritages, and in particular UNESCO sites, are powerful means to deal with a changing climate. They show how vulnerable heritage is to climate change's effects but also the role they can play to proactively pursue adaptation and resilience. Within the Heritage studies, an interesting transdisciplinary debate is arising on the relationship between heritage and contemporary uncertainties, in particular with climate change. From a 'stability under threat' [2][3] starting vision - highlighting exclusively the negative impacts on heritages to be preserved as unchanged -, recently a more convincing line of investigation emerged which explores heritage and climate change nexus in all its complexity. Heritage, a 'fundamental resource for human development' [4] is positioned as a crucial asset and a source of creativity for climate adaptation, leveraging the differently adjectivized concept of transformation [5-7].

Adaptation appears to be a key concept in exploring the nexus between heritage and climate change, opening up to more up-to-date ways to support heritage-based sustainable development scenarios in a changing climate. Adaptation is defined, as 'the ability of a system to adjust to potential damage, to take advantage of opportunities or to respond to consequences' [8]. Adaptation continues to be explored inside climate change cultural heritage research field: 'reactive', 'proactive' and 'planned' [9], 'persistent', 'autonomous' and 'anticipatory' adaptation [10] and other definitions represent this effort. 'Cultural heritage, whether tangible or intangible, is sustainable to the extent that it has the capability to adapt to change through creative transformation and continues to develop' [11]. Recently, Climate Heritage has emerged as a promising concept that tries to integrate climate action into consolidated heritage practices. By taking advantage from adaptation processes and enhancing overall resilience to present and future vulnerabilities, adjectify heritage as climatic could have a crucial role in addressing the Agenda 2030 Sustainable Development's challenges. It asks also to discuss and update current methodologies and practices. Although Climate Heritage innovative potential has been recognized, conceptual and procedural gaps [12] that limit its operability still exist. The research aims to identify principles and procedures to operationalize, through a design-oriented approach grounded on transdisciplinary [13], the concept of Climate Heritage, considering the UNESCO site of the Sassi of Matera, and its interconnection with the cotemporary city [14].

2.   Matera as a living heritage archipelago

The Sassi and the Park of the Rupestrian Churches of Matera has been inscribed in the World Heritage List (WHL) in 1993. Its Outstanding Universal Value (OUV) "stems from the symbiosis between its cultural and natural characteristics" [15]. "An ingenious system […] where necessity has led to the best possible use of natural resources by managing water, soil and energy appropriately and harmoniously." A complex ecosystem resulted from the mutual adaptation between man and nature that has been interpreted as an "…example for the sustainable city, a metaphor for a new model and a proposal for the entire planet" [16]. For the Sassi, a cultural landscape in essence, an operation of value extraction was done, letting emerge the character of its living heritage on the interface between tangible and intangible. But the harmonious relationship between man and nature, the way of using natural resources and the environmental context, the traditional knowledge and practices should be read also in symbolic perspective. Not only because the symbolic aspect of life is part of the pre-modern culture that the site bears witness, but also because a holistic approach that brings together materiality and aspects that transcend it may hold effective potential [17]. Concerning water, functional and symbolic aspects were intertwined in the life of the Sassi, and such a holistic approach can become effective again in addressing challenges of sustainability and awareness [18]. Traditional knowledge has been formed and refined over centuries by the community, with specific outcomes that are different from authorial products. However, today there are questions about how developments in open source and new web-based models of participation can change authorship, even in architecture, and there is a glimpse of a push for closeness between open source and vernacular architecture [19].Traditional knowledge and practices, beside their testimonial value, can be interpreted as a living reservoir of knowledge to support the recovery of an approach to natural resource management characterized by resilience, adaptation, and sustainability [20]. The Management Plan envision the Sassi as a "model Mediterranean rock ecosystem," an expression of a new ecological paradigm [21]. Matera can be interpreted as a living heritage archipelago [22], made up by the Sassi, the Murgia plateau, and the Park of Rupestrian Churches, but also of its Modern neighbourhoods and the ongoing community-based cultural significance processes taking place in its contemporary suburbs [23]. In the aftermath of the II World War, Matera from "national shame" had been turned into an urban laboratory where to experiment innovative design and planning solutions. Its modern neighbourhoods and rural villages are today recognized by the architectural culture as part of the Modern Heritage, thus to be preserved and enhanced [24].

3. The Water system in a changing climate between the Sassi and its Modern neighborhoods

Today climate change impacts, in particular pluvial flooding and heat stress, is impacting on the city, the WH site and its communities. The changing precipitation pattern, combined with local fragilities caused June 2, 2023 flooding in the Sasso Caveoso [25]. If the climatological projections will be confirmed, flooding events will be more frequent in the future as well as longer drought period. The city urges to redefine its relationship with water and its scarcity. The peculiar way the Sassi had lived with water has shaped spaces, morphologies, local practices and techniques that has been progressively eroded and forgotten in the last two centuries. The Nature-based Solutions implemented over centuries, like cistern, pit, ponds, catch basin and channels [26, 27], roof and terraced gardens were part of a system of water management that had allowed the cities to flourish even in a resource-scarce environment. Although its sustainable, circular and smart [28] water system and its Nature-based solutions had been crucial in the inscription into the WHL, more research is needed, also in a climate-adaptation perspective. Recent flooding phenomena and water speed which characterize them can be attributed in part to the reclamation of ancient cisterns for other uses in the Sassi; but also to modern and contemporary developments that have artificialized the hills around the ancient city, increased impervious surfaces, and to the obsolesce to the water infrastructure. Water thus is not absorbed and collected and picks up speed following the topography of the soil until it reaches the Sassi. Through Nature-based Climate-Adaptive Regeneration, Modern and contemporary neighbourhood [29] can contribute to reduce flooding exposure and risk for the Sassi and simultaneously improve space quality and wellbeing for their residents [30].

1	CITY LAKE
2	TOWN CISTERN
3	POND
4	GRABIGLION
5	NEIGHBOURHOOD CISTERN
6	WELL
7	CATCH BASIN
8	PRIVATE CISTERN
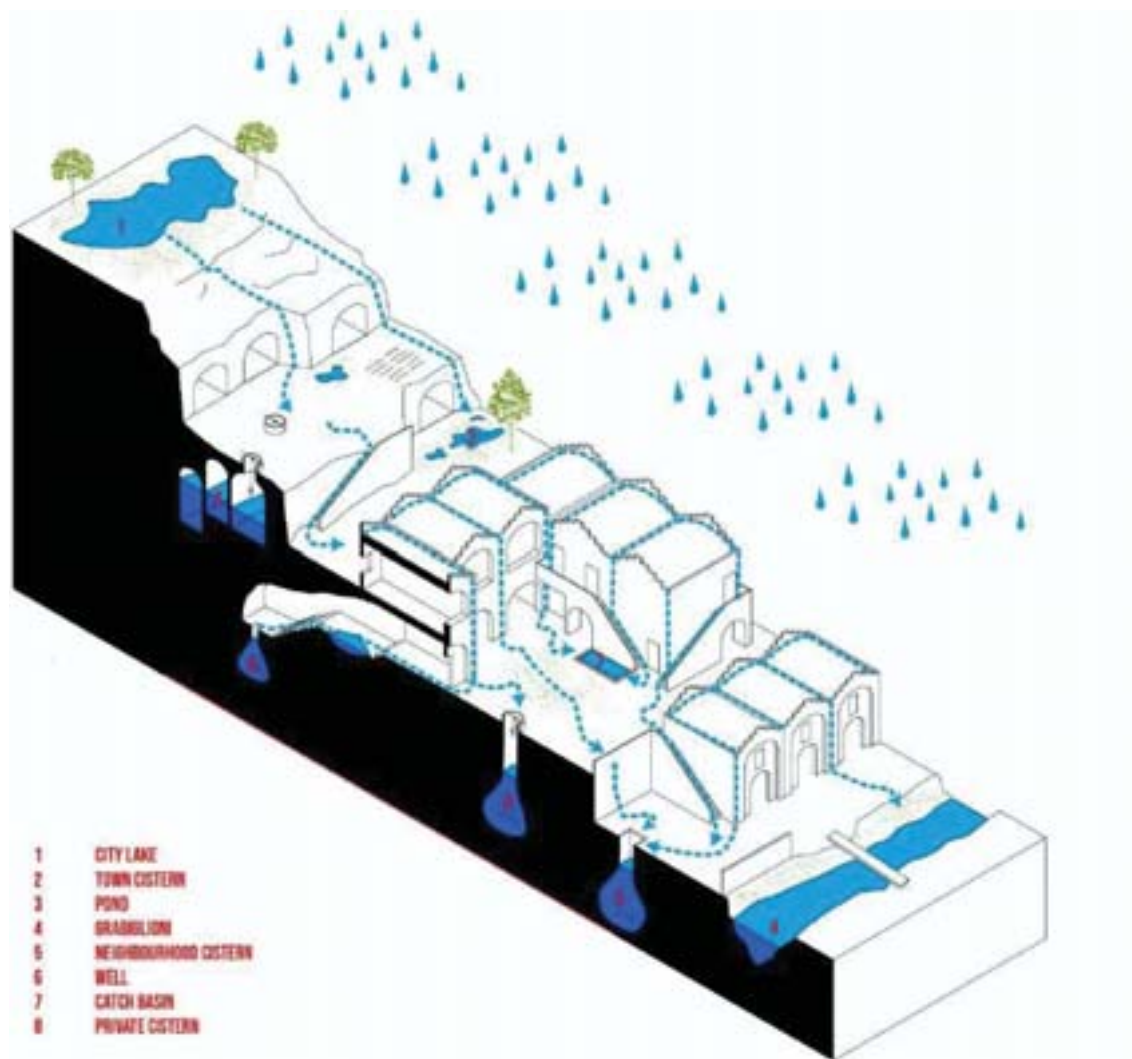
Fig. 1: Diagram of the water management system of the Sassi (graphic elaboration by A. Tonon, with A. Raffa).

3.1 Reconnecting the Sassi and Lanera Modern Neighborhood through Nature-based Climate-Adaptive Regenerative process

Inside this problematic framework, an experimental process has been structured in order to address, from a design-oriented perspective, the entanglements between Climate Heritage, adaptation, water ecologies and Nature-based regeneration between the Sassi and its Modern neighbourhoods. With this objective in mind, the Lanera neighbourhood [31] has been selected as urban design prototype.

Fig. 2: On the foreground, the Lanera neighborhood today with the Sassi and the Gravina creek (elaborated from Google Earth).

Fig. 3: Aerial view of the Lanera neighborhood (elaborated from Google Earth).

Lanera is located in an elevated topographic position and is part of the Sasso Caveoso watershed [32] [33], thus contributing to the flooding of the homonymous part of the Sassi; it's exposed to flooding phenomena and water shortage during drought periods. Beside these

issues, Lanera is characterized by a set of weakness and opportunities, recurrent in other neighbourhoods [34].
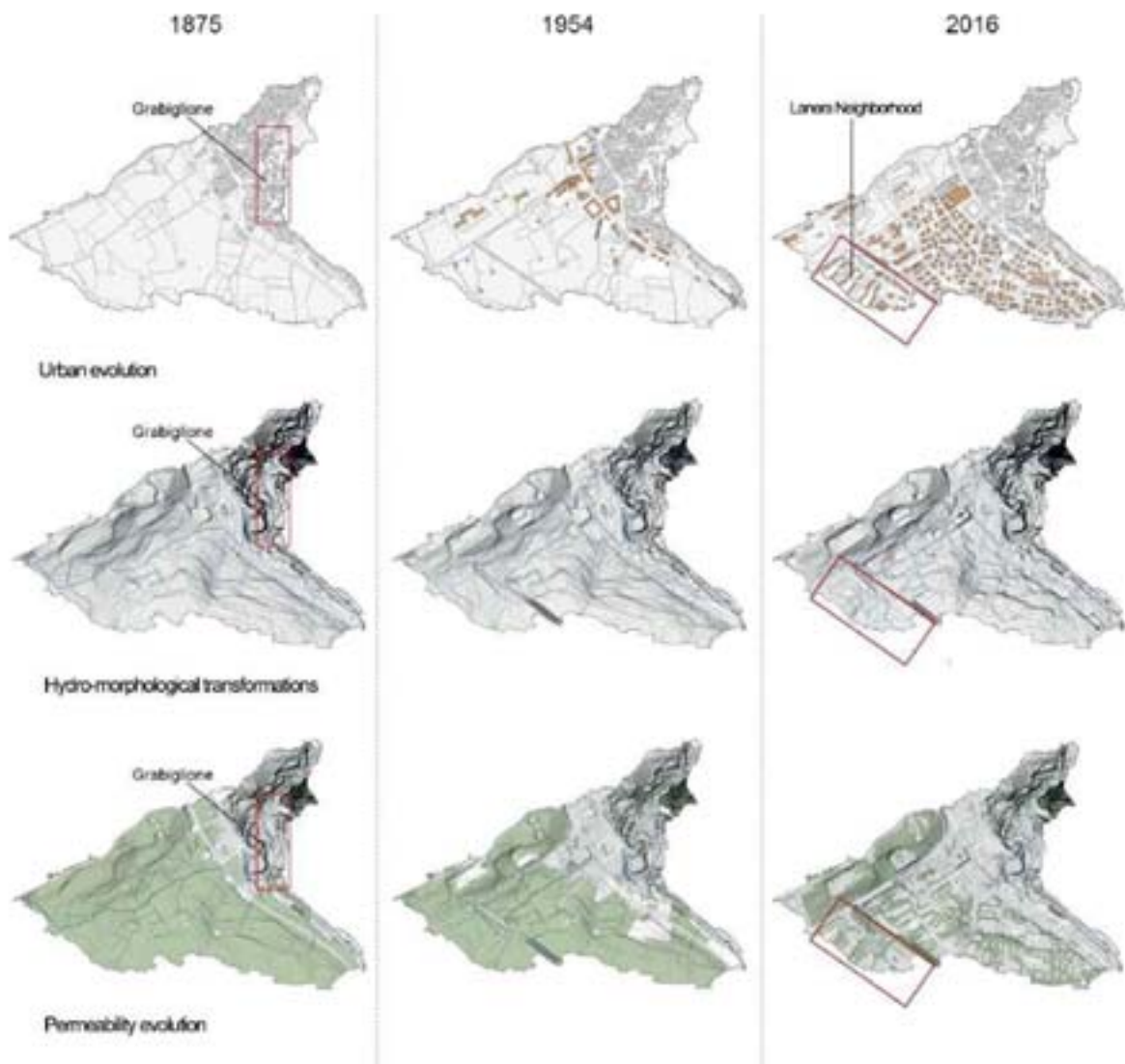
Fig. 4: The Sasso Caveoso watershed in 1875, 1954 and 2016. Urban evolution (in gray the Sasso Caveoso district, in brown the new urbanizations), Hydro-morphological transformation (main runoff pathways—blue line), permeability changes (impervious area in gray, pervious in green). (Courtesy of the research group: Raffaele Albano, Leonardo Mancusi, Ruggero Ermini, Aurelia Sole, Amir Zoubi).

How to let neighbour community re-discover and re-connect with the Sassi's Water heritage from a climate adaptation perspective? Can the water heritage of the Sassi inform a nature-based climate-adaptive urban co-design process for the neighbourhood regeneration? How Nature-based solutions that had shaped the Sassi can contribute to improve climate adaptive capacity, improving space quality and wellbeing?

3.2 A four step design-oriented experimental process
The envisioned experimental process will be grounded on an integrative, holistic, trans-disciplinary and multi-stakeholder approach able to interconnect the best available science and the endogenous way of knowing [35], the UNESCO site, the neighborhood and its community, leveraging the potential related to the Sassi's water heritage. The foreseen activities will benefit from the CHA-Climate Heritage Atlas [36]. The foreseen activities will be organized into the following four interacting steps: (i) Raise Awarness; (ii) Rediscover & Learn; (iii) Co-design; (iv) Implement.

i	Raise Awarnes s	Raise awareness, among the community about the regenerative potential related to climate adaptation, starting from the relation with the water heritage of the Sassi, through the concepts of continuity and spatial belonging. With respect to current effects and projected climatological scenarios, limits and possibilities concerning the relationships between the neighborhood and the UNESCO site will be explored.
ii	Rediscover & Learn	Rediscover and learn about/from the water heritage of the Sassi and the Nature- based solutions implemented over the centuries to adapt to conditions of resource scarcity and climate variability that have helped to shape its extraordinary cultural landscape. The knowledge process will cover material shapes, techniques and local knowledge related to water management, reframing them with respect to present climate adaptation needs.
iii	Co-design	Design Nature-based and Climate-adaptive urban regeneration through a co- creation process that will bring out local criticalities and potentials in a logic of interconnection between the neighbourhood, its residents and the UNESCO site, focusing on water resource management. The co-design process will adopt a scenario-based approach and will identify a taxonomy of Nature-based Climate-adaptive opportunities for intervention between built and green spaces, in order to improve the space quality and well-being of residents, reduce risk exposure and strengthen relationships with the Sassi.
iv	Implement	Through a phased approach, a theory of interventions characterized by different levels of complexity will be implemented. Local community will be directly involved in the simplest actions and caring for places. A program of activities will be also defined to enable the sharing of best practices at the city level to facilitate their dissemination and implementation.

Fig. 5: The four-step design-oriented experimental process for Nature-based Climate-Adaptive Regeneration for the selected Modern neighborhood.
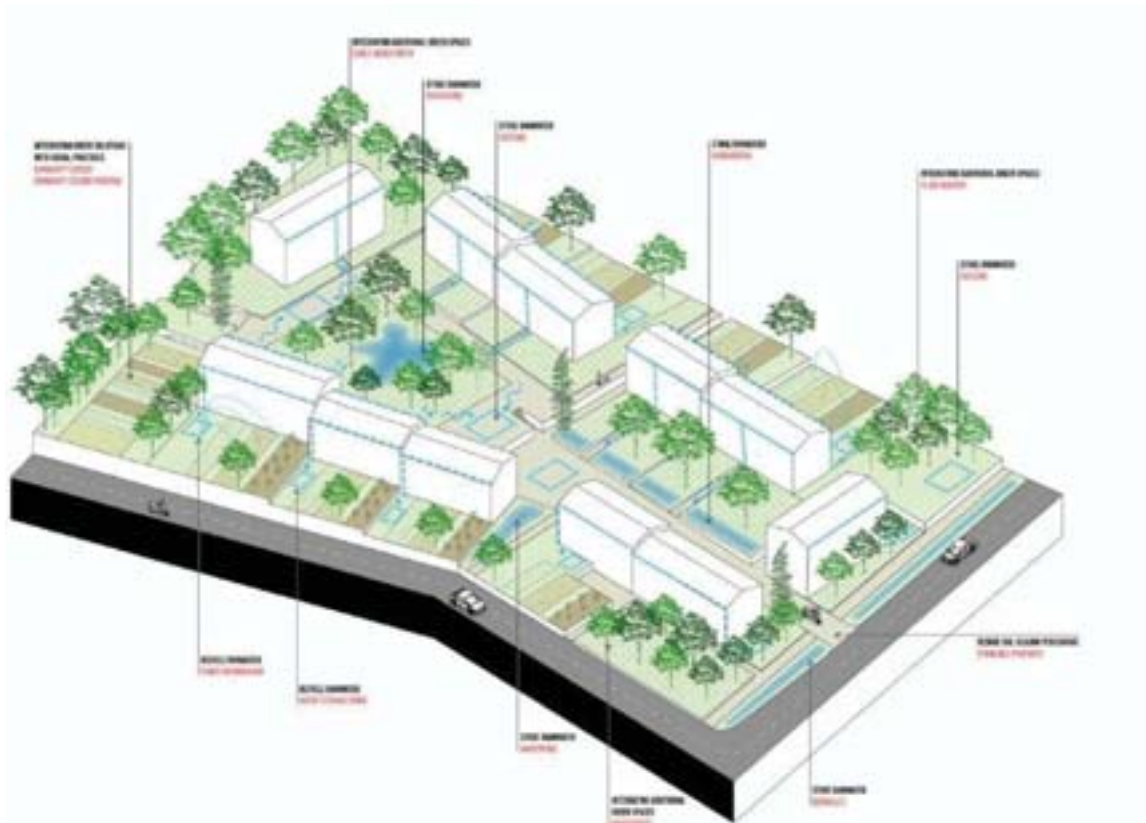
Fig. 6: Schematic design for Nature-based opportunities concerning water and green management in a portion of the Lanera Modern neighborhood (graphic elaboration by A. Tonon, with A. Raffa).

4. Conclusion

Climate heritage is a powerful concept to strengthen the relationship between the UNESCO site and anthropogenic climate change, but also with its context (social, economic, ecological and cultural), going beyond consolidated approaches and practices to heritage management. Its proactive dimension can inform Nature-based climate-adaptive regenerative process and foster the connection between communities and the property, coherently with the transformative dimension of living landscape. In a logic of interconnectedness between the UNESCO Site, the Buffer zone and its surroundings; it can also contribute to regenerative strategies and actions. The envisioned experimental process, by leveraging the potential related to the Sassi water heritage, will contribute to define a design-oriented working method with the objective to operationalize Climate Heritage.

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The hilly historic centres in the Ionian settlement system of Calabria. Between conservation and tourist accessibility

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Abstract

The Ionian settlement system of Calabria presents a rather original characteristic, linked to historical events and social dynamics: the main urban centres are located along the coast at a distance of the order of 5-15 km, but on the hills behind, often in strategic positions , twin centres are located. In fact the latter represent the historic centres of the coastal cities. In relation to the orography of the places, the access routes from the sea towards the mountains are often located along the banks of the numerous water courses, known by the name of "fiumare", climbing the sides of the mountains with a tortuous path and often with steep slopes. A road network is configured, schematically structured "comb-like" with a primary axis along the coastal gutter. The paper analyzes the settlement structure, with particular reference to the Ionian belt of the Province of Reggio Calabria as a case study, and highlights how, unlike typical cities which contain their own historic center, on the Calabrian Ionian side the historic center of the coastal cities is detached, in an elevated position and far from the sea. The result is a singular settlement system with historical, architectural and monumental characteristics of the historic centres, sometimes with common elements and sometimes with peculiar attributes, which make the whole very attractive from a tourist point of view. The theme of accessibility and usability for visitors of historic centres in hilly areas is also put under the spotlight, in relation to roads and transport services, with a proposal aimed at enhancing the places.

Keywords: Grecanic Area, architecture, tourism, cultural route

1. Introduction

Over the last few decades, the tourism economy in many parts of the world has undergone an upward trend. There is a for the natural environment, direct knowledge of local territories and cultures, and forms of well-being linked to slow or sporting mobility. New economic opportunities are therefore emerging for lands capable of meeting this type of demand, of

organising and developing a quality supply, of satisfying a wide range of users, without necessarily aiming for mass forms of tourism, exploiting many resources not explored in the past. Itineraries in welcoming environments, in contact with nature, with characteristic historical and cultural heritages, which also allow social life experiences, are attractive [1].

Calabria's Ionian settlement system has many qualities in this field and could play a significant role on a national and international scale, not least because significant improvements are being made to transport facilities to encourage accessibility from the outside. Many small and medium-sized urban centres are located along the coast, at distances of between 5 and 15 km, and many others are nestled in the hills behind them; these villages often represent the historic centres of coastal towns. The article analyses the settlement structure of the Reggio Calabria Ionian strip as a case study, and highlights the singular architectural and monumental features of the historic centres that make the area attractive for tourists. The theme of land accessibility is also addressed, in relation to the road network and transport services, with some proposals aimed at enhancing the locations and economic potential linked to active mobility and ecological collective means for tourism purposes.

2. Coastal cities along the Ionian coast of Reggio Calabria province

Along the Ionian coast of Reggio Calabria province, over a distance of about 110 km, there are about twenty major urban centres (Tab.1); they are spaced a few kilometres apart, as can be seen from the progressives, so that a linear and discontinuous urbanised fabric is configured. The cities vary in land dimension and population, generally of modest size. Only four cities exceed 8 thousand inhabitants (Melito, Bovalino, Locri and Siderno), eight have less than 4 thousand inhabitants.

Most of the centres sprang up between the end of the nineteenth century and the beginning of the twentieth century following the transfer to the coast of part of the population settled in inland towns; in many cases the first coastal nuclei sprang up near the stations of the new Ionian railway line. This phenomenon occurred in some cases in much more recent times, i.e. at the end of the last century (Ferruzzano, Bruzzano, Casignana, S.Ilario, Riace) due to a tendency to abandon inland towns. Africo represents a singular case; the original settlement located in Aspromonte was transferred following a devastating flood event in 1951 and built within the municipal territory of Bianco in 1954.

In practice, coastal urban settlements were generated as detachement from the original historic centres located on the Ionian hillsides; many of the new cities thus took on an attribute in the name (Marina) to distinguish them from their mother (denoted by the term 'Superiore'). In most cases the municipalities maintained administrative unity, but in a few cases there was a separation (Bova/Bova Marina, Gerace/Locri, Gioiosa Ionica/Marina di Gioiosa).

N.	City	Progr. (km)	Inhab. (1901)	Inhab. (1951)	Inhab. (2024)	Historic Centre	Same Municip.
1	Melito P.S.	0	5331	8704	10497	Pentedattilo	Y
2	S.Lorenzo M.	4.7	5254	5727	2155	S.Lorenzo Sup	Y
3	Condofuri M.	8.0	3636	5865	4552	Condofuri Sup	Y
4	Bova M.	12.6	2140	4192	4029	Bova	N
5	Palizzi M.	18.9	3327	5147	1854	Palizzi Sup	Y
6	Brancaleone	32.0	2250	4543	3236	Brancaleone Vetus	Y
7	Ferruzzano M.	38.4	2004	2068	736	Ferruzzano Sup	Y
8	Africo Nuovo	43.4	1812	2542	2710	NN	//
9	Bianco	46.8	3298	4851	4125	NN	//
10	Casignana M.	50.5	1440	2059	669	Casignana Sup	Y
11	Bovalino M.	54.4	4530	7835	8669	Bovalino Sup	Y
12	Ardore M.	59.0	6068	7846	4845	Ardore Sup	Y
13	S.Ilario M.	62.0	2384	2898	1348	S.Ilario Sup	Y
14	Locri	66.6	5650	11120	11850	Gerace	N
15	Siderno M.	71.7	10775	16551	17593	Siderno Sup	Y
16	Gioiosa M.	82.0	7356	9330	6304	Gioiosa Ionica	N
17	Roccella Ionica	88.2	6338	8128	6116	NN	//
18	Caulonia M.	94.2	9152	13004	6723	Caulonia Sup	Y
19	Riace M.	101.2	2109	2331	1789	Riace Sup	Y
20	Monasterace M.	107.8	1283	2549	3304	Monasterace Sup	Y

Tab.1 Main features of cities along the Ionian coast of Reggio Calabria province

The table 1 shows how, in almost all the other cases there was a significant demographic decline after the peak in the 1950s/60s; many families moved to the larger towns and often to other regions.

There are many cities keeping their original position, in the hills or mountains. As can be seen from Table 2, there are 24 cities, with their own municipal territory, all of them small; about ten have less than a thousand inhabitants, most of the others do not exceed 3,000. They gravitate around the coastal centres and the table suggests a correspondence in relation to the communication routes on the sea-mountain direction. The distance from the coast varies between 7 and 18 km (in time terms. between 8 and 20 minutes). Many of these sites are characterised by minimal internal historic centres.

Figure 1 illustrates the settlement structure, distinguishing with schematic graphic symbols the coastal cities from those in the inland area; the axes of correspondence sea-mountain are particularly highlighted. The old routes developed linearly along the classic rivers ("fiumare"), particularly in the summer season; in other cases, and especially for the villages located further inland, the roads adapted to the morphology of the hills with winding routes marked by singular pass points.

N.	City	Inhab. (1901)	Inhab. (1951)	Inhab. (2024)	Corresponding coastal city	Distance (km - min)
1	Montebello	4947	8710	5632	Melito P.S.	12 - 15
2	Staiti	1598	1434	155	Brancaleone	13 - 14
3	Bruzzano Z.	1719	3028	1043	Marinella di B.Z.	8 - 9
4	Samo	714	1395	732	Bianco	11 -12
5	S.Agata	3336	3533	1666	Bianco	7 - 12
6	Casignana	1440	2059	710	Casignana M.	8 - 13
7	S.Luca	2029	3728	3417	Bovalino M.	12 - 13
8	Benestare	2261	3273	2439	Bovalino M.	7 - 8
9	Careri	1591	2953	2133	Bovalino M.	11 - 12
10	Platì	5059	6200	3704	Bovalino M.	18 - 16
11	Ciminà	2243	2207	531	Ardore M.	14 - 19
12	Portigliola	1836	2348	1073	Locri	9 - 14
13	Antonimina	1836	2243	1073	Locri	13 - 14
14	Agnana	1113	1545	467	Siderno M.	10 - 11
15	Canolo	2002	2267	688	Siderno M.	15 - 17
16	Mammola	8564	10840	2494	Gioiosa M.	13 - 11
17	Grotteria	6385	9242	2851	Gioiosa M.	12 - 14
18	S.Giovanni G.	1606	1737	410	Gioiosa M.	11 - 20
19	Placanica	1846	2859	1000	Caulonia M.	11 - 13
20	Stignano	2025	2319	1213	Caulonia M.	11 - 14
21	Camini	1169	1264	795	Riace M.	9 - 13
22	Bivongi	3118	3805	1150	Monasterace M.	15 - 15
23	Pazzano	1725	2021	498	Monasterace M.	16 - 18
24	Stilo	3177	3675	2528	Monasterace M.	13 - 16

Tab.2 Main features of the cities in the Ionian hinterland of Reggio Calabria

Fig.1 Settlement system of the Ionian slope of Reggio Calabria

3. Significant architectural assets in hillside historic centres

Coastal cities, due to their deferred birth of centuries compared to the corresponding hillside villages, have rare architectural-monumental presences. For the most part, these are archaeological complexes from the Greek-Roman period such as those of Locri Epizefiri, Kaulon (temple and mosaics), Casignana (Roman villa), Marina di Gioiosa (Greek-Roman theatre); or singular fortresses such as the Carafa Castle in Roccella Ionica. The following are some of the many architectural emergencies located in the hill settlements; they represent the testimony and the value of historic centres that appear detached from the new cities but remain strongly linked to them [2, 3, 4, 5, 6].

Pentedattilo (Fig.2) represents the historical centre of Melito Porto Salvo**.** It rises perched on the rock in the characteristic shape of a hand with five fingers. The ancient village was definitively abandoned in 1971; the population migrated slightly towards the valley. In good condition is the church of Saints Peter and Paul, of Byzantine origin, **Gallicianò** (Fig.3) is one of the historical centres of Condofuri Marina. It is located on the right bank of the fiumara Amendolea. It is known as the "Acropolis of Magna Graecia". It was the municipal seat, but following the 1783 earthquake, the people moved to Condofuri Superiore. The main building of historical-monumental value is the Church of Byzantine origin dedicated to St John the Baptist. **Bova** (Fig.4), capital of the Calabrian Greeks, rises almost 1000 m above sea level. The castle of which only imposing ruins remain today, consisted of a fortified part and a part excavated in the rock. Built in Norman times and reinforced at the end of the 15th century by the Aragonese, it suffered gradual degradation over the centuries. **Palizzi Superiore** (Fig.5) is located at the base of a rock mountain. The castle, standing on the rock summit, has been declared National Monument. Due to its strategic and impervious position, the castle was a safe haven for the population as it allowed them to control the coast. It was built in the 14th century by the Ruffo family; it has undergone several renovations over the centuries.

Fig.2 Pentedattilo and the Church of Saints Peter and Paul

Fig.3 Gallicianò and the Church of Saint John the Baptist

Fig.4 Bova and the castle ruins

Fig.5 Palizzi Superiore and its castle

The village of **Brancaleone Superiore** (Vetus, Fig.6) stands on a small hill, formerly called Sperlinga (cave). This centre was part of a rupestrian complex. The ancient settlement was destroyed by earthquakes, in particular that of 1908, and abandoned after the flood of 1953.

Some interesting structures remain, such as parts of the medieval castle and the Annunziata Church. The ancient village of **Bovalino Superiore** (Fig.7) almost certainly dates back to the medieval period. It was surrounded by high walls, with two city gates for access. Inside was the castle, which dates back to Norman times (12th century). It has a square plan with a moat, drawbridge and triangular bastions at the corners, vaulted rooms arranged on several levels around a central courtyard and a cistern along the curtain wall. The churches of Saint Maria of Snow and Saint Nicola di Bari still stand out. **Ardore Superiore** (Fig.8) is the ancient village of the city built on the Ionian coast at the end of the 19th century. The Feudal Castle is considered among the best in the surrounding area. Its planimetric layout has a square shape with four towers at the corners. Between the drawbridge and the main façade there was a beautiful garden, eliminated in 1882 to enlarge Umberto I Square.

Fig.6 Brancaleone Vetus and the Annunziata Church

Fig.7 Bovalino Superiore and the castle ruins

Fig.8 Ardore Superiore and its castle

Gerace (Fig.9) rises 500 m above sea level, overlooking the ancient Greek city Locri Epizefiri. The village dates back to the 7th - 8th century; the original structure is Byzantine: a fortified castron defended by several ring walls, interspersed with twelve gates. In the upper part of the village, the remains of the Norman-era castle are still visible. The ancient **Gioiosa Ionica** (Fig.10) is located about 6 km from the corresponding new city on the coast. The village appears well preserved. The Mother Church (or Saint John the Baptist Church) dates back to the 15th century. It originally consisted of a modest building with a nave; it was then enlarged in 1771, 1810 and 1858 until it had five naves, a feature very rare in Calabria which

made the Church one of the largest. **Roccella Ionica**(Fig.11) is one of the few towns on the coast that does not have a corresponding historic centre located inland. It was built in the Middle Ages on a rocky promontory (hence the ancient name Rupella, later changed to Roccella) and was a citadel-fortress, protected by walls. In the innermost area, jutting out towards the sea, there is a fortification component consisting of a circular tower communicating via a rocky isthmus with the ancient San Vittore Castle.

Fig.9 Gerace and its Cathedral

Fig.10 Gioiosa Ionica and the Mother Church

Fig.11 Roccella Ionica and the Carafa Castle

The villages in the Ionian hinterland, not qualified as historic centres of coastal towns, are also of great interest. In addition to the characteristic features of the Aspromont villages, they often host architectural gems. Just as representatives, three sites of great tourist interest are here mentioned.

Near the historic centre of **Bruzzano Zeffirio** was a medieval castle, now reduced to ruins. Not far stand the "Triumphal Arch of the Carafa" (Fig.12 left). Saint Maria of Tridetti (Fig.12 right) is a Basilian-style church with some arab elements, located not far from Bova, but in the municipality of **Staiti**. It was part of a monastic complex between the 11th and 12th centuries. In the early Middle Ages, **Stilo** (Fig.13) was a town surrounded by walls and

towers, with five gates. The "Cattolica of Stilo" is a famous Byzantine architecture located upstream of the historical village.

Fig.12 Carafa triumphal arch in Bruzzano Zeffirio and Saint Maria of Tridetti Church in Staiti

Fig.13 Stilo and the Byzantine Church "La Cattolica"

4. Tourism and accessibility

In order to visit the historic hill villages today, one must necessarily travel by car from the coastal SS 106 (E90); public transport services are rare and not attractive. On the other hand, there is no internal road system, the road system is comb-shaped, but the teeth of the comb are not straight; the routes from the sea to the inland are rather winding and long. Moreover, the roads have modest features, not infrequently with bottlenecks or parts subject to landslides or ground subsidence.

There is awareness that the potential of historic centres is considerable and that in order to avoid the death of these villages and the degradation of their historical-monumental assets, smart action must be taken. Far-sighted actions are envisaged:

 a) preservation, restoration, conservation of existing valuable assets;
 b) targeted urban regeneration;
 c) valorisation of assets through a tourism promotion;
 d) improvement in accessibility through a strengthening of infrastructures and transport services.

With regard to the latter, the opportunity to adapt the existing road network on the sea-mountain route is highlighted, so as to guarantee standard road section, make travel safer and reduce travel times. But there are further interesting elements to be considered; a fast-flowing road system (new E90 Ionian Highway) is currently being built along the Ionian coast, in an intermediate position between the coast and the hills where the old towns are located (Fig.14). It is already functional from Roccella Ionica to Locri and is planned to be extended; it will be important to consider appropriate junctions for easy access to the historic centres; but it is also necessary to avoid breaking the unity between these villages and their respective seaside towns, which could result in forms of social and cultural lacerations.

On the other hand, it would be opportune to adapt a secondary road network, in order to ensure a direct connection among the old hill villages; alternatively, a new road network design should be developed that would allow the villages to be connected by the new highway, adapting the road upstream (Fig.14).

Two forms of accessibility are still to be considered important (Fig.15). The first has been developed in recent years, promoted by associations and local authorities, a network of equipped paths and trails, much appreciated by active tourists. The second could be a better public transport service; for example, forms of intermodal train-bus services coordinated in timetables and demand responsive minibus services [7,8].

Fig.14 Potential future road network

Fig.15 Tourist accessibility by bus and hiking routes in the hinterland

5. Conclusion

The article proposes a subject linked to the tourism economy in relation to a growing demand for innovative services, not limited to ordinary tours, but rather aimed at enjoying healthy natural environments, in direct contact with local people and cultures, practising forms of slow mobility or sports, with an emphasis on personal well-being. Particular attention is paid to itineraries developed in welcoming environments, in contact with nature, visiting sites with characteristic historical and cultural heritages, also experiencing social life with local people.

The Ionian settlement system of Calabria is proposed as an area of high potential, as it has many valuable land attributes and there are significant improvements in transport facilities to promote accessibility from the outside. There are many small cities along the coast and many villages located on the hills behind; the latter often represent the historic centres of coastal towns. In

particular, the settlement structure of the Ionian strip in the province of Reggio Calabria is analysed, highlighting the singular historical, architectural and monumental features of the historic centres, which make the whole area very attractive from a tourist point of view. The theme of territorial accessibility is also addressed, in relation to the road network and transport services, with a number of proposals aimed at enhancing the locations and tourist potential linked to active mobility and public and intermodal transport services.

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A review of urban development plans in Iran and the existing weaknesses in preservation and sustainable development

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Abstract

The subject of restoring historical urban fabric and carrying out urban design projects faces a dual challenge. We divided the various approach methods in this two challenges. First-Development-based approach, it is also considered as an attention to valuable fabrics. It emphasizes that dealing with historical fabrics should be more than just a historical observation, because attention to the past prevents from consideration of the needs of the present and the future. They point to the empty structures today or the valuable houses that no one is interested in living in anymore as a result of conservation efforts, which leads to a reduction in the quality of life and the sustainability of valuable urban fabrics. The result of such an argument will be a kind of accelerated development. The second challenge is a Protection-based approach, it considers protection as the most important pillar in urban planning and management and believes that by looking at the past and preserving the structure of cities, as well as using past experiences, provides sustainable plans for the future. The result of such an argument will lead to a kind of museum-like conservation. The preparation and development of urban programs in the world and Iran are not a new concept, and efforts in this regard can be traced back to ancient times. However, to this day, comprehensive research on the history

and evolution of this matter has not been conducted. A review of literature to discover the background of any subject, in this case the urban development, can guide many of the existing challenges in this regard. The main objective of this research is a comprehensive review of the history and sustainable development and protection of architectural and urban heritage in Iran, as well as an examination of the history of managing conflicts in development and heritage conservation plans. The research method in this study began with the selection of 50 articles that had thematic relevance based on their titles. Subsequently, after reviewing the abstracts' introductions and results 42 articles were identified for final analysis. The results indicate the existence of a conflict between development and preservation plans, leading to the lack of success. If this trend continues, it will irreparably damage Iran's historical urban textures.

1. Introduction

If it is accepted that the value of land in the central core of cities is high, then we will consider the physical-spatial value of historical fabrics and the necessity of organizing and revitalizing them [1]. Although there are many obstacles to the optimal and efficient use of historical fabric spaces, the importance of preserving the identity and structure of the city makes it necessary that, before any intervention in historical fabrics or any action towards urban development [2], the preservation of historical and dilapidated fabrics and their revitalization should be a prerequisite for urban planning in various fields.

The next step is to strive to reduce the sense of void in the approach to revitalizing historical urban fabrics. What is currently underway as conservation and revitalization of historical fabrics is necessary in the first stage, but it is never enough [3]. Actions taken towards the revitalization and reuse (renewal) of historical fabrics are complementary to conservation and protection measures, and in the event of shortcomings in such actions economic social physical, and even environmental damages will be inflicted on the historical fabric and its surrounding environment. The main goal of examining the problems and potentials of historical fabrics is to identify key problems and potentials so that the groundwork can be laid for developing objectives and strategies to eliminate problems and use the potentials of historical fabrics [4]. The reasons for the problems in historical cities, and in particular historical fabrics, are diverse and numerous. Some of them are due to the individual performance of residents, and some are due to the lack of control tools [5].

2. The evolution of urban development plans in Iran

The history of urban development plans in Iran has evolved over time. The first urban development plans were created during the Sassanid era, which was the first comprehensive urban planning system in Iran. The modern system of urban planning in Iran began with the five-year development plan before the revolution in 1967. The plan included 14 comprehensive urban plans for different cities [4]. After the establishment of the High Council of Urban Planning and Architecture in 1973, the process of creating comprehensive urban plans was revised and divided into two stages: the comprehensive plan and the detailed plan. The current approach to conservation and revitalization of historical fabric is not enough, and additional actions are needed to revive these areas. In Table 1, a summary of the changes in urban development programs in Iran is provided.

3. Articles Analysis

Kajouri (2005) in his article, explains the obstacles, limitations, and structural features of the management system and urban planning of Tehran. He examines the structural indicators of the existing management system in the decision-making, planning, and implementation processes of urban development projects in Tehran [7]. Melki (2018) reviews the failure of the plans and deems a change in approach necessary for the realization of urban plans [8]. Hanachi (2009) consider the challenge between preservation and development as the most

important factor in the transformation and changes in the charters and resolutions of urban conservation [6]. They compare the experiences of urban conservation in developing, developed, and historical urban areas in their study and discuss the goals and strategies of these plans. According to Andalib (2011), government interventions in urban management and the transformation of the municipality into a government-affiliated organization have roots in the country's historical political culture. He presents the multiple mapping of Tehran and the challenges arising from it, advocating for unified management as a solution [9].

Mohammadpour (2015) in his book "New Experience, Change, and Development in Huraman" examines the transformation through qualitative studies and uses an interpretive social approach as a theoretical guide. He employs ethnography for field operations and a theoretical framework to collect, analyze, and present data, focusing on the residents' interpretation and meaning of the process and consequences of renovation [10]. Rahimnia (2017) in his doctoral dissertation titled "The System of Conservation Interventions in Earthen Architecture from the Perspective of Indigenous Architects" uses qualitative methods to explain the role of indigenous architects in the conservation of earthen architecture [11].

N	Years	Changes	Results
1	1879	The drafting of the constitution and the approval of the municipal law create a new turning point in the history of Iran."	In pursuit of legalizing the relationship between the government and the people, along with the developments in various fields of European society, including the urban system, a new turning point is created in the history of Iran
2	1925	The transition from tradition to modernism	Following the legalizing of the relationship between the government and the subjects, accompanied by the societal transformations in various areas, including the urban system.
3	1961	The first practical step towards preserving old neighborhoods was taken by amending and adding a few articles to the Municipalities Law	
4	1967	The first comprehensive plan prepared and approved in legal system in Iran	The comprehensive urban plan aims to define the directions of development, formulate a program for the city, and meet its needs based on predictions and urban development goals.
5	1973-1978	In Iran's Fifth Development Plan, the necessity of preserving historical textures is considered	The comprehensive urban plan is prepared to determine the directions of development, develop a program for the city, and meet its needs based on predictions and urban development goals.
6	1985	The formation of the Cultural Heritage Organization in Iran	In the fifth development plan of Iran, the necessity of preserving historical textures is considered. The central government, municipalities, and limited local participation are responsible for organizing and streamlining historical axes
7	1991-1994	reconstruction of damaged cities after war	Establishing a new balance between the new and old structure of the city by the central government and municipalities
8	1995-1997	The second five-year development plan is being developed under the title of "Problematic Urban Texture.	The policy of using deteriorated urban centers to compensate for part of the housing needed by the government through acquisition, clearance, and consolidation of existing units marks the beginning of a new era of intervention in urban fabric, initially under the title of consolidation.
9	1998	Formation of the Ministry of Housing and Urban Development	With the establishment of the Civil Engineering and Renovation Company, the aim has been to achieve sustainable city goals and revitalize urban areas. The primary responsibility of this company is to identify urban issues at the national level and specify urban problems. In the next phase, the company conducts studies, proposes solutions, and ultimately implements appropriate methods to move towards improvement.
10	2005	The program titled "Renovation and Revitalization of Deteriorated Texture" was formed.	During this period, strategies are built upon previous strategies and the evolution of approaches from the previous period, with an effort towards planning for the utilization of existing capacities for development.

Table 1: Summery of evolution of urban development plans in Iran

The urban development plans in Iran do not meet the expected efficiency and function of urban managers, experts, and the public. One of the main reasons for the failure of these plans can be attributed to their conflict with property rights [12]. The difference between old and dilapidated textures and their various conditions in terms of the existence of buildings with different economic values and facilities for ownership makes it necessary to adopt various methods for intervention in the texture, making it completely specialized and feasible in the texture [13]. Strategic planning is not just a practical method and scientific solution for preparing and implementing a plan, but a new paradigm that is the product of collective wisdom and human society experiences. Its ultimate goal is to ensure sustainable development and improve the quality of life, and it is relatively adaptable and generalizable [4][14]. Hanachi explains the prevailing views on the revival of historical textures in Iran and deals with the methods of dealing with historical and value assessment areas in the field of urban conservation, dividing it into three categories:

1- Negative and inactive method

2- Positive and limited active method

3- Positive and extensive active method.

which includes the most conservative to the most daring approaches, and proposes ways to protect historical areas by mentioning the characteristics of each one. According to Bahreini, the concepts of sustainable development are compatible with the goals and purposes of modern urban planning, and urban planning can use them to achieve sustainable goals. Azizi (2012) conducted a study to identify and rank the actors and tools of integrated urban management in the Tehran metropolis [15]. Azizi believes that the increasing growth of development programs, whether deliberate or spontaneous, in the 1970s has led to environmental, social, and economic warnings. In response to the crises created, new concepts and approaches for future developments have been introduced, including sustainable development, environmental justice, and smart development .Radul discusses the relationship between conservation and sustainability, despite considering the roots of these two concepts to be different [15]. In these days' world, urban planning activities cannot be considered merely as a scientific and technical profession or a governmental duty. Urban planning and spatial management have evolved into a broad collective and inclusive activity that should be considered as one of the fundamental institutions of society and strengthened and stabilized in the macro-management structure of country [16]. Several studies have been conducted to evaluate the feasibility of plans and identify their positive and negative aspects, such as the evaluation of the Juybar neighborhood revitalization and renovation plan in Isfahan [17]. These studies emphasize the importance of evaluating plans and the role of participatory approaches. Other studies have focused on issues such as authenticity in development plans, the impact of contemporary urban development plans on the historical structure of the city, and the consequences of tourism industry development on the urban fabric. In general, it is necessary to pay attention to the different dimensions of urban life to achieve a logical and intelligent urban development.

Despite the criticism of conservation and development plans, there has not been a scientific and coherent approach to evaluating urban development plans. Improving and preserving the quality of the urban residential environment is of vital importance, and assessing the quality of urban residential environments is the first step in managing the quality of urban residential areas [18].

Behzadfar and Suleimani Rad presented an article titled "Evaluation of the Effects of Urban Development Plans on the Structure of Ancient Cities in Iran" at the first international conference on traditional settlements in Zagros. They analyzed the historical development of the spatial structure of the city of Sanandaj in different historical periods and evaluated the role and impact of official government plans [19]. These studies highlight the importance of evaluating the impact of development plans and emphasize the participatory approach. The results of these research efforts were presented at the International Conference on Architecture, Civil Engineering, and Sustainable Urban Development.

Ziayatavana (2015) also conducted a study to evaluate the spatial consequences of industrial tourism development and renovation policies in the historical fabric of Sarakhs [20]. Furthermore, Maleki (2020) conducted research on interventions in the historical fabric of Isfahan, focusing on the impact of contemporary urban development plans on the spatial

structure of the northern historical core of the city [21].

4.   Conclusion

Based on the review of the background and literature on the subject of preservation and development in Iran, and the analysis of 42 related articles, it is evident that there are fundamental weaknesses in the management system and the proposed plans. Without correcting the management process of urban fabrics and the urban planning system, it is unrealistic to expect complementary development and preservation.

No	Problems and chalenges	Factors
1	Cultural Heritage Management	Lack of Coherence in the Management System in Iran Lack of Unified Management and Separate Urban Administrations Lack of Attention from Managers to Areas with Historical Value Absence of a Regional Management System
2	Challenge in content and meaning of plans and programs	Having a one-dimensional view of issues Lack of alignment of development plans with needs, necessities, and cultural structures of historical contexts Changing attitudes towards the concept of heritage and historical values over time
3	Cultural and social challenge	Conflict of private and public interests Conflict of values Lack of a sense of belonging among new residents in historical contexts
4	Specialized and knowledge challenge	Lack of proper education Insufficient scientific knowledge and inadequate understanding of the functioning of the development and preservation system in historical contexts Lack of specialized workforce in the planning system Intervention by non-experts
5	Time problem	Accelerated development and provision of maximum services in urban redevelopment areas Lack of proper development scheduling Short timeframes for drafting programs
6	Power and politics problem	Inefficiency of the planning and management system Failure to register valuable residential structures in the national heritage list Registration of buildings in the heritage list and inventory, preventing intervention by owners without their consent Political instability in many developing countries
7	Legal and regulatory obstacles	Lack of effectiveness and legality prevailing in Iranian society Failure to enforce laws in the country Heritage registration and the absence of construction permits issued by the municipality Lack of alignment between laws and regulations with the needs and desires of residents
8	Economic issues	The cost-ineffectiveness of redevelopment operations compared to new construction Lack of financial capability among residents of historical areas for conservation and preservation Absence of economic feasibility studies
9	Cognitive approach to plans	Methodological Weakness
10	Lack of sustainable thinking	Lack of public discussions and negotiations between stakeholder groups Lack of foresight in projects Inability to assess the feasibility of project realization
11	Environmental problems	Lack of environmental studies Conflict between development interests and the environment Absence of sustainable thinking
12	Lack of evaluation of plans	Lack of sustainability thinking in this process
13	Incorrect performance of the Cultural Heritage Organization	Lack of attention to the historical core of cities and having a visionary perspective on projects Funding Issues Political Instability Lack of Public Awareness Lack of Expertise
14	Conflict between the performance and goals of the Cultural Heritage Organization	Resource Allocation Political Interference Inadequate Planning and Strategy Public Engagement and Awareness Lack of Collaboration Technology and Infrastructure Issues Changing Societal Values Legal and Regulatory Framework
15	Lack of conformity of the plan with implementation	Poor Communication Inadequate Planning Lack of Resources
16	Lack of conformity of the goals and results of the plan"	Unclear or Unrealistic Goals Changing External Environment Lack of Monitoring and Evaluation

Table 2: guideline for future efforts of improvement

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From SfM acquisition of the current state to the as-built model state. The Village of Pietrapizzuta in Francavilla di Sicilia

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Abstract

This article focuses on *Information and Communication Technologies* (ICT) for Cultural and Environmental Heritage. The case study deals with an episode of the 20th-century Italian heritage that is now abandoned and in ruins, the village of Pietrapizzuta, an area of the larger village of Schisina, designed in 1942 and built in the 1950s by *Ente di Riforma Agraria* (ERAS) in the municipality of Francavilla di Sicilia (ME). The current state of this housing cluster stimulates thoughts about the impact of natural disasters and human carelessness on Cultural Heritage. The model was developed starting with *Structure from Motion* (SfM) video acquisition, using *Unmanned Aircraft System* (UAS). The state of ruin of the site favoured a detailed analysis of the techniques and materials used in its construction, requiring particular attention during selection of the materials for developing the as-built model textures. Multimedia archival images were also used in order to obtain a rendering that could refer to the perception of the building as it was just completed.

Keywords: Survey; Structure from Motion; UAS; Data extraction/analysis; Physically Based Rendering

1. Introduction

The transition from the continuous physical reality to the digital -and thus discrete- one takes on particular significance in the surveying field. We propose, in this article, a workflow adopted during the definition of a model for the virtual reconstruction of the external features (as-built) of an entire foundation village, which was designed and built in the first half of the last century in Sicily (Fig. 1). Our case study stems from the results of a series of digital survey campaigns, extended to all the nuclei belonging to the macro village of Schisìna, built by ERAS in the municipality of Francavilla di Sicilia (ME). Specifically, our subject is the suburb of Pietrapizzuta, composed of 14 identical buildings, designed in 1942 under Law no.

1/1940 and built in the 1950s following the Agrarian Reform Law no. 230/1950 [1].
It is one of the many housing clusters which Carlo Emilio Gadda defines as follows: *"Designed to flank the hamlet (in place and function), it will have to support the vanguards of wetlands reclamation, namely the more distant houses, and their people, who really do seem to be displaced at the edge of living"* [2]. More than 70 years after their construction, the villages still bear witness to that specific architectural style as well as the building techniques of the period. While non-use has substantially preserved its state from significant building transformations, it has also made looting and vandalism possible revealing particular construction peculiarities.

2. Objectives

The objective of investigation is the definition of a digital model, to be intended as a useful tool for knowledge and dissemination in the field of Information and Communication Technologies (ICT) for cultural and environmental heritage. The case study is substantiated in the context of the so-called "minor Italy" which:
"[...] It could be a point of interest and cultural and economic momentum, if only it could be recognisedfor the values it represents and the potential it can express. It is the Italy of rural villages and small foundation towns [...] which mirrors an ideology of urban decentralisation and agricultural occupation ofthe countryside against latifundism" [3].
The Sicilian operation is still little known if not even unknown. These assets, now owned by municipalities, are for the most part abandoned and crumbling (Fig. 2). As early as 1960, only 10 years after it was made, Michelangelo Antonioni shot a scene from his film *L'Avventura* [4] in the metaphysical grounds facing the church in the abandoned Borgo Schisìna. In 1967, Roberto Rossellini also included one of the seven nuclei of Borgo Piano Torre in his documentary Idea di un'isola [5], dedicated to Sicilian historical and cultural aspects and highlighting the state of complete abandonment of what the commentator described as ghost villages.

3. Background and methodology

Digital modelling for Architecture and Landscape has benefited from the introduction of SfM techniques, of which the *Speeded Up Robust Features* (SURF) and *Scale Invariant Feature Transform* (SIFT) algorithms are essential components [6]. The automated determination of homologous points between frames [7] enables the generation of 3D point clouds even from unorganised collections of digital photographs [8]. Within the scope of this work, two separate acquisition campaigns were carried out using video footage taken with two UAS equipped with different sensors; in order to optimize the results in terms of multiscalarity: one campaign aimed at the digital reconstruction of a single building unit, the other of the entire complex. As is well known, SfM processes are based on statistical calculations whose parameters can be influenced either by endogenous factors, such as the optical sensor used, or by exogenous causes, such as light and its reflections from the surrounding environment. To minimize light effects we took a shot of a calibrated colours table before each mission. The model processing step was also organized into two separate workflows, one relating to a single building and the other to the wholevillage (Tab. 1).
After transforming the WGS84 coordinates of *Digital Surface Model* (DSM) clouds into xyz coordinates, we applied the workflow related to the overall SfM reconstruction model. Once formal congruence had been verified, a surface model was drawn up relating both to the orographical course of the areas surrounding the individual building units and to the ancillary works such as earth retaining elements and connecting paths. From the dense clouds, we generated polylines useful for processing in the 2D CAD environment. Then, we exported the two 3D models in Hi-Poly and the processing defined by CAD into two separate projects in the modelling software Blender. By means of the extrusion of the edges and the contextual verification of the reliability in terms of form with respect to the Hi-Poly model, a new surface model was generated. Textures elaborated by means of dedicated software were applied to this very model, following appropriate photographic shots as basis and devoting particular attention to colour and definition useful for subsequent use in *Virtual Reality* (VR).
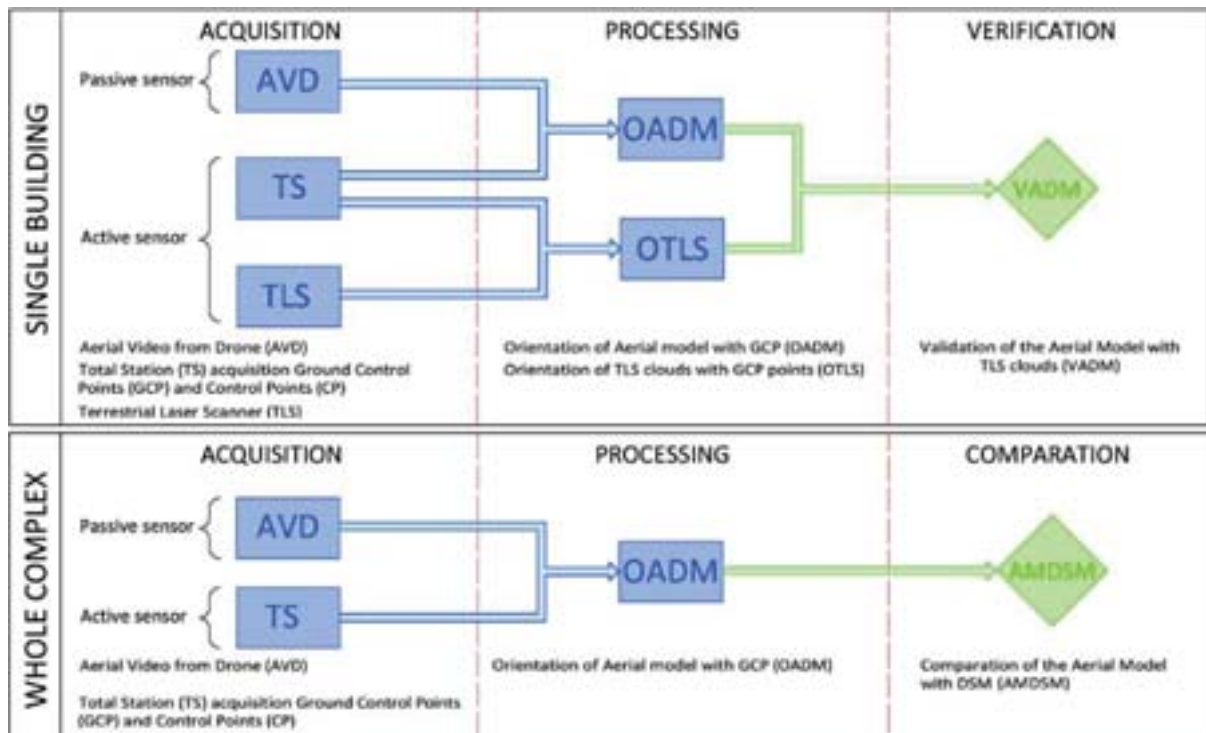
Tab. 1: Workflow diagram aimed at defining and verifying the SfM reconstruction model of the typical building unit and of entire complex.

3.1 Data acquisition and processing with active sensor devices, topographic network, andterrestrial laser scanning

The topographic network, structured by celerimetric survey, was used as a common reference system. The 21 station points, of which 11 are located outside the complex outline, define the vertices of the closed polygonal and were used as ground constraints and *Ground Control Points* (GCP) in the orientation process of the SfM and TLS models (Fig. 3). Integral to the network are the 49 collimated points on the buildings, used as constraints and *Control Points* (CP). For both the above reasons and the size of the precision polygon, in order to localise possible eccentricity errors in the individual station while minimising angular propagation, the TS and reflecting prism were set up with forced centring. The second phase of active sensor acquisition involved 3D laser scanning to check the accuracy of SfM models. The TLS campaign covering the building identified as a model type was performed by means of 7 scans for the individual construction (Fig. 4). The clouds were then aligned one by one using *Iterative Closest Point* (ICP) procedures referring to GCP and CP targets.

3.2 Data acquisition with airborne passive sensor devices and consequent processing

For the UAS campaign aimed at video filming, two types of missions were carried out. The campaign dedicated to the acquisition of the entire complex, performed using UAS DJI Phantom. The nadiral captures, taken at a height of approximately 30 metres during the definition of the model, were integrated with acquisitions carried out by means of low-altitude overflights. These overflights were aimed at capturing the partition of elevation walls with distances, heights, and camera orientations appropriate to elevated elements and terrain (Fig. 5). The acquisition campaign aimed at defining the typical sample building was carried out with manually piloted UAS DJI Mini 3 Pro. For the models the software extracted from the videos 1483 frames for the entire settlement, and 2495 frames for the individual building, generating respectively sparse cloud consisting in 283,000 and 467,000 points.

3.3 Reliability and consistency check of photogrammetric models

We checked the reliability of the 2 SfM models using CloudCompare software. In the case of the single building model, we compared the dense cloud with the TSL cloud union reduced to a number of points close to that of the photogrammetric model. The outcomes (Fig. 6), are represented by means of colour scales indicating the distances of the *Cloud to Cloud* (C2C) points. The comparison shows good congruence, with average deviations of less than 2 cm. With regard to the model for the entire area of interest, we checked the SfM point cloud discarding architectural elements and vegetation characterised by heights greater than 30 cm in relation to the orographic surface statistically calculated by the same software. The resulting cloud shows that the average deviation was around 30 cm. These values, as for the first comparison, are well below the margins of uncertainty or indeterminacy conventionally permissible for the respective scales of representation.

3.4 From SfM reconstruction models of the actual state to the generation of the virtual model ofthe original state

Once the verification phase completed, we generated two surface models (meshes): one for the entire village, another for the sample building (Fig. 7). With regard to the orographic reconstruction of the village, which is today partially concealed by low but locally dense spontaneous shrub vegetation, we analysed the model generated by SfM excluding buildings and vegetation. The results of the elaboration took the form of an orographic model characterised by a series of moderately sloping terraces, connected on the line of maximum slope by retaining walls approximately 1 metre high (Fig. 7). With regard to the model of the sample unit, a series of horizontal and vertical cutting planes were defined by means of which the polylines, necessary for outlining the two-dimensional drafts, were generated and then exported to the CAD environment. The dilapidated state of the architectural organism made a detailed analysis possible in terms of both technology and execution (Fig. 8). Once we defined the geometric layout with CAD, the 2D drafts and the textured mesh model of the building were exported to Blender software. Although the 'frame' we used for surface modelling operations was structured on the basis of the imported plans and sections, we conducted the operations for generating both the more extensive fronts—such as facades— and the more detailed ones—such as earth connections, cornices, etc.—by means of continuous comparison with the mesh model related to the actual state (Fig. 9). Considering

the state of abandonment and the consequent repeated spoliation suffered over time, the buildings are substantially devoid of all removable technological components such as woodworking, decorations, and system facilities. Only sporadic traces remain of the rainwater drainage systems, the interior and exterior window fixtures, the majolica and ceramic elements that marked the entrances to the individual housing units with biblical episodes. These elements are obviously not secondary if we aspire to reconstruct the image of the village as philologically as possible. As far as documentary research is concerned, given the type of missing elements, the already scarce graphic documentation available did not make rigorous formal definitions possible. The analysis was therefore directed towards the available multimedia documentation as the above-mentioned documentary film by Rossellini. By interpolating the few remaining data about the site and observing the documentary stills we could reconstruct, with a fair degree of reliability, the formal definition of elements that have now been lost. The last phase of the work was based on structuring and use of mesh maps (texture maps, normal maps, roughness maps, etc.), which we elaborated using Materialize software on the basis of the photographic material acquired on site and from paper and digital archival sources. Although featuring a high level of definition, these maps allow an agile exploration of the site in multi-scalar VR mode with *6 Degrees of Freedom* (6DoF) [9], both in overall terms and in details (Fig. 10).

4 Conclusions

This complex of Sicilian villages is located in an area of considerable interest straddling the tourist/naturalistic districts of Taormina, Etna, Alcantara, and Monti Nebrodi. In addition to characterising that same landscape, it constitutes tangible evidence of a particular historical and socio-cultural period in our country. A tutelage programme presupposes their in-depth knowledge and valorisation. One of the possible ways to protect heritage is to raise awareness, including through dissemination. No matter how much plans for reuse and thus recovery have been devised over time, the state of ruin continues inexorably in its systematic dismantling. Today the opportunities of contemporary technologies make it possible, even for non-specialists. From virtual to augmented reality, through immersive experiences capable of communicating/disseminating a reality that no longer exists but is nevertheless worthy of an albeit difficult rebirth, from its own ashes.
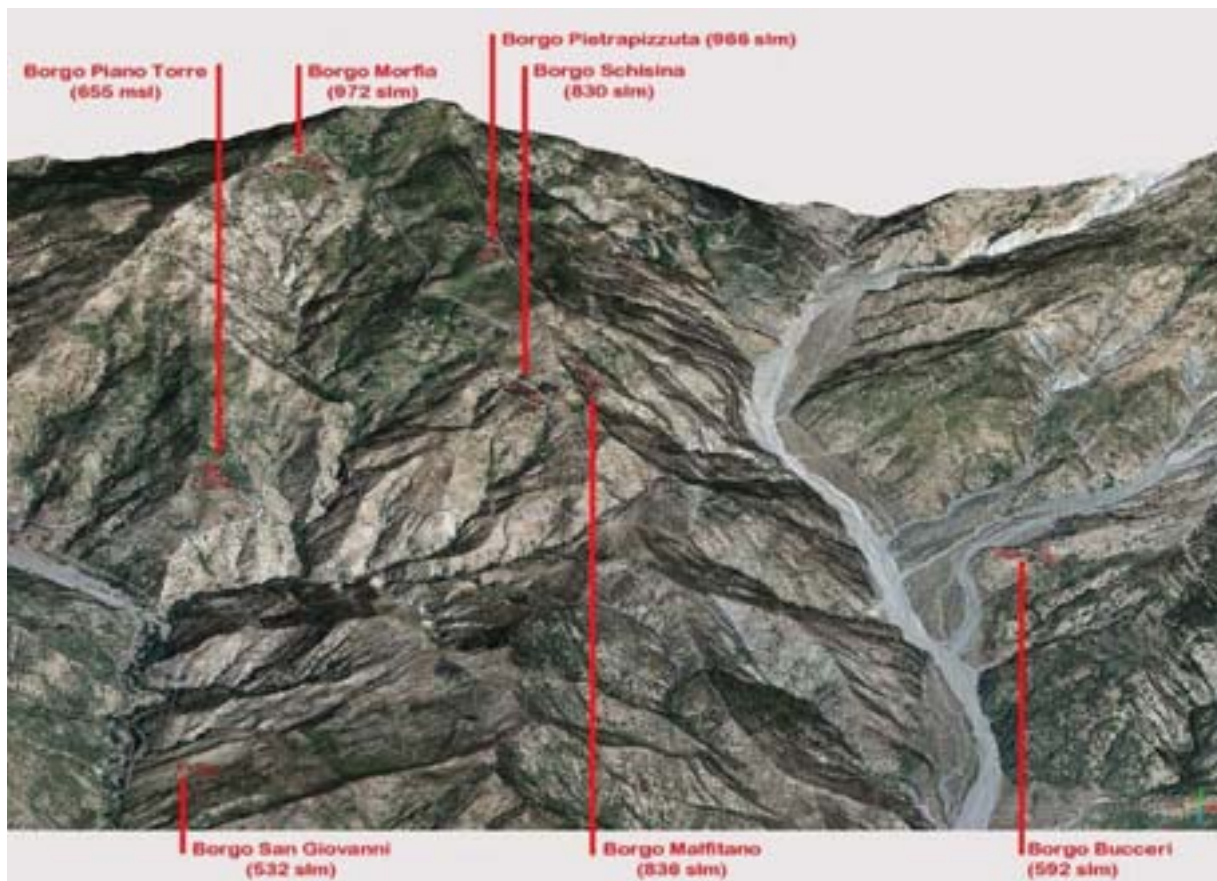
Fig. 1: Territorial context and geographical arrangement of the 7 villages. Image developed by processing colour orthophotos, year 2012, coverage of areas in Zone WGS84-UTM33, and LiDAR point clouds. Source: ©Italian Ministry of Environment and Energy Security (MEES), Geoportale Nazionale. All Rights Reserved.

Fig. 2: Images of Borgo di Pietrapizzuta acquired by UAS: bird's eye views and photos of details.

Fig. 3: Orthophoto of the complex and its immediate surroundings, the image highlights the colour range in relation to heights, on the right, orthophoto of the mesh model with topographic polygon and indication of the GCPs used for alignment.
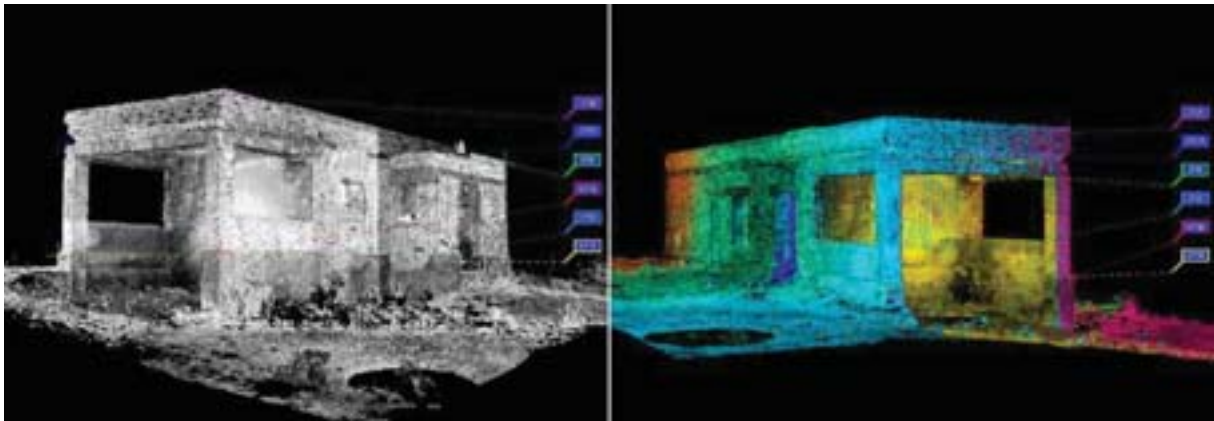
Fig. 4: Model building. On the left, set of TLS point clouds with reflectance values and points used for model definition. On the right, view of the range maps of the 7 TLS scans.
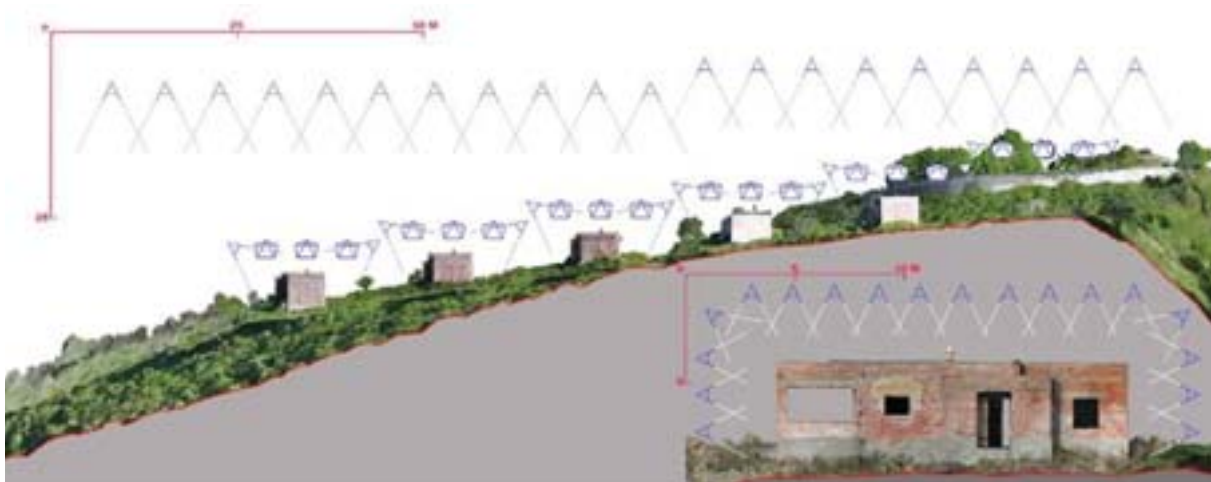
Fig. 5: On the top, longitudinal section (orthographic image) of the model with the view points extracted from the videos. On the bottom right, orthographic image of the model relative to the sample building with the view points extracted from the videos.
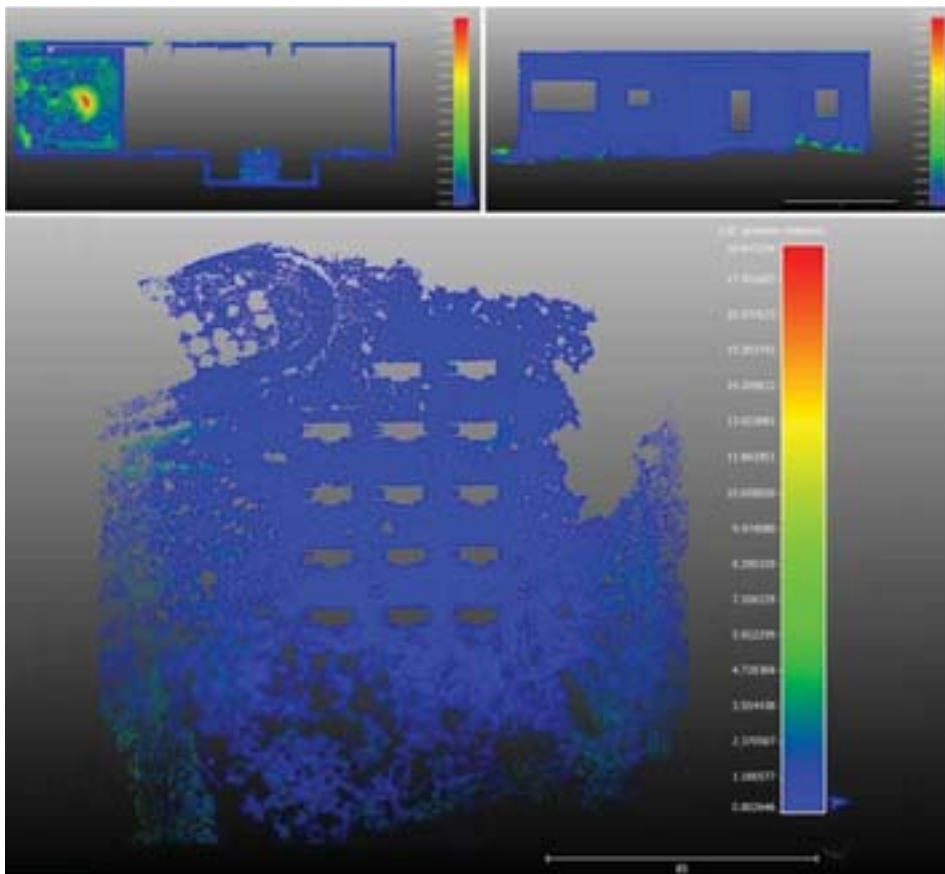
Fig. 6: Map of the deviation between the TLS cloud and SfM dense cloud, on the top map and elevation of the sample building considered; on the bottom, map between the point cloud relating to the orographic context of the hamlet, generated with the photogrammetric model and the LiDAR data taken from tile D37941512_0101. Source: © (MEES), Geoportale Nazionale. All Rights Reserved.

Fig. 7: On the top left side, the textured mesh model of the actual state obtained from SfM reconstruction of the entire Borgo di Pietrapizzuta; on the right, the mesh model of the building sample chosen for the study. On the bottom: left side, image of the mesh model of the village processed from SfM clouds, right side, mesh reconstruction of the buildings and orography of the site area.

Fig. 8: Selection of CAD drafts and orthographic images of the type unit.
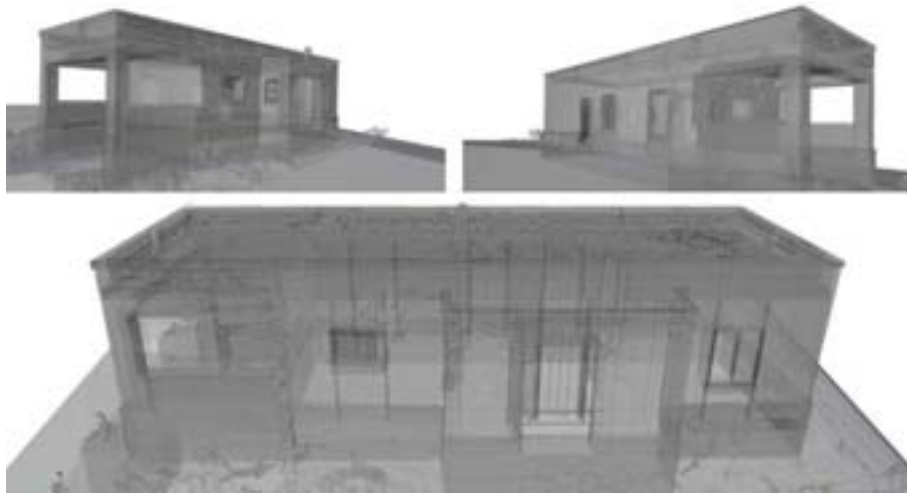
Fig. 9: Model building. Wireframe views of the reconstruction model of the sample building superimposed on the mesh model of the actual state, generated by SfM reconstruction.

Fig. 10: Views of the as-built model of the village of Pietrapizzuta.

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World Heritage and Dwelling on Space
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Human-centered approaches: flexibility as a design strategy for dwellings

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Abstract
Flexibility emerges as a possible human-centered design strategy that allows users with changing needs to choose the suitable solution among the possible ones and readjust it at low cost. The topic of flexibility is addressed as a useful design strategy if declined together with objectives essential to the design such as sustainability, energy efficiency, innovation and reuse, because it can lead to integrated design solutions for the achievement of technological, environmental and social quality of architecture.
Referring to the results of a research on the topic of flexibility for dwellings, granted by the Foundation of Cassa di Risparmio di Lucca, the research aimed to build an operational tool in the form of design guidelines for the development of flexible solutions in the design of living spaces. However, this goal requires a prior phase of theoretical systematization of the topic, in which a framework of design solutions is outlined recognizing the potential not only in relation to the design project but also to the process one.
The paper returns the theoretical research framework to underline forms and types of flexibility as designtool to ensure the usability of spaces.

Keywords: flexibility, human-centered design, flexible dwellings, housing, sustainability

1. Introduction

The Human-centered design (HCD), as defined by ISO 9241-210:2019(E), is an approach that aims to understand how design can respond to human needs and make environment usable by focusing on the user's needs. This approach "can play an essential role in dealing with today's care challenges" [1].
Based on the idea that HCD approach starts with the people you are designing for [2], it impacts the space design especially post Covid-19 because of the behavioral changes the crisis has triggered [3]. The behavioral changes and the ability of architecture to manage those changes has been investigated not least through the lens of flexibility. In fact, flexible design is generally investigated focusing on forecasting on the change in the use of architecture over time. This gives continuity to the assumptions from which the research was born, the results of which are partially presented in this paper, and which has declined the topic of flexibility in reference to the new demands of contemporary living in dwellings. The

residential building is linked to the topic of transformation over time because more than others it is a function of a continuously variable structure [4]. This is because of demographic and socioeconomic changes that have modified the ways and times of permanence in living spaces [5] and, consequently, have required solutions capable of evolving as users and the demanding framework change. All this outlining that the new topics of design culture are marked by user profiles and new forms of living space[6].

In the magazine Metamorfosi a long examination of housing projects is reported and, as one of the "five open topics" defined, the topic of transformations over time is the one that binds the project to the concrete life of the neighborhood whose physical and social changes make up a sort of palimpsest [4]. Furthermore, the reflections taken and in progress on the topic of post-pandemic architecture have brought out the need for reflection on design strategies which, aimed at underlining the need for adaptation, contemplate, on an urban scale, the functional mixite and proximity of services, and, on thebuilding scale, flexibility [7,8].

It is exactly in the direction of a possible tool of adaptation and transformation within the topic of living and about different case studies that flexibility arises as a possible strategy for architectural design [9].

2.   The Research

2.1Methods

The research method is based on the research model that Niezabitowska classified as prevalent in architecture aimed at the refinement of the design process and strategic decisions addressed to it [10]. The research can be typologically placed as basic research due to the cognitive nature and it was partly supported by the tools of diagnostic research. It aimed to collect information and data for future predictions [11]. The methodology adopted is predominantly based on the case study method, partially contaminated, as often happened in research in architecture [10], by the method of qualitative research. The reconnaissance of past cases and studies allowed to investigate the topic in the context of modern to contemporary architecture, and to verify the validity of the theoretical framework of the research. The use of case studies is considered a sound method particularly when a holistic investigation is required [12].

This methodological approach has been key to assessing flexibility in relation to other design strategies, as even the individual case study can provide access to the reasons for using the strategy and how it isused in relation to others [13].

The case studies considered are design projects that have assumed in the research the role of feed back to the validation of theories or the investigation of phenomena and the advancement of knowledge

[14] in the specific case of the topic of flexibility and have allowed to define a new horizon of strategic relationships with the topics of efficiency, innovation, sustainability and architectural language.

2.2Discussions

Although the Western architectural culture is thousands of years old, the interest and experiments on the flexibility of living spaces began only at the beginning of the last century (Fig.1).

The little "history" that this topic has in our continent comes from the statute of modernity that has theorized the possibility of modifying/adapting the architectural organism to new, changed needs of a different nature [4]. Flexibility is a topic that appears jointly with technological advancement and with the appearance of significant changes in social stratigraphy and lifestyles. An environment without technological means would therefore appear, from the point of view of the feasibility of a flexible project, to have less potential [9]. Some recent examples such as the case of the Studio Elemental project in Chile (Fig. 2) and the development of informal housing in much of the marginal urban areas in Latin America, they are based on the principle of incremental housing that is completed over time and in relation to the economic possibilities of the families. They show that flexibility has less to do with technological innovation but much to do with the predictive use of architecture technology in relation tolocal resources.

The Sliding House in Suffolk (2009) (Fig. 3) by Studio dRMM is at the opposite end of the spectrum and is emblematic in demonstrating how many and what technological tools are available today to create flexible housing.

Fig. 1: An historical case study. Moisei Yakovlevich Ginzburg e Ignatii Milinis, Dom Narkomfin, Mosca, Russia, 1928-1930. (photo by: Robert Byron)

Fig. 2: Alejandro Aravena e Studio Elemental, Residential complex, Quinta Monroy, Cile, 2004 (Photosby: Cristobal Palma).

Fig. 3: dRMM, Sliding House, Suffolk, UK, 2009 (Source: www.theplan.it)

Kronenburg states that "there was a time, not too distant in terms of the evolution of the species, when our existence was based on our ability to move and adapt", and it is in fact by investigating this concept of "flexible living" that has allowed us to analyze the first experiences of built environments that characterized a "life in motion" [15].

In Western architecture, the interest in flexibility is visible in the first experiences at the beginning of the 20th century: the search for flexible solutions, able to adapt to the needs of modern man, finds concreteness in the free plan that allows internal flexibility and transformability according to the new models of life (fig. 4).
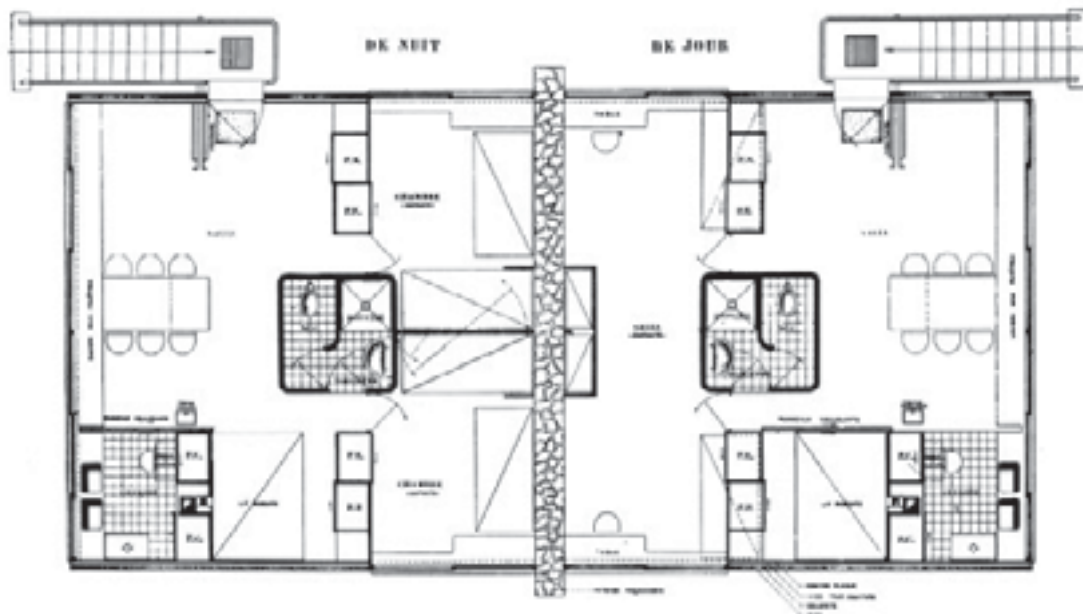
Fig. 4: Le Corbusier, Maison Loucheur, 1929.

The 21st century is the one where flexibility experiences seek a local dimension, aligning themselves with the inescapable need for sustainable and resilient projects, seeking to achieve flexible housing in terms, above all, of adaptability to local resources and needs.

The synthesis drawn through historical analysis and the literature on the subject has made it possible to determine a synthetic classification of flexibility into types and forms. The typological classification identifies the types referable to functional, spatial, structural and technological-plant flexibility. The classification by forms is, instead, the result of the deepening of the topic as a strategy that can be achieved by different means and times. Flexibility it is not only inherent in the moment of the design concept but present throughout the useful life of a

building organism. A building can recover some forms of flexibility during its life cycle and through interventions of functionalization and modernization [9].

The classification by forms determines the first character of originality of the research, that is, the reinterpretation of flexibility along the entire building process in the phases of design, construction/demolition and finally in that of use, classified in the research as project flexibility, work flexibility and system flexibility. The project flexibility concerns the phase of ideation, is characterized by the interaction between the client and the design team to resolve conflicts between the interests of the various disciplines involved in the project [5]. System flexibility affects the in-use phase and aims to improve its in-use performance. This is the form of flexibility that most contributes to managing the phenomenon of obsolescence. This flexibility derives from interventions that can be implemented first during construction and then during demolition and depends on the construction and material choices; it is clearly exemplified by Glenn Murcutt's Marie Short House in Kempsey[1], Australia (1975-1980) (fig. 5, 6).
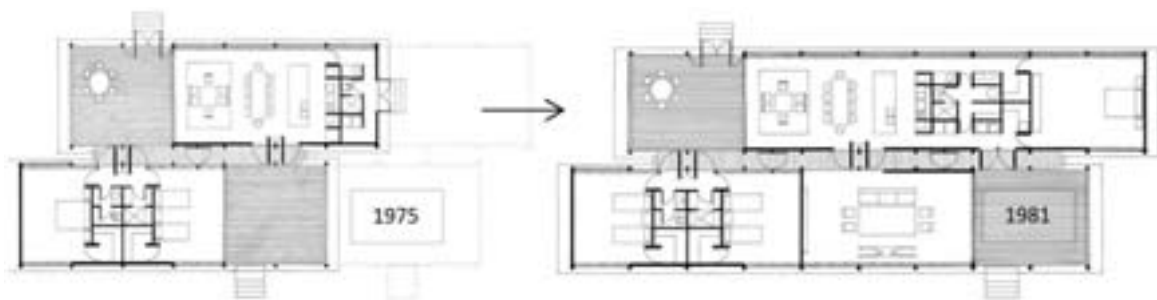
Fig. 5: Glenn Murcutt, Marie Short House, Kempsey, Australia, 1975-1980, plan evolution

Construction flexibility is a strategy to implement interventions during the construction phases of a building, involving improvements and adjustments agile and not onerous on the built, it is a useful condition that the elements of the construction could possess.

A second character of originality of the research was to decline the topic in relation to the concepts of sustainability, energy efficiency, aesthetics, innovation, and reuse.

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[1] Glenn Murcutt designed the Marie Short House in 1975, originally consisting of six bays, 5 years later he purchased the building himself, increasing the number of bays to nine in order to obtain a building that would meet the different needs than the initial client. Murcutt describes the enlargement operations as follows: "The original bay was an external veranda in tallow wood, wood obtained from a beautiful Australian timber tree [...]. I unbolted what was bolted to the new living room and rolled it on cylinders and moved it to a new position. I then re-bolted everything, took the gable, disassembled and reassembled [...]" [20].

Fig. 6: Glenn Murcutt, Marie Short House, Kempsey, Australia, 1975-1980, external view

The integration between the topic of flexibility and the different topics that contribute to define the theoretical-applicative dimension of the architectural project, is recognized by the scientific literature that has addressed, in several studies, the relationship between flexibility and other topics considered however individually (e.g. flexibility and sustainability, flexibility and reuse, etc.) [16,17,18,19].

Reflections on the different issues were addressed both in a dichotomous comparison between flexibility and a single strategy at a time, and in a holistic re-reading of case studies in which multiple strategies were pursued simultaneously.

Case studies of realized projects have been investigated and selected giving priority, to the time of realization, i.e. the most recent possible, and to their ability to represent how the tools of flexible design also become tools of sustainability, energy efficiency, aesthetic quality of the building organism, technological innovation, and functional reuse.

Examples include Nextoffice + Alireza Taghaboni's Sharifi-Ha Residence[2] in Tehran, Iran (2013) (fig. 7 and 8).

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[2] The Sharifi-ha House is a single-family residence whose design concept is inspired by the functioning model of traditional Persian houses that perform the same function of living area in different climatic periods for the need to adapt to the climatic context. The architectural space is characterized for each of the three levels of the house, by an added volume in the facade, able to rotate up to 90 degrees determining, at the variation of its positions, the change and therefore the flexibility of the internal space, the conditions of thermal and luminous comfort and the shape of the facade.

Fig. 7: Nextoffice +Alireza Taghaboni, Sharifi-Ha Residence, Tehran, Iran, 2013, external view

Fig. 8: Nextoffice +Alireza Taghaboni, Sharifi-Ha Residence, Tehran, Iran, 2013, plan

3.   Conclusions

The ultimate objective of the research is the drafting of guidelines for the definition of flexible solutions in residential construction. The first results of this phase allow us to recognize the flexibility as a capacity of preparation that the designer transfers to the project and the process in a predictive form with respect to the changes that the built could undergo. Moreover, the guidelines will be able to descend from the declination of numerous examples, types, degrees and forms of flexibility for the project of living, leading them back, through the interpretative grid preconstructed, to syntax immediately recognizable and replicable. In this way, the research will allow the construction of a wide-ranging tool for the designer, able to highlight how the strategic solutions for the flexible design can be a design proposal resulting from a replicable methodological path.

In a society in which we do not know the terms of change, the dimension of the project first and then of the building, we cannot ignore that we can fulfill a changing and not completely predictable framework to try to offer architectures and processes that have readiness and economy towards the logic of adaptation and respond in a sustainable way to social change.

This first investigation presented has allowed to develop a theoretical scaffolding declined through several residential case studies, giving a first limit to the research but also a first significant potential development. The mode of the study, in fact, can be extended and applied to fragile users, because of their complex and changing needs and time frame.

A second important possibility of development is inevitably linked to the transfer of the typological plan, from residences to more complex structures such as, for example, sociomedical ones.

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HIA methodology for safeguarding the minor historical and cultural heritage from the impacts of natural disasters

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Abstract
The catastrophic events that have struck Italy in recent years, in addition to the painful loss of human lives and considerable property damage, have, in some cases, affected significant elements of the cultural heritage.
It follows that, within the broader theme of risk mitigation associated with the effects induced by climate change and natural disasters, a separate chapter is represented by the widespread presence of historical sites that, due to their particular nature, are extremely vulnerable.
Heritage Impact Assessment, promoted by ICOMOS (International Council on Monuments and Sites), is the assessment methodology that examines the impact of transformation projects on the values, attributes, authenticity and integrity of World Heritage sites. This paper proposes to broaden the scope of the HIA, extending it to the assessment of impacts produced by natural events on minor historical and cultural heritage.
The proposed methodology involves three distinct steps: (i) assessment and classification of the degree of significance of cultural heritage elements; (ii) assessment of the level of risk for different classes of cultural heritage assets located in historic areas; (iii) assessment of the resilience of local communities in historic areas.
Decisive for the success of the proposed methodology is the collaboration of local communities. With this in mind, it is envisaged to use the Living Lab approach (which can help, among other things, to incorporate intangible heritage aspects into the HIA) as a useful ecosystem to develop shared solutions with communities to improve the resilience of historic areas.

Keywords: cultural heritage, climate change, resilience, living lab, community prevention

1.   Climate change and cultural heritage
The impact of climate change on Cultural Heritage has long been ignored at both the international research and policy levels, which is unacceptable since Cultural Heritage is a nonrenewable resource to be passed on to future generations.
Cultural landscapes, historic cities, archaeological sites, and vernacular architecture are constantly being impacted by climate change; perhaps one of the most obvious examples of how climate change threatens Cultural Heritage is the case of Venice and its Lagoon. More than one-third of World Heritage cities are in areas at risk from rising sea levels [1], but while

this is an obvious large-scale threat, climate change is also having impacts on heritage sites not directly exposed to this danger. Rising temperatures, increased precipitation, droughts, and more frequent extreme weather events threaten various heritage sites and the communities that identify with them and on which their economies often depend. After all, the latest report of the Intergovernmental Panel of Experts on Climate Change [2], highlights the multiple intersections and interdependence between climate, natural systems and human societies.

In 2017, UNESCO adopted a "Strategy for Action on Climate Change" [3] in which it is blatantly emphasized that cultural heritage and cultural diversity are resources that member states must look to in learning how to respond to climate change [4]. ICOMOS, an advisory body of UNESCO, also advocates for better conservation and management of tangible and intangible cultural resources vis-à- vis climate change as a source of resilience and a resource for climate action [4]. In this regard, to increase stakeholders' attention to the dangers of climate change on cultural heritages, the Climate Change and Cultural Heritage Working Group published "The Future of our Pasts: Engaging Cultural Heritage in Climate Action" [5], which presents a multidisciplinary approach intended for site managers, scientists, researchers, climate activists, and policy makers.

Climate change impacts Outstanding Universal Values (OUVs), especially Integrity and Authenticity, as well as economic and social development, more generally, the quality of life of communities associated with World Heritage sites [6].

Unfortunately, although there is awareness of it, sporadic are the examples of national risk management and mitigation plans that contain specific measures and strategies for its protection. The Italian National Strategy for Adaptation to Climate Change is a positive example in this regard, as it proposes recommendations and actions aimed at the protection of materials used in Cultural Heritage, strategies for sustainable management of the built heritage and adaptation actions and safeguards for landscape assets. In Europe, besides Italy, at present only France and Ireland include measures for the protection of Cultural Heritage in their national plans.

2.   The ICOMOS HIA.

The Heritage Impact Assessment (HIA) is an assessment methodology based on the guidance found in the ICOMOS "Guidance on Heritage Impact Assessments for Cultural World Heritage Properties" [7]. It aims to assess, with a systematic and consistent pathway, the positive/negative impact of one or more transformation projects affecting values, attributes, authenticity and integrity of World Heritage sites. The assessment is instrumental in indicating recommendations and possible mitigation measures to reduce or avoid possible negative effects on heritage.

HIA falls under the umbrella of Impact Assessments (IA), defined by the International Association for Impact Assessment (IAIA) as structured processes useful for identifying the consequences of a current or proposed action with respect to significant changes that may be implemented at the environmental, political, economic, or social level [8]. Under the most commonly used assessment procedures (SEA - Strategic Environmental Assessment, EIA - Environmental Impact Assessment), components such as values, related attributes, and conditions of Authenticity and Integrity are not specifically examined with the risk of not obtaining a comprehensive view of the OUV of the World Heritage site and neglecting, for example, cumulative impacts and social aspects.

The HIA is an adapted version of the EIA with specific focus on the cultural and heritage sector, directly focused on the manifestations of OUV. The HIA is thought of as a process of identifying, predicting, assessing, and communicating the likely direct or indirect effects of a specific project or development proposal that could potentially threaten World Heritage site values (perceptual, social, economic, artistic, etc. values). In contrast to SEA and IEA, the HIA, within all project phases, integrates predictions and outcomes, involving all relevant stakeholders (local, regional, and ministerial governments, citizenry) so as to introduce mitigation measures that limit the negative effects of projects.

From an implementation perspective, there are six main phases of the HIA:
1. Identification and selection of cases (screening);
2. Preliminary investigation (scoping);
3. Impact assessment;
4. Introduction of mitigation measures;
5. Monitoring;
6. Dissemination of results

Significant, in the context of the applications of HIA in Italy, is the experience of the Historic Center of Florence, where thanks to the funds of Law 77/2006 of the Ministry of Cultural Heritage and Activities and Tourism, the HeRe_Lab laboratory was funded. HeRe_Lab has perfected a preliminary assessment model, developed to resolve the complexities of interaction and coordination among the various parties involved in some transformation projects [9].

3.   A possible evolution of the HIA

The case study of Florence shows how there is, on the one hand, a need to go beyond ICOMOS procedures, and on the other hand how the focus is still on UNESCO heritage.

The approach proposed in this paper differs from the traditional approach promoted by ICONOS in several respects:
-   it focuses on potential impacts resulting from climate change and natural disasters rather than human-caused impacts;
-   it does not apply only to World Heritage List sites, but more generally to historic areas;
-   does not refer exclusively to the attributes of the OUV, but incorporates the social, legal, political, economic, and organizational aspects, as well as the physical (environmental, ecological, and technical) aspects, specific to the area under consideration, in order for the estimation of risk and resilience levels to be made.

It follows that the quantification of potential damage is not limited to material heritage alone, but also considers the effects on intangible cultural heritage, as well as the mutual influence between tangible and intangible cultural heritage [10].

The proposed methodology consists of three interacting steps:
1.   assessment and classification of the degree of significance of cultural heritage elements;
2.   assessment of the level of risk for different classes of cultural heritage located in historic areas (with respect to the classical criteria: hazard, vulnerability and exposure):
3.   assessment and strengthening of the resilience of local communities in historic areas.

In the first stage, it is necessary, through the application of multi-criteria assessment methods [11], to identify a set of elements (intangible value of punctual and diffuse cultural heritage, population concentration, spatial distribution of cultural assets, form and contextual value of historic areas, etc.) that will allow to identify, within a holistic framework, the value of the significance of any cultural asset [12]. This "value," which will be expressed through the analysis of the identified criteria, will make it possible to hierarchically order cultural heritage assets according to their spatial significance and, therefore, to establish an order of priority for intervention [13]. The synthesis of the assessment process will be a cultural heritage significance map, which will be produced by means of a synthetic numerical index (CHSI - Cultural Heritage Significance Index), defined by a set of metadata entered into a significance matrix concerning the individual cultural property analyzed.

The second phase analyzes the correlation of natural hazards with cultural heritage assets in specific areas. The response of cultural heritage assets is significantly different depending on their inherent characteristics; the environmental context, physical characteristics, as well as the origin of construction materials are crucial aspects in assessing vulnerability and specific risk levels. Through the assessment of the impacts of any natural hazards, specific criteria can be developed for the construction of a multi- factor risk index [10]. This index (HARI - Historic Area Risk Index), which is derived from the hazard and vulnerability maps superimposed on the significance map, contains both multi-hazard aspects (isolated events, concomitant events, follow-on events or cascading effects) and multi-vulnerability aspects (population, infrastructure, cultural heritage, etc.) [13].

The third stage of the methodology involves assessing the resilience of the community that hosts that specific cultural heritage (and recognizes itself in it). The resilience of a community, as described by some authors, is a set of interconnected skills that facilitate a flexible, dynamic and adaptive response to situations of change [14]. The shared idea of resilient communities is based on three principles: resilience tendency (the community's ability to absorb impact); recovery tendency (the abilities to recover from stress and their relative speed); and creativity tendency (the potential to improve one's functioning as a consequence of adversity) [15]. In addition, the abilities and possibilities to mitigate the risks and effects of climate change are inevitably linked to government policies and decisions that influence communities of individuals. Cultural heritage, while a key asset in characterizing a community's identity, is often excluded from existing Community Resilience Assessment

methodologies. This approach neglects stakeholders' perceptions of the consequences of climate change on their heritage. This step must take place through a bottom-up approach that focuses on vulnerabilities at the local level, specifically working on prevention versus recovery through risk reduction and event preparedness activities.

4.   Community Prevention

One of the key elements in cultural heritage protection is the creation of stakeholder communities in a collaborative and knowledge-sharing framework to co-create, share and manage improved practices, knowledge and experiences.

A knowledge-sharing process is necessary to develop and validate procedures and methodologies for managing cultural and artistic heritage in the context of climate change. Key node of this process are Living Labs, which according to the definition of the European Network of Living Labs (ENoLL) [16], are citizen-centered urban innovation ecosystems, based on the systematic involvement of users in real- world contexts through a wide variety of methods, tools and incentives, with the participation of multiple stakeholders in the co-creation of innovations that respond to predefined urban challenges.

The Heritage Living Lab, in short, provides an opportunity to implement cooperation between scientific- technical knowledge and the affected communities that are often ignored by academic research and classical governance structures. In this way, by also activating Citizen Science processes, more accurate data, deeper knowledge and better assessment of the local significance of cultural heritage can be achieved.

In particular, the use of sharing methodologies enables local communities to transfer knowledge and skills, share experiences and results, have access to shared data, be informed about needs and decisions, and understand best practices for strengthening resilience and/or sustainable reconstruction of historic areas [17].

Heritage Living Labs, will be the place to develop forms of community prevention, where local communities, through a pro-active approach, will be involved in the planning and management of risk prevention and monitoring activities, so as to also foster the strengthening of local social relations and the re-interpretation of territorial resources [18].

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Possibility of Countermeasures for Visitors' Evacuation by Utilization of Tourist Resources - For Emergency Evacuation Spaces in Tourist Attraction Areas of Historic City Kyoto

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Abstract
Kyoto has positioned local temples and shrines, etc., as "emergency evacuation spaces" under the agreements. Still, in the event of a large-scale disaster, we believe that it is necessary to present and study new possibilities of measures for supporting people who have difficulty returning home by utilizing existing tourist resources, such as "temporary stay facilities" where tourists can rest or stay overnight and use souvenirs as foods and other items as relief supplies.
In this study, we evaluated the possibility of utilizing Kyoto's existing tourist resources, such as facilities and equipment of shrines and temples, etc., and souvenirs as relief goods, to be used as temporary places to stay, mainly in emergency evacuation squares, for about three days, similar to temporary stay facilities in a contingency.
As a result, we clarified the possibility of positioning these facilities as one of the measures for supporting people who have difficulty returning home to Kyoto.

1. Introduction

1.1 Background of the study
Kyoto, the target area of this study, is home to numerous cultural properties and historical townscapes and is visited by more than 53 million tourists annually [1].
Japan is prone to disasters, and many places are seeking a review of their disaster prevention performance after the Great East Japan Earthquake in 2011. Especially in Kyoto, which many tourists visit, the number of people who have difficulty returning home, including tourists, is estimated to be more than 370,000 [1].

Previous papers on using temples and shrines as emergency evacuation spaces or temporary stay facilities along with making effective utilization of food souvenirs, which are one of the tourist resources, as relief supplies when there was a shortage of evacuation centers due to damage to public evacuation centers [2,3]. The possibility of utilizing temples and shrines as evacuation centers has been presented in the studies conducted by Taniguchi et al. [4] and Shimizu et al. [5] to examine the effectiveness of temples and shrines as disaster preparedness centers.

1.2 Purpose of the Study

This paper examines the possibility of using "emergency evacuation spaces," including shrines and temples with which Kyoto has concluded agreements, as "temporary stay facilities" for all visitors. It discusses new possibilities for measures for people who have difficulty returning home by utilizing resources in tourist areas, such as using on-site resources as souvenirs and relief supplies.

1.3 Definition of terms

[1] Emergency evacuation spaces for tourists (hereinafter referred to as "Emergency evacuation spaces"*): Places that are set up 3 to 12 hours after a disaster to provide temporary stay and disaster information to ensure the safety of tourists immediately after a disaster (temples & shrines, parking lots, parks, etc.) [6].

[2] Temporary stay facilities for tourists (hereinafter referred to as "Temporary stay facilities"*): Places where the visitors staying in the emergency evacuation spaces can stay overnight for a maximum of three days after the disaster (Lodging facilities and other indoor facilities, etc., affiliated with the Kyoto Prefecture Ryokan Association) [6,7].

*Emergency evacuation spaces and temporary stay facilities refer to the facilities that have entered into agreements with Kyoto.

2. Characteristics of target areas

2.1 Establishment of target areas

Based on the "Survey on Tourist Trends (2021)" [8] showed that the tourists who have difficulty returning home concentrated around Kiyomizu-Gion (hereinafter referred to as the "Gion Area" (Fig. 1)) and Saga-Arashiyama (hereinafter referred to as the "Arashiyama Area" (Fig. 2)), the study was performed by considering these two areas as the target areas, considering the temples and shrines, etc. (Table 1) in the established regions in Kyoto's "Tourist Evacuation Guidance Plan" (hereinafter referred to as the "Guidance Plan") [9,10] as the "Emergency Evacuation Spaces," and considering each shopping street (Table 2) as the target for souvenirs.

Tab. 1: Target Emergency Evacuation Spaces

	Gion Area	Arashiyama Area
Shopping Streets	Gion Shopping Street Promotion Association	Arashiyama Shopping Street
	Kiyomizu-dera Monzenkai	Saga Shopping Street
	Kiyomizu Hanraikai	Arashiyama Jukkenkai
	Southern Gionmachi Council	Arashiyama Nakanoshimakai
	Koto-ni Miseru Kai	Arashiyama Nishinokai
	Chawanzaka Hanraikai	
	Kiyomizu Sennenkai	
	Kodaji Temple Monzenkai	
	Gojozaka Tovankai	
	Kiyomizumichi Shopping Street	

Tab. 2: Target Shopping Streets

	Gion Area	Arashiyama Area
Emergency evacuation spaces	Kiyomizu-dera Temple Parking Lot	Jojakkoji Temple
	Kyoto City, Kiyomizuzaka Tourist Parking Lot	Nison-in Temple
	Maruyama Park	Seiryouji Temple
	Yasaka Shrine	Restaurant Arashiyama
	Otani Mausoleum	Kyoto City, Arashiyama Tourist Parking Lot
	Kyoto Ryozen Gokoku Shrine	Saga Torokko Station Building/Station Square
	Ryozen Kannon	Arashima Park, Nakanoshima Area
	Kyoto National Museum	
	Kodaji Temple	

Fig. 1: Target Area (Gion Area).   **Fig. 2:** Target Area (Arashiyama Area).

2.2 Disaster risk of the target areas

There are multiple faults in Kyoto: subduction-zone earthquakes due to plate boundary faults in the Nankai trough or inland earthquakes with the epicenter in the Hanaore fault [11].

2.3 Disaster prevention system of the target areas

Kyoto designated the emergency evacuation spaces (Temples & shrines, parking lots, etc.) and temporary stay facilities (Lodging facilities and other indoor facilities affiliated with the Kyoto Prefecture Ryokan Association) separately. In addition, the "Council for Countermeasures for Visitors of Tourist Attractions in Kyoto" was established to implement measures for people who have difficulty returning home, especially tourists.

Furthermore, the specific items or quantities of the stockpile are indicated in the "Kyoto Stockpile Plan".

3. Research Methods

3.1 Investigation items related to the equipment and stockpile of the emergency evacuation space

A questionnaire survey and an interview-based survey was conducted for 9 facilities in the Gion area and 7 in the Arashiyama area. This study clearly articulates the stockpile supplies or equipment (hereinafter referred to as the "support items") that need additional support for cases in the tourists account for those who have difficulty returning home after a disaster and live in the emergency for three days. The investigation items were determined by focusing on the relation between the duration of stay as evacuees and the support items while also referring to the "Kyoto Stockpile Plan" (hereinafter referred to as the "Stockpile Plan" [12]) and past research by Shirane et al. [13]. As a result, based on the "Stockpile Plan," from the supplies stored in the emergency evacuation spaces, the stockpile quantities of "food," "drinking water," "portable toilet," and "toilet coagulants" were considered as the investigation items. Further, "permanent toilets" and "water sources required for use" were added to the investigation items.

Tab. 3: Outline of the Interview-based Survey

Survey Target	Survey Schedule	Survey Items
Kyoto City Disaster Prevention and Crisis Management Office	2022/11/21 to 2023/3/30	· Countermeasures for Visitors' Evacuation · Amount of well water available
Souvenir shops in shopping street (Gion: 35 stores, Arashiyama: 13 stores)	2022/12/15 to 2023/12/22	In-store stock of unbaked yatsuhashi
Facilities that are emergency evacuation spaces + Bicycle Policy Promotion Office, City Planning Bureau, Kyoto City + Southern Midori Management Office, Kyoto City Construction Bureau	2022/12/30 to 2023/3/19	Equipment and supplies within the facility (indoor space, stockpiled supplies, water resources, number of parking spaces for regular cars and sightseeing buses)

3.2 Outcome of investigation of emergency evacuation spaces

Of the seven facilities in the Arashiyama area, three facilities were unable to cooperate during the investigation due to business-related reasons; therefore, the number of permanent toilets was considered zero, the water sources were referred from the website of each facility, and for the quantity of stockpiled supplies, the quantities mentioned in the data provided by Kyoto (as of November 30, 2022) [14] were considered as the current quantities. (Table 4)

Tab. 4: Quantities of Equipment and Stockpiles in Gion Area and Arashiyama Area

3.3 Determination of support items and alternative support items

Based on the past investigation [13,15,16], the alternative support items were determined as given in Table 5. Since each facility has permanent toilets and water resources such as ponds and tanks, in addition to "drinking water" and "food," "living space" might require additional support of stockpile supplies, and these three items were considered the support items.

Tab. 5: Support Items and Alternative Support Items

Support Items	Alternative support items
Living space	Indoor space of the emergency evacuation space · Accomodation space using tents · Space where overnight accommodation can be done inside cars
Drinking water	Water from Disaster Cooperation Well
Food	Souvenirs from shopping street (Nama Yatsuhashi)

3.4 Evaluation method
a) Determination of the number of evacuees

It was assumed that all tourists who had difficulty returning home had to take refuge until the lifeline services were restored (around 3 days). To ensure the safety of the tourists and to prevent them from returning home all at once, in Kyoto's "Countermeasures for Visitors," that at first, the tourists are evacuated to the emergency evacuation spaces (Fig. 3: [1]), and then from [1] they are divided into two groups, [2]: Tourists transferred to temporary stay facilities and [3]: Tourists who return home individually. Since it was assumed in this study that the

people from the group [3] might also have difficulty returning home and would take refuge in the temporary stay facilities.
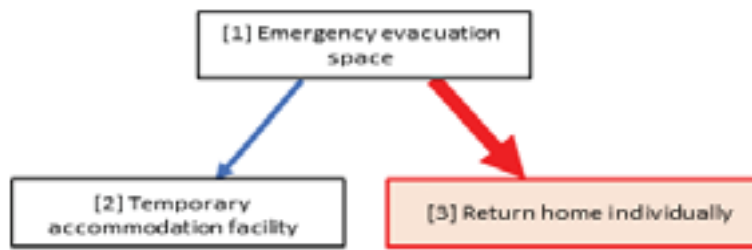
Fig. 3: Movements of people who have difficulty returning home after disaster outbreak.

Based on this, the number of target evacuees in this study is set as follows.

([1] Number of evacuees in the emergency evacuation spaces) - ([2] Number of evacuees in the temporary stay facilities) = ([3] Number of people returning home one by one) = "Target evacuees" in this study.
For the Gion area, it is 48,000 people - 29,000 people = 19,000 people [9].
For the Arashiyama area, it is 26,000 people - 14,000 people = 12,000 people [10].

b) Sufficiency rate evaluation method
For the number of evacuees, it was evaluated the sufficiency rate to check whether it was possible to secure the quantities of supplies or living spaces in the two regions based on the total "Support items (stockpile supplies)" and "Alternative support items" that were investigated. As the response rate of the target facilities was not 100%, evaluation was done by dividing the responses as given below:
(i) Quantity obtained from the responses
(ii) Quantity obtained by assuming a 100% response rate (calculated by assuming that the quantities of non-responding facilities were the same as the quantities stated by the responding facilities)

4. Evaluation of each alternative support item

4.1 Number of people accommodated in the living space
The indoor area of the facility/number of persons that can be accommodated, the size and the number of tents owned by the facility, and the number of parking spaces available in the parking area were investigated referring to the research methods of questionnaire and interviews by Taniguchi et al. [16], and the "Number of persons that can be accommodated in the living spaces (hereinafter referred to as the "Accommodation capacity") was obtained. Accommodation capacity is the total of the following: [1] Number of people that can be accommodated in the indoor space of the emergency evacuation space, [2] Number of people that can be accommodated in covered spaces such as tents that are set up outdoors, and [3] Number of people that can stay in the cars parked in the attached parking lot.

a) Method of calculation of the accommodation capacity
The accommodation capacities of both Indoor spaces and spaces that are set up outdoors were calculated by referring to the "Kyoto Station Area Urban Renewal Safety Assurance Plan; Evacuation Guidance Manual" and by considering a required space of two square meters per person [17].
(Size of the space (m2)) ÷ 2 m2 = (Accommodation capacity)
In this survey, the number of people that can be accommodated was calculated for the facilities based on the area or number of people, and represented in Table 6.

Tab. 6: Accommodation Capacity of Living Spaces

Gion area		Number of people (people)		
		① Indoors	② Tent, etc.	③ In the car
	1	0	11	76
	2	0	40	536
	3	562	91	188
	4	100	2	200
	5	119	58	0
	6	0	0	0
	7	0	0	1446
	8	5	0	240
	9	0	27	292
	Subtotal	786	249	2978
	Total	4013		

Arashiyama area			Number of people (people)		
			① Indoors	② Tent, etc.	③ In the car
	1		300	18	40
	2		91	0	20
	3		1750	22	960
	4		0	0	1234
	5		0	0	0
	6		0	0	0
	7		0	0	0
	Subtotal		2141	40	2254
	Total	(i)	4435		
		(ii)	7780		

(i) Quantity obtained from the responses only
(ii) Quantity obtained by assuming 100% response rate
* For facilities that have not responded, consider the number of people as 0.

According to the "Road Transport Vehicle Act" [18], the minimum passenger capacity of a standard-sized car is 4 persons for the small passenger vehicle, and for the sightseeing buses, the minimum capacity of a small microbus is 22 persons based on the classification [19] of the types of chartered buses.

 {(Number of parking spaces for standard-sized cars) x 4 persons} + {(Number of parking spaces for sightseeing buses) x 22 persons} = (Number of people that can stay in the vehicles)

b) Method of calculation of the sufficiency rate

The estimated number of target evacuees that require living spaces is 19,000 for the Gion area and 12,000 for the Arashiyama area. Therefore, if an emergency evacuation space is converted to function as a temporary stay facility, sufficiency rates for the number of target tourists would be as given below.

(i) Quantity obtained from the responses: It became evident that about 21% of the evacuees can be accommodated in the Gion area, and about 37% can be accommodated in the Arashiyama area.

(ii) Quantity obtained by assuming a 100% response rate: When the total response rate of 57% in the Arashiyama area was converted to 100%, and the obtained value was considered as the overall value, the result was 7,780 people (4,435 people ÷ 0.57 ≒ 7,780), and it was understood that about 65% of the capacity could be accommodated.

4.2 Drinking water

The amount of water taken from the "Disaster Cooperation Well" was assumed as an alternative support for drinking water, which is a voluntary registration system of private wells in Kyoto in preparation for water shortages in the event of a large-scale earthquake. The wells are currently only for use in household work and are not expected to be used for drinking [20]. However, the evaluation was done by assuming it can be used for drinking by installing water purifiers or boiling. By using the average distance of 500 m [21] traveled by the evacuees on foot during the Great East Japan Earthquake as a reference, we used the hazard map [22] to identify the wells located within a 500-meter radius from the emergency evacuation spaces as shown in Fig. 4 and Fig. 5 and found that the number of target wells was 6 in Gion area and 6 in Arashiyama area.

Fig. 4: Locations of Disaster Cooperation Wells (Gion area).

Fig. 5: Locations of Disaster Cooperation Wells (Arashiyama area).

a) Method of calculation of the amount of water taken
We referred to the data of water taken from wells in the Higashiyama Ward, including the Gion area, and Ukyo Ward, including the Arashiyama area. Upon calculating the average amount of water drawn from one well is about 64 L/minute in the Higashiyama Ward and was about 500 L/minute in the Ukyo Ward.

These values were used as a reference for the volume of water per well within a 500-meter radius, and the total amount of water taken for 3 days was obtained from the following equation:
(Average amount of water taken from one well within the ward (L/minute)) x quantity for 3 days x (number of wells within a 500-meter radius) = (total amount of water taken (L) in 3 days)
As a result, the total amount of water taken in 3 days became clear, as shown in Table 7.

Tab. 7: Assumed amount of water taken from wells

	Average water intake per well in the ward (ℓ/min)	Number of target wells within the target range (wells)	Total water intake for 3 days (ℓ)
Gion area	64	6	1658880
Arashiyama area	500	6	12960000

b) Method of calculation of the sufficiency rate

For drinking water provided to the evacuees, by using the minimum required amount of water of 1 L per person per day given in the "Disaster Food Stockpiling Guide" [23] as a reference.

Gion area: 19,000 people x 1 L x quantity for 3 days = 57,000 (L)

Arashiyama area: 12,000 people x 1 L x quantity for 3 days = 36,000 (L)

For the stockpile quantity of drinking water (Table 3) to be added, by performing calculations using 500 ml bottles and using 2 bottles to obtain 1 L, the following values were obtained for the total amount of drinking water. Gion area: 1,662,297 L (16,58,880 L + 6835 bottles/2 = 1,662,297), Arashiyama area: 12,961,260 L (12,960,000 L + 2520 bottles/2 = 12,961,260).

Accordingly, when the total amount of water, including the stockpile supplies in the emergency evacuation spaces and the water provided from the disaster cooperation wells, was considered as the alternative support of drinking water for 3 days.

However, since 5 out of 6 wells in both Gion and Arashiyama areas have electric pumps that cannot be used during a power outage.

4.3 Food

Souvenir foods that sell in Kyoto have the potential of rations as emergency food supplies. For the target souvenirs, we focused on "Unbaked Yatsuhashi," which were the most sold according to the survey results of souvenir purchases by tourists in the "Survey on Tourist Trends" [8].

We conducted a questionnaire for the in-store inventory of souvenir shops that sell "Unbaked Yatsuhashi" in the target shopping streets. We obtained responses from 24 out of 35 stores in the Gion area (response rate of about 68%) and 8 out of 13 stores in the Arashiyama area (response rate of about 61%).

a) Method of conversion of food

We understood that the calories per unit of "Unbaked Yatsuhashi" do not vary greatly with the manufacturer or flavor, so we used the 60 kcal, as the reference. In addition, for the food conversion factor, a supply of 180 kcal per person per meal was used as a reference based on the "Stockpile Plan" [12]. The total calories and the food conversion factor obtained from it based on the inventory quantities of each store are shown in Table 8.

Tab. 8: Inventory Quantities of Shopping Streets

	Total calories in each store inventory (kcal)	
	Gion area	Arashiyama area
①	21000	428400
②	54000	120000
③	18600	81600
④	1200	126000
⑤	15000	31200
⑥	127200	786000
⑦	105000	31200
⑧	768000	93300
⑨	60000	
⑩	136800	
⑪	30000	
⑫	720000	
⑬	66000	
⑭	30300	
⑮	90000	
⑯	42000	
⑰	15600	
⑱	12000	
⑲	30000	
⑳	5700	
㉑	336000	
㉒	756000	
㉓	144600	
㉔	120000	
Total for all stores (kcal)	3705000	1697700
Total food equivalent (meals) (I)	20583	9431
(II)	30017	15325

(I) Total of response results only (meals)
(II) Estimated total with 100% response rate (meals)

b) Method of calculation of the sufficiency rate
The amount of food required for the number of evacuees for 3 days is as follows.
Gion area: 19,000 people x 3 meals x quantity for 3 days = 171,000 (meals)
Arashiyama area: 12,000 people x 3 meals x quantity for 3 days = 108,000 (meals).
Therefore, if it is assumed that sufficient food for 3 days is secured to be distributed to temporary stay facilities, the sufficiency rate of the total amount of supplies, including stockpiled food and alternative support for the target number of evacuees, would be as follows:
(i) Quantity obtained from the responses: Since the total amount of supplies is 28,508 meals (20,583 meals +7,925 meals = 28,508 meals) for Gion area and 13,231 meals (9,431 meals + 3,800 meals = 13,231 meals) for Arashiyama area, food can be provided to about 17% and 11% of the target evacuees in the Gion and Arashiyama areas, respectively.
(ii) Quantity obtained by assuming a 100% response rate: Since it is 30,016 meals (20,583 meals ÷ 0.68 = 30,016) for the Gion area and 15,325 meals (9,431 meals ÷ 0.61 = 15,325) for Arashiyama area, the total amount of supplies including stockpiled food would be 37,941 meals for Gion area and 19,125 meals for Arashiyama area. Therefore, it became evident that the sufficiency rate for the number of evacuees was about 22% for the Gion area and about 18% for the Arashiyama area.

5. Conclusion

5.1 Summary of the study
[1] About living space: Even in case of a shortage of temporary stay facilities, accommodations with a sufficiency rate of about 21% and 37% can be secured in the Gion and Arashiyama areas, by utilizing the facilities of the emergency evacuation spaces. Since parking lots are vacant spaces other than the facilities of the emergency evacuation spaces.

[2] About drinking water: Considering using water from disaster cooperation wells in Kyoto as drinking water by using water purifiers, it became evident that sufficient drinking water could be supplied to the expected number of evacuated tourists.

[3] About food: It became evident that by using "Unbaked Yatsuhashi" stocked in the stores in the shopping streets as food to be provided to the emergency evacuation spaces, a sufficiency rate of about 17% and about 11% concerning the food required for 3 days can be secured in Gion and Arashiyama areas.

5.2 Challenges in the future

In this study, we evaluated the effectiveness of water from disaster cooperation wells as drinking water based on the assumption that water purifiers can be permanently installed at each well.

Acknowledgment

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World Heritage and Dwelling on Space
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Cultural and environmental heritage amid conflicts, climate change and overexploitation: an unsustainable and often underestimated cost for the future

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Abstract
Unfortunately, today the effects of conflicts fought with increasingly devastating weapons are added to the climate vulnerability and the dangers of excessive exploitation of environmental resources. Alongside the dead and wounded in the disastrous toll of wars, there are other silent victims: monuments, landscapes, urban and building fabrics, environmental ecosystems, water and natural resources of territories and places. However, safeguarding and protecting monuments and testimonies, not only material but belonging to the cultural space of universal and intergenerational value of humanity, can represent a significant tool for strengthening the resilience and ability to survive of peoples and communities. In our present SDG16 Peace, justice and solid institutions, of the 2030 Agenda seems like a utopia but pursuing it with tenacity is the main hope for the future of humanity.

Keywords: Climate change, Heritage, Wars, planetary boundaries

1. Introduction

The theme proposed this year by the XXII International Study Forum Le vie dei Mercanti requires a reflection on what it means to "inhabit space" and on the definition of space. Physical space, tangible, certainly, therefore territory, buildings, houses, natural and anthropic landscape but also cultural space, intangible belonging to the Noosphere but no less real and important than the first. Material reality, the space that surrounds us, is continuously shaped by human activities and technology, with impacts now so significant that, as we know, first Eugene Fillmore Stoermer and then Paul Crutzen [1] coined the term Anthropocene to indicate this era geological, shaped by humanity assimilated to a true geological force. The transition from the Holocene to the Anthropocene, on the one hand celebrates the elevation of Homo Faber to the artifex of the world, on the other hand, however, it presents us with problems of unprecedented complexity.

Thanks to the enormous and uninterrupted technological development from the last century onwards, Humanity today occupies every area of the Earth's Biosphere (including the space above it), putting the survival of millions of plant and animal species at risk.

The technological apparatus is at the service of a development model based on unlimited economic growth, which is based on ahistorical economic theories, developed at the beginning of the first scientific and industrial revolution [2], when the understanding of the same physical laws that regulate the functioning of planetary systems was just beginning.

The demographic explosion of our species correlated to a development model dependent on the growing consumption of natural resources - primarily energy - is putting the survival of terrestrial ecosystems and of our own species at risk. The recent updates of the studies conducted since 2009 by Johan Rockstrom and his research group [3] show a worrying

worsening of the anthropic impact on all the main axes of the biosphere with the exceeding of 6 out of 9 planetary boundaries in 2023. On the one hand, the science of complex systems has been telling us for decades that we need to overcome the deterministic science of the Enlightenment and the first industrial revolution, because the dilemmas of the Anthropocene can only be addressed with conceptual tools based on the understanding of the complex network of interrelation and interdependence between all terrestrial ecosystems, of which humanity is part. The human species represents approximately 2% of all terrestrial species, however the anthropogenic mass, i.e. all the artefacts built by humanity, exceeded all the biomass existing on Earth in 2020 [4].
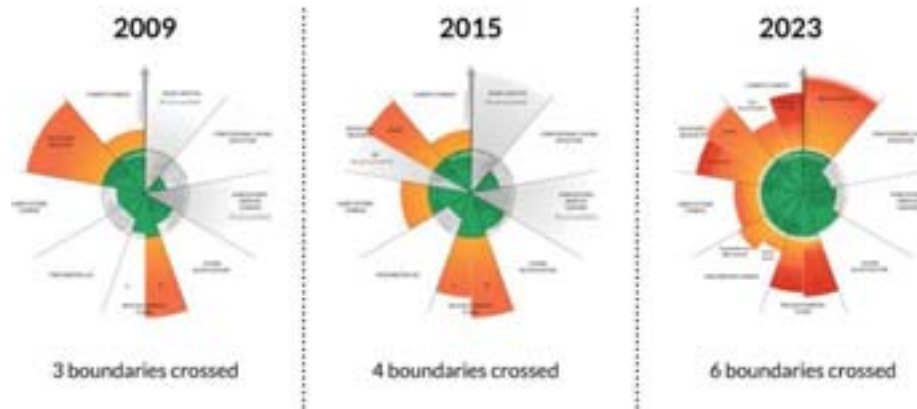
Fig. 1: The evolution of the planetary boundaries' framework - Credit: Azote for Stockholm Resilience Centre, Stockholm University. Based on Richardson et al. 2023, Steffen et al. 2015, and Rockström et al. 2009

In this sense, inhabiting space means understanding that we have one and only one planet to live on and that we must urgently learn to share this space in a sustainable way with all the other species that populate it. On the other hand, it is clear that no remedy can be effective if the current economic and development system is not regulated and made compatible with planetary constraints - which, being determined by physical laws, cannot be circumvented or negotiable - as indicated by the model of Donut Economy. [5]. In this sense, the 2030 Agenda and the 17 United Nations Sustainable Development Goals represent a partial and intermediate instrument and require a real paradigm shift for their implementation.

Fig. 2: The Donut Economy by Kate Raworth, Credits: https://www.acomeambiente.org/mostre-temporanee/economia-della-ciambella.html - SDGs Wedding Cake, EAT Food Forum in Stockholm 13 June 2016

2. Cities and settlements between climate risk and wars

Climate change, caused by the impact of climate-altering gases released into the atmosphere as a waste product of human activities, has become one of the most significant threats to the survival of natural ecosystems and to our species itself. Urban agglomerations need urgent actions to mitigate the consequences of increasingly extreme phenomena such

as prolonged drought, floods, flooding of waterways, more frequent and intense heat waves. Recent data on ongoing climate change [6] shows that Europe is the fastest warming continent in the world, resulting in threats to energy and food security, ecosystems, infrastructure, water resources, financial stability and people's health. Urgent, broad and incisive action is therefore needed. In this context, southern Europe, of which Italy is part, is particularly at risk from fires, the impacts of water scarcity on agricultural production and human health. Flooding, erosion and saltwater intrusion threaten Europe's low-lying coastal regions, including many densely populated cities.

The European Commission has recently indicated [7] Nature Based Solutions as the most suitable and preferable tools to improve the resilience of our cities. Nature-based solutions use natural systems strategies and technology to mitigate the effects of change and rebalance compromised areas. However, they need to be adopted on a large scale and in a coordinated manner at different territorial and urban levels.

3.   Cultural heritage between climate risk and wars

World Heritage, monuments, archaeological sites and cultural heritage as a whole are also threatened by climate change. UNESCO recently underlined the seriousness of the situation for many sites and areas of universal value. One example among many, the earthen tower houses in Yemen's capital San'à have been destroyed or damaged not only by the years-long war, but also by the torrential rains and floods that have hit the country in recent years. In our country, as we have known for some time, the city of Venice and the Venetian lagoon risk ending up permanently underwater due to the rise in sea levels expected in the coming decades. However, the problem is global and can only be addressed on a global and international level. The threat to the survival of humanity's cultural and material heritage has grown enormously in recent decades also due to the increase in conflicts underway in various parts of the world. There are currently over 170 conflicts or wars taking place in the world [8]. Many of the concluded or ongoing conflicts have involved and destroyed cases of unique and invaluable heritage of monuments, cultural and environmental assets.

To give a few recent and geographically close examples, in the Syrian civil war, between 2015 and 2017 the Islamic State conquered the archaeological site of Palmyra and destroyed a large part of the Roman- era monuments of the place, including the temple of Bel (Jupiter), that of Baalshamin, the triumphal arch of Septimius Severus, not to mention the systematic and illegal plundering of Syrian and Iraqi archaeological sites. In the ongoing war between Russia and Ukraine, according to UNESCO [9], 341 sites have been damaged since the beginning of the conflict, 126 religious, 150 buildings of historical and/or artistic interest, 31 museums, 19 monuments, 14 libraries, 1 archive. In the war between the Israeli state and Palestine, according to the UNESCO updates of 8 April, 43 sites of cultural interest were destroyed, including 10 religious sites, 24 buildings of historical and/or artistic interest, 2 deposits of objects and goods of a cultural nature, 3 monuments, 1 museum and 3 archaeological sites. Furthermore, according to UNESCO, approximately 40 percent of the educational buildings present in the area have been destroyed [10]. Despite the 1954 Hague Convention, despite Sustainable Development Goal 11.4 - Strengthen efforts to protect and safeguard the world's cultural and natural heritage - despite the 2005 UNESCO Convention on the Promotion and Protection of Cultural Diversity, one of the which armies increasingly brutally resort to in modern conflicts is the destruction of Heritage. Today, as in the time of Cato the Censor, *Carthago delenda est*: the annihilation of a people passes through the destruction of its material and cultural heritage.

Fig. 3: Transfiguration Cathedral in Odessa after Russian missile attack, 2023-07-23 – Source: Ministry of Internal Affair of Ukraine (published on Wikipedia); at right, Important sites in Gaza hit by Israeli bombing – Source: www.dailymail.co.uk, Heritage for Peace

4. Heritage protection as a tool to increase community resilience

For the reasons just set out, it is necessary to increase programs and actions to protect and safeguard not only the environment and human communities, but also the material and cultural testimonies of peoples from climate and conflict threats and risks. After a disaster, culture has always proved capable of increasing the resilience of a community and directly contributing to its recovery. An interesting experience based on these premises is the ICCROM "Culture Cannot Wait Heritage for Peace and Resilience" project [11]. The project is part of the 'FAR - First Aid and Resilience' programme in cooperation with the Swedish Postcode Foundation and aims to demonstrate how integrating heritage first aid with humanitarian aid can be a significant contribution to alleviating the trauma of communities affected by disasters and conflicts [12]. The FAR program focuses on training, knowledge building, networking, awareness raising and policy guidance with the overall objective of reducing disaster risk for tangible and intangible heritage and associated communities. The program's slogan "Culture Cannot Wait" is based on the belief that by integrating heritage care into broader disaster risk reduction, humanitarian aid, peacebuilding and climate action programs, peaceful communities can be built and resilient to disasters. Today, the FAR network, made up of over 1,000 cultural first aid workers, extends to more than 100 countries. Since its inception in 2020, the Program has served and engaged 122 countries by offering consultancy services for the protection of cultural heritage before, during and aftera disaster or conflict, with the support of 132 partners.

The enormous challenges posed by ongoing climate change should direct the efforts of all humanity to mitigate its effects, prevent its most catastrophic consequences and teach us to abandon wars as a tool for resolving disputes between peoples. In all of this, safeguarding and protecting monuments and testimonies, not only material but belonging to the cultural space of universal and intergenerational value of humanity, can be a significant tool for strengthening the resilience and ability to survive of peoples and communities.

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Agricultural and environmental recovery between archeology and viticulture in Alta Val d'Agri

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Abstract

Val D'Agri is known for its scenic beauty, with a combination of mountains, hills and a wide valley for creating an evocative landscape. The valley is crossed by the Agri river to which the region owes its name and is surrounded by the mountains of the Lucanian Apennines. Famous for its natural resources, it is the headquarters of one of the largest Italian oil companies, created by the ENI Company. The article highlights how there are specificities at the root of southern agricultural territorial systems and the combination of these elements that have also emerged thanks to the archaeological discoveries. The case studies are emblematic for this application, for example, Agrivanda arises from the desire to recover, redevelop, and enhance land with a purely agricultural vocation and is part of the broader integrated "Energy Valley" program of landscape and territorial redevelopment underway in the area around the Val d'Agri Oil Center in Viggiano. The Alta Val d'Agri itself is an area that reveals within it a varied and complex richness from many points of view, from biodiversity to the many historical-cultural aspects that characterize it.

Keywords: Agricultural, Recovery, Archeology, Viticulture

1.   South Italy identity and vineyards

Landscapes characterized by wine cultures are always a diversified system, for their economic system as well as for their intangible values, in a mixture of production, culture, and environment. They are based on the interconnection between the traditional wine human activity and the agricultural system, in which man's ability to affect the territory is expressed in various ways, in relation to dissimilar environmental conditions and different production techniques; but in any case they are based on the need to find a balance with the environment in which people operate. In South Italy, particularly, the wine traditional work has antique roots, connected to the identity of many areas, especially in what was once called "Enotria". The borders of this region are now not clear but it was probably extended from Cilento, Basilicata and part of today's Calabria. It is even not certain that the name "Enotria" is bound as ethymology to wine tradition, but what is certain is that in this region the wine production is very antique.

A framework for promoting the return to the identity of these places, together with the goal of an economic profit for the community, is to be studied today. In this view we could be helped by a large amount of experiences of interchange between the two urgencies: the need of economic return for people living in the country, on one hand, and the environmental urgency for an enhanced quality of life in rural territories, on the other hand. Semi-abandoned villages, which are very frequently present here, are suitable for interesting recovery prospects. At the

same time, their perceptual identity must be reconfigured and it could be possible to start testing innovative multimedia connections on a global scale.

Particularly the connotation that makes it possible is the reorganization of diversity: diversity in space, in time, in seasons. It is the integration of history and nature that compounds a variable diagram of diversity into a rural environment. It is true that cultivation has sometimes a perceptive impact, with the consequent homogenization of local identity, while during the past, as in the ancient experiences of South of Italy, a mixture of different elements was well disposed, and this organization influenced the latent opportunities of territories to take advantage for community.

But also today there is a way for reducing visual impact of production and recovering at the same time an integrated component into territorial dimension and a well-functioning socially and politically context.

There is a way of compounding natural and artificial resources, inspiring to the traditional way of working in a natural asset of people during time. In that way the central concepts of sustainability are applied to a rural environment, like into ecomuseum experiences, looking at a local approach, especially if a grade of community consensus is reached.

Small rural villages may be the occasion for experimentation with these kind of approach, with a social vision of living mainly in open spaces and into an enclosed landscape unity. Organization of territories very often recalls organization of behaviors and in this sense a research could individuate various correspondences focusing on the features of small rural contexts and on the way in which they are interconnected with the distribution of landscape.

Recovering could be inspired to the traditional way of working in a natural asset of people during time, realizing process of cohesion among pieces of territory, in a well-balanced relationship between functional organization and intangible perceptive values.

The reference to the ecomuseum tradition could be useful, but the idea of "eco-museum" has got differences with that of "enomuseum", since an enomuseum is focused only on one product, and here designing should work against homogeneity. It is the combination of history and nature that compounds a variable diagram of diversity into a rural environment. That meant something like continuation in an unbroken tradition of wine product which had never been since now apanage only of one experience field.

2   Val d'Agri: between archeology and viticulture

Basilicata is, like many Italian territories, a land that bears the imprint of its past and future history and culture in its landscape. In the south-western area of this region - about which there is still too little talk - is the Val D'Agri, crossed by the Agri river, which falls entirely within the province of Potenza, and which since 2007 has fallen within the perimeter of the National Park of Lucanian Apennines – Val d'Agri – Lagonegrese.

The Alta Val d'Agri is an area that reveals within it a varied and complex richness from many points of view, starting from biodiversity to the many historical-cultural aspects that characterize it. An area to be discovered and experienced, which having few communication routes has remained intact over time and retains much of the original landscape.

Val d'Agri is to all intents and purposes also known as the "Land of Energy" (Fig. 1), due to the presence of the largest European oil field on land, but few are aware of the fact that in Tramutola, in the 1930s and again in the 1950s, first AGIP Mining and then ENI drilled 48 wells, extracting and using methane gas and oil. In a wonderful naturalistic context, it is possible to witness an unusual and surprising natural phenomenon: outcrops of water mixed with oil that flow incessantly (the first attestations date back to the nineteenth century).

Fig. 1 Natural manifestation of hydrocarbons – Tramutola

The importance of having an overall idea of the distribution and movement of vine varieties in Basilicata traces the general lines of the biodiversity context in which the entire Val d'Agri (Fig. 2), is located and introduces the investigation of the archaeologist Stefano Del Lungo, aimed at establishing the cultural and material methods with which the Greek civilization first and that of the Romans then, reached the already mentioned upper valley, "middle land", comparing themselves with the Oenotrians and the Lucanians, up to the design of a new agricultural landscape centered on Grumentum.

Fig. 2 Viggiano (Alta Val d'Agri)

During the study work, the identity and nature of the greatest number of traces left in the field by centuries of agricultural and viticultural exploitation were recovered. The Grumentum Archaeological Park (Fig. 3-4), considered by many to be the small Lucanian Pompeii by virtue of the very rich finds discovered, contains the remains of the ancient Roman city which was founded in the first half of the 3rd century BC, it became one of the most important centers of ancient Lucania until the transfer of its inhabitants - decided by the Normans at the end of the 11th century - to the new foundation of Grumento Nova, not far from there.

Fig. 2,3: The Grumentum Archaeological Park

The ancient city and the subsequent events of the site document and make it exciting to follow an unprecedented tour backwards, based on the history and winemaking tradition of this area, as evidenced by the eighteenth-century palmenti, set directly on the Roman ruins.

The Alta Val d'Agri was finally identified as the epicenter of the Third Center for the Domestication of the vine and the accumulation of varieties, since the second millennium BC, with the tradition of cultivation centered on the oynotron, the support pole for the vine, which it was immediately identified by the Greeks as the land of "vine poles", or Enotria. With these data in hand, attempts to say that the vine from the East arrived on the peninsula from the Alps are refuted.

As underlined by the commander of the Military Geographical Institute, Gen. D. Pietro Tornabene: "Wine biodiversity, the agronomic culture that passes it down and the related civilization of wine, are the common thread of geographical exploration and Greek penetration into a hinterland unknown populated by oenotrians, vine lovers in the eyes of the settlers who settled on the coasts of the Ionian Sea. Vines, objects, caves, production infrastructures, historical maps, illustrated in the different chapters of this volume, help to follow the events and transformations of this civilization over the centuries. The interrelationships between research in the agronomic, archaeological and anthropological fields summarize that idea of historical geography in which the configuration of space over time by man is studied in relation to plant presence, agricultural use and its use by of the Settled Communities".

Among the many pieces of information that have emerged, what is striking is how the link between viticulture and territory is, in this specific case, truly solid and concrete; a path which, contrary to how it is usually told, has a change of direction, there are no longer the Greeks who introduced viticulture into Italy but we discover a southern Italy populated in the hinterland by those who founded a civilization on viticulture.

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The Mutations of Time: Erbil Citadel's Heritage Dwellings Between Architectural Preservation and Transformation

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Abstract
The investigation of architectural mutations within the historical Fabric of Erbil Citadel aims to focus on the different types of influential factors that have contributed to their development. This employs a systematic approach to analyze the diverse manifestations of mutations, categorizing them into natural and alterations. The study endeavors to contribute to a wider discussion on the preservation of cultural heritage of Erbil Citadel,Iraq. offering valuable perspectives between upholding historical reality and accommodating present-day necessities.

Keywords: Heritage, Erbil Citadel, Preservation, Historical Fabric.

1.   Introduction
The investigation of architectural mutations within the historical fabric of Erbil citadel aims to focus on the different types of influential factors that have contributed in the citadel's development.

the study explores the factors that contribute to these changes, encompassing the effects of urbanization, socioeconomic shifts, and cultural effects. the Erbil citadel function as a captivating case study, enabling a comprehensive analysis of the current mutations and their consequences. moreover, the study delves into the dynamic interaction between these genetic changes and the cultural importance of the citadel, offering valuable insights into the preservation obstacles.

synthesizing these discoveries, the investigation endeavors to contribute to the wider discussion on the preservation of cultural heritage, offering valuable perspectives on the intricate equilibrium between upholding historical reality and accommodating present-day necessities. the consequences of this examination are intended to enlighten techniques for conserving, recommendations for policies, and initiatives for engaging with the community, fostering a sustainable manner of the abundant cultural inheritance embodied by the residences of Erbil Citadel.

2.   Historical Context of Erbil Citadel

The architecture of the Ottoman Empire is widely known for its recognizable and embellished characteristics, which have left a lasting impression on the regions that were formerly encompassed within the rich Ottoman Empire. Erbil Citadel in Iraq is an example of a region, where distinct architectural elements influenced by the Ottoman period have been conserved.[1], [2]

The urban arrangement of the citadel settlement remains readily identifiable through its division into blocks and network of narrow streets. Certain demolitions carried out by the previous regime have created open spaces, while the building inventory has experienced deterioration over the past five decades., The citadel was historically divided into three districts: Saray occupied the Eastern section, Topkhana was the Western one, and Takya was the central and Northern portion. As mentioned in UNESCO Website: 2014, Erbil, also known as ancient Arbela, held significant importance as a political and religious center in the Assyrian civilization. [2]

Where the literature body on the architectural style of the Ottoman Empire in different regions has been covered by many studies, a research gap persists in directly comparing the architectural elements of residential structures in the Erbil citadel. The citadel is a fortified habitation located on a commanding ovoid-shaped elevation (a mound formed through countless generations of human habitation and reconstruction in the same location) in the Kurdistan region, Erbil governorate. A continuous wall of tall 19th-century façades still conveys the visual impression of an impregnable fortress, dominating the city of Erbil. [3], [4].

The Erbil Citadel stands as a unique case of a previously fortified community that has developed atop a commanding hill of an ovoid shape. The man-made topographic features of the archaeological mound have shaped the urban layout of the settlement, with the architectural composition of the Ottoman era still discernible amidst the intricate network of narrow pathways and dead-end streets that radiate from the primary gate. [4], [6] See (Fig. 1)

Fig. 1. Satellite image of Nominated Property and Erbil Citadel. Source: Author/ google Maps

3.   Research Scope

The purpose of this investigation is to ascertain the common attributes, regional disparities, and modifications observed in these architectural components. Furthermore, it endeavors to reveal the historical, cultural, and geographical determinants that have played a role in shaping these resemblances or disparities. However, the methodology used was a comprehensive examination of the architectural attributes and an examination of archival records and documents to explore the influences of the Ottoman Empire. Evaluation of efforts for preservation, restoration initiatives, and contemporary trends in the citadel inquisition of endeavors for conservation, refurbishment initiatives, and analysis of manifestation mutations. This research scope presents a thorough framework for the examination of Ottoman architecture in the Erbil citadel., guaranteeing a concentrated and thorough exploration of fundamental components within a historical, cultural, and contemporary context.

4.   Conservation Strategy: International Charters

There exist numerous international charters that have been adhered to by the conservation Projects, and the application of these charters in the historical Erbil citadel of Iraq has demonstrated their guidance in the realm of restoration and Conservation of the management Plans for the Sites.[2], [3],

The implementation of international charters has promoted a cross-cultural understanding of the significance of preserving the past for future generations, with its diverse cultural heritage spanning multiple civilizations, and Iraq, where ancient civilizations have left an indelible mark on the architecture. Both nations, who are responsible for maintaining these old houses, have realized the value of sustainable conservation methods that go beyond aesthetics and place a strong emphasis on community involvement, instruction, and thorough documentation.[3]

The conservation efforts include a comprehensive strategy that considers the historical, cultural, and social significance of these residences in addition to rehabilitating the physical structures. The charters act as a compass, assisting practitioners in striking a careful balance between maintaining the buildings' original characteristics and making necessary modifications to meet modern requirements. [4] As shown in the table below. Table.1

Table. 1: Main articles in the three reviews charters

Example of the main Articles for the Washington Charter in 1987 for The Conservation of Historic Towns and Urban Areas suggest.[5]	The Venice Charter of 1964 addressed these Articles regarding the conservation of the old structure. [6]	The Burra Charter 1999 mentioned the Articles that tackled the main aspects of the new use. Australia [7]
- "Conservation in a historic town or urban area demands prudence, a systematic approach, and discipline. - New functions and activities should be compatible with the character of the historic town or urban area. - When it is necessary to construct new buildings or adapt existing ones, the existing spatial layout should be respected, especially in terms of scale and lot size".[5]	- "Article 5. The conservation of monuments is always facilitated by making use of them for some socially useful purpose. - Article 9. The process of restoration is a highly specialized operation. It aims to preserve and reveal the aesthetic and historic value of the monument and is based on respect for original material and authentic documents. - Replacements of missing parts must integrate harmoniously with the whole, but at the same time must be distinguishable from the original so that restoration does not falsify the artistic or historical evidence".[6]	- "Article 7. Use - 7.1 Where the use of a place is of cultural significance it should be retained. - 7.2 A place should have a compatible use. - Article 15. Change - 15.1 Change may be necessary to retain cultural significance but is undesirable where it reduces cultural significance. - Article 17. Preservation is appropriate where the existing fabric or its condition constitutes evidence of cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out. - Article 18. Restoration and reconstruction Restoration and reconstruction should reveal culturally significant aspects of the place. - Article 19. Restoration is appropriate only if there is sufficient evidence of an earlier state of the fabric". [7]

5.   The Citadel Architecture and Urban Value

The Management of the Buffer Area of Erbil citadel is recognizable as a historical pattern. The Erbil citadel is one of the few archaeological sites that has preserved its urban form since ancient times. The positioning of the mosque in the center of the citadel is consistent with the typical placement of the main temple in Mesopotamian cities.[3], [4]., The houses on the citadel have a high architectural value, with almost a third of the historic buildings being attributed to

a high grade. The early houses are particularly important due to their unique decorative and physical features that are specific to the Kurdistan region. The private dwellings inside the citadel showcase various characteristics such as open courtyards, elevated terraces featuring arcades or colonnades, expansive windows with views of the courtyard, as well as the incorporation of decorative motifs and materials.[6]. The architectural value of these buildings is further heightened by meticulous attention to design details and embellishments, including painting, decoration, and ceiling embellishments on the primary level. .[4], The paradoxical nature of the Citadel's resistance to modernizing forces while still playing a vital role in the urban landscape is best understood when examining its architectural elements. By analyzing the architectural features of the Citadel, a deeper understanding of its historical significance can be obtained. Despite evolving, the Citadel maintains a cohesive architectural style that serves as a timeline of its past. This architectural continuity is rooted in its geographic placement atop an artificial tell.

The persistence of the outer wall signifies that the Citadel has remained fortified throughout its history. The tell's initial steep silhouette may have been altered by the construction of a moat and an accompanying bridge in the medieval period. In 1466-1501, during the rule of the Aqquoyunlu dynasty Rekabey, they filled in the moat and repaired the bridge with a vaulted drain serving as a walkway across it that led to the southern gate. Today, these structures are gone, having made way for modern adaptations. Based on the alterations made by different civilizations. [4] See (Fig. 2)

Doors, Windows, Railings, Colonnades, Stairs, Slabs

Architecture features in Erbil Citadel
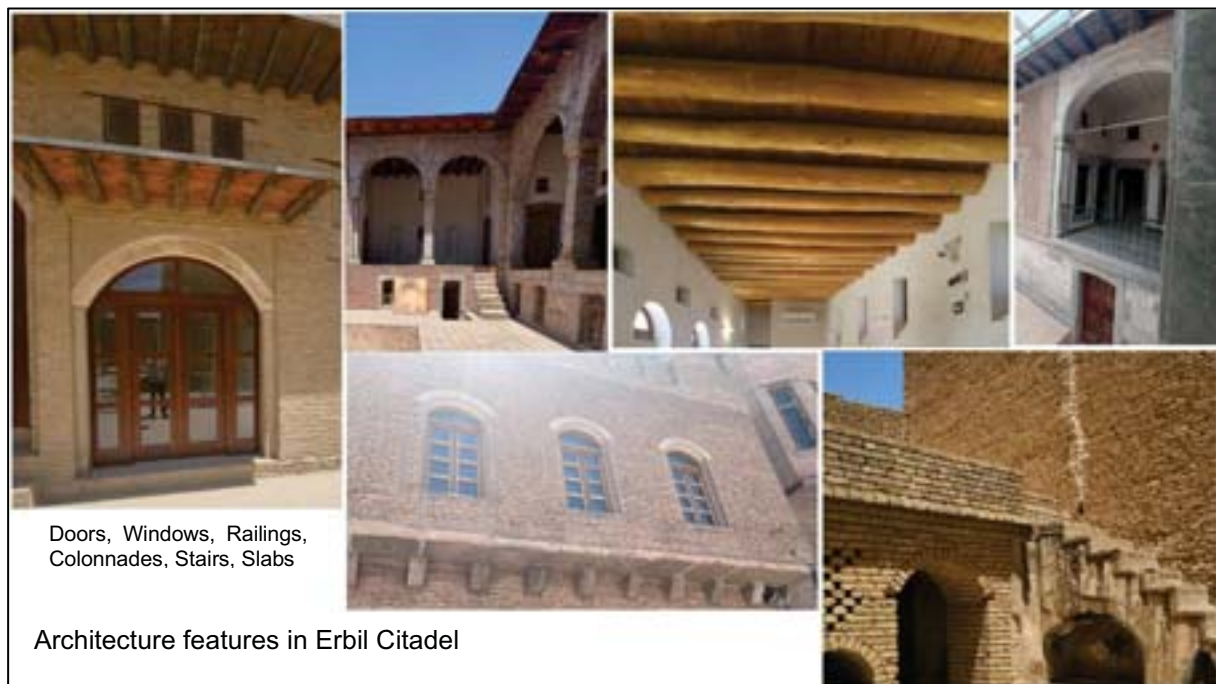
Fig. 2. Main Architecture Elements of the houses in Erbil Citadel . Source: Author

The Erbil Citadel has been a walled city, the unbroken inhabitation has resulted in the preservation of various aspects of ancient city life that were generally overshadowed by subsequent modernization. Erbil indeed provides a unique opportunity to trace and compare these features across such an extensive time frame.

In the modern citadel, notable features include its integration with the sloping terrain, narrow labyrinthine streets, a plethora of houses that belonged to common folk, market squares isolated from religion, and most of these situated on an acropolis. Over its existence, it has accommodated everything from a dwelling equivalent to a village farmstead to a large metropolitan center. Today, this urban center is well remembered in local lore, and its presence can be ascertained in various locations within the citadel. [8] See (Fig. 3)

For the greater part of the 20th century, some houses of the historical cities went through historic changes. Many owners had built new rooms on top of the roof of the original house, either using fired bricks or concrete. Others had rebuilt original rooms using fired bricks, but

the most alarming innovations were the introduction of municipal works such as overhead wire networks, piped water, and main sewerage channels. These last changes have turned out to be a disaster for the historical houses of northern Iraq, which have unstable foundations and therefore weak structures. On the other hand, along with the rise in population in the historical cities, a massive wave of squatting occurred, while add-ons to early buildings were constructed without any aesthetic sense if not total demolition to make way for modern buildings. Any new constructions and public works carried out in the historical cities do not respect the architectural heritage and hence contribute greatly to its destruction. See (Fig. 3)
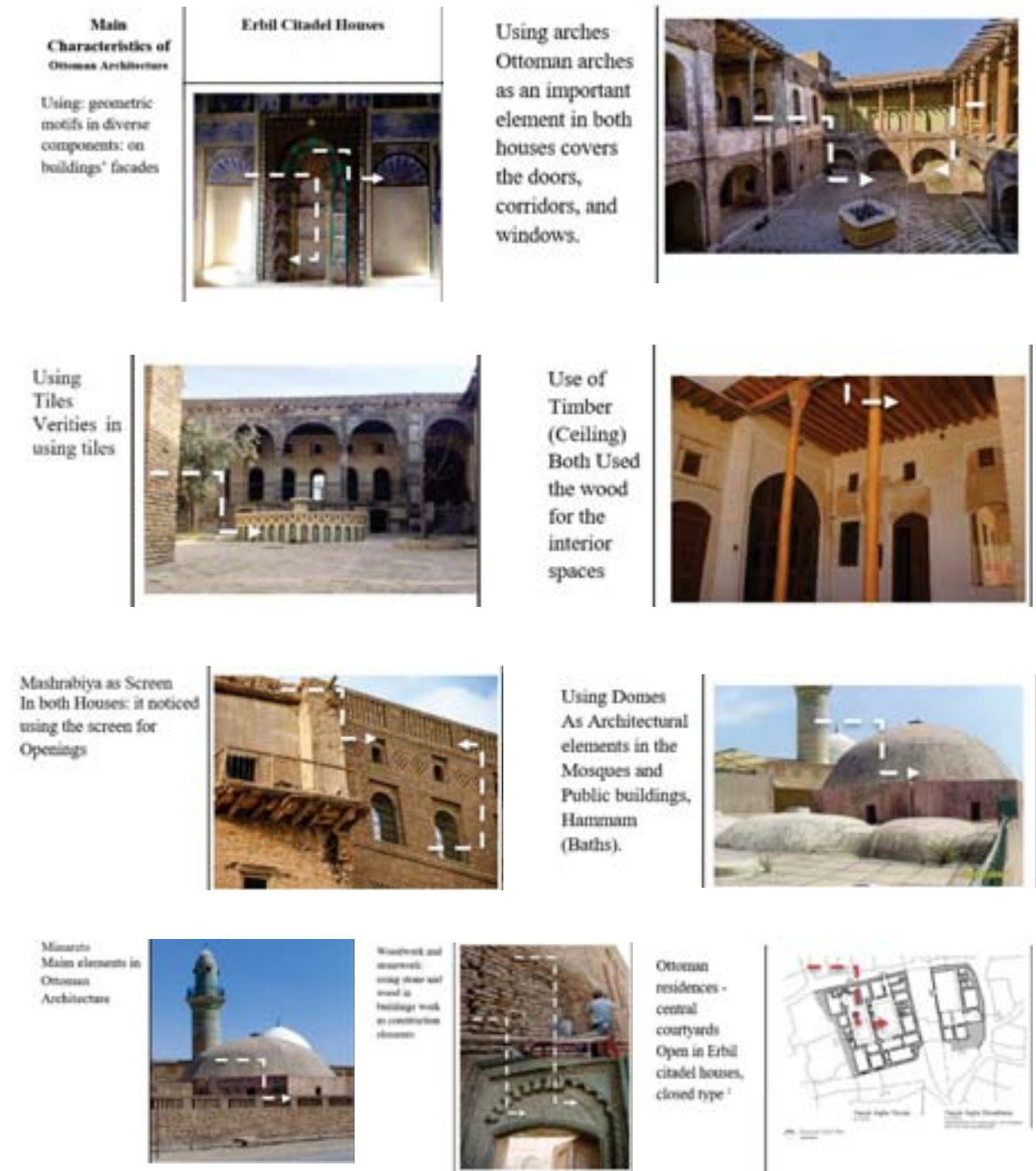
Fig. 3. Analytical Vision for the Urban and Architecture Values of Erbil Citadel . Source: Author

Fig. 4. Summary of Architectural and urban characteristics in Erbil Citadel . Source: Author

6. Mutational transformation of Erbil Citadel

The transformational alterations are facilitated by various factors, including urbanization, socioeconomic transitions, and cultural phenomena. The residential structures within the Erbil citadel serve as an intriguing subject for examination, allowing for a thorough investigation of the present transformations and their outcomes. Furthermore, this research delves into the intricate interplay between these evolutionary modifications and the cultural significance of the citadel, providing valuable perspectives on the challenges related to preservation.

Those factors that have manifestations of mutational effects in the citadel are summarized in the diagrams below:

- numerous civilizations have successively built and repaired the structures of different periods, they reveal a unique blend of architectural styles and techniques that provide important information about the processes of cultural communication that led to the formation of the citadel. See Diagram 1

Diagram 1:-
Source: Author
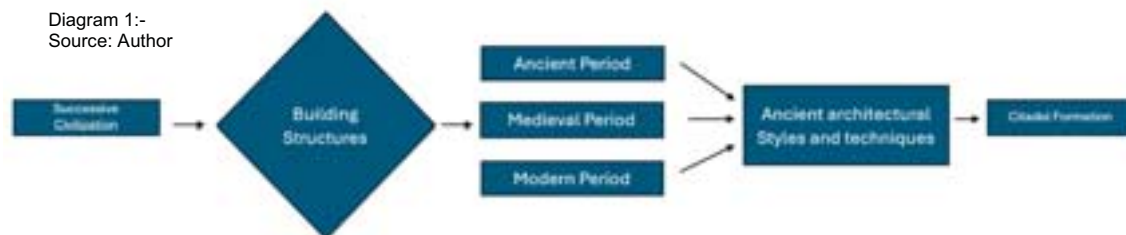
- The fact that it was an important strategic point is testified by the fortifications and fortresses of the fortress, which are equally visible in various historical epochs. These buildings also suggest that it is essential to secure such a place and not let anyone into it.. See Diagram 2

Diagram 2:-
Source: Author
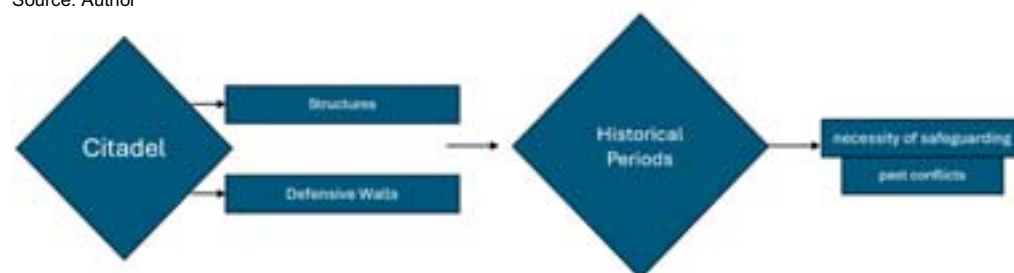
- The organic layout of streets and narrow pathways found in urban areas throughout the world is due to urban development over long periods that fostered shared living practices, creating a sense of community and inclusionSee Diagram 3

Diagram 3:-
Source: Author
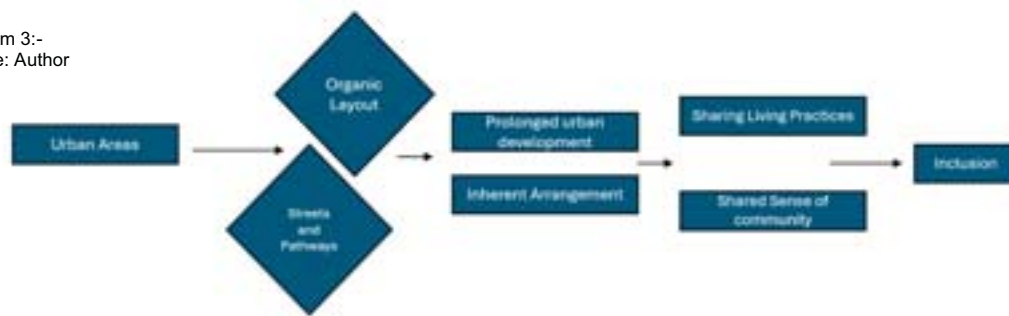
- Important public areas like parks, plazas, and courtyards are instrumental in promoting social interaction among the people and cultural exchange. They reflect the vitality of life in a city and its continuing appeal as an engine of social progress. See Diagram 4

Diagram 4:-
Source: Author
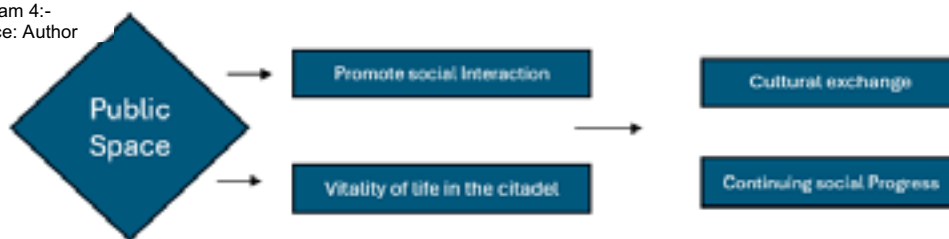
- Religious buildings such as mosques and other architectural constructions act as symbols for the spiritual beliefs and social norms practiced by inhabitants who have come before us, highlighting the multitude of religions peacefully coexisting within this fortified city. See Diagram 5

Diagram 5:-
Source: Author
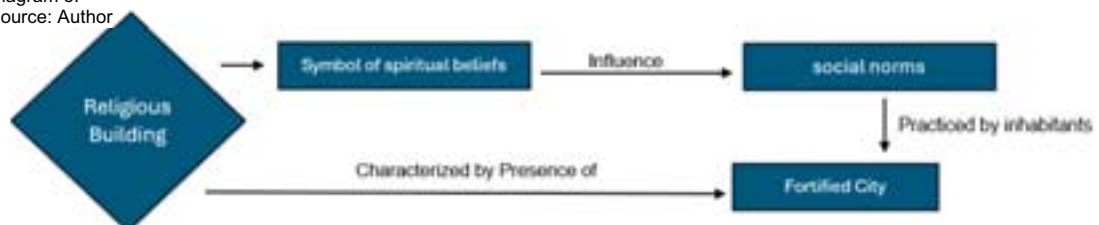
- Artistic features in the form of minute carvings, designs, and decorative architectural elements serve to demonstrate the degree of creativity that the artisans of yesteryears had, thereby enhancing the beauty and attractiveness of the fortress as well as helping to keep alive a tradition of original innovation. See Diagram 6

Diagram 6:-
Source: Author
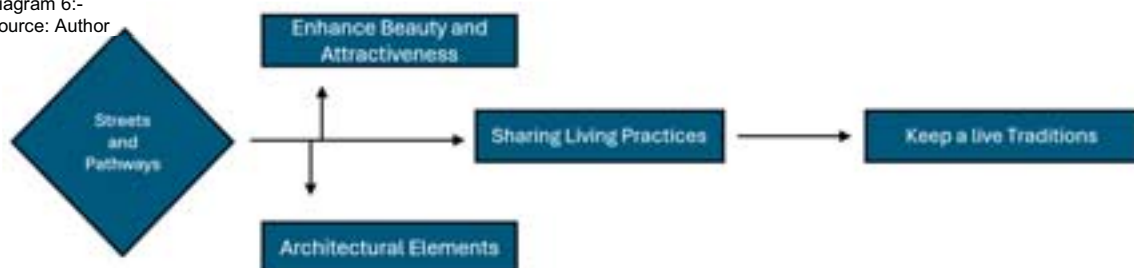
7.   Conclusion

This investigation concludes that there are significant shared characteristics of the residences found in the Erbil citadel. The examination of these elements demonstrates that despite being geographically separated, certain design elements like geometric patterns, arches, tiles, and woodwork have transcended national borders. However, it is important to note that regional adaptations and variations also exist, which can be attributed to local factors. This study emphasizes the necessity for further research into the historical and cultural exchanges that contributed to these architectural similarities, as well as the preservation and evolution mechanisms that have ensured the continuity of Ottoman architectural elements in these distinct locations.

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A dip in the pool in Milan: Cozzi and Caimi swimming pools

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Abstract
The construction of a capillary system of swimming pools in Milan was part of Mussolini's Fascist sports programme, in which politics, architecture and urban planning were intertwined.
This policy left us with sports facilities that are still in use today and that, at the time of their construction, were internationally renowned for their technical and technological research, innovative spatial solutions and attention to the relationship with figurative art.
Starting from this premise, the article examines the construction history of the Cozzi and Caimi pools, designed by the engineer Secchi.

Keywords: Cultural Heritage, Fascism, Sport, Swimming Pool, Architecture

1.   Introduction*
The decision – made during the twenty-year Fascist period – to provide Milan with a capillary network of sport infrastructures linked to pool activities must be placed in the socio-political context in which this decision matured. Beginning with the authoritarian turn of the party in 1925 [1], the Fascists considered sport [9] – especially non-competitive sport – as an important pedagogical tool [4] capable of controlling all moments of citizens' lives [30], including leisure time, which Fascism no longer considered a private moment [12] but a public one: time to improve the race and temperament of society, participating directly in the «unified collective conscience» [11, p. 13].

Fig. 1: Three aspects of the Fiat *Dopolavoro* activity; top left: the rowers and their boats on the Po; right: on the summit of Gran Paradiso; large: collective gymnastic exercises [33, p. 57].

Fig. 2: The swimming pool Umberto di Savoia, via Padova, 1928. ASPM, Archive Secchi, Sect. A1, f. 18.

Sport becomes a means of managing the population [30, p. 259] and a tool for overcoming social divisions and strengthening national identity [6][7]. The regime proceeds by creating a perfect "consensus factory" [10], which finds its implementation through the power of the haracterized n of sport [16][19]. The motto is: work on the Italian body to «improve the race» and create a «new man»

[21] who is both worker and soldier. This propaganda was accompanied by the construction of new facilities all over the country, including in Milan. In fact, the City Council, in line with the regime's sport policy, decided to draw up a plan, unique in Europe, for the construction of seven outdoor swimming pools and one indoor pool. The project was promoted by the Podestà De Capitani d'Arzago, a firm believer in the hygienic and educational importance of sport facilities, who entrusted the definition of the technical and design aspects to the eng. Secchi [29], then employed at the Municipality's technical office.

2.   The swimming pools of Milan

The programme drawn up by eng. Secchi, provided for the construction of 7 open-air swimming pools, as explained in an article published in 1928 in the magazine *Il Politecnico*, in which he stressed the need to focus the design on technical and financial aspects rather than on aesthetic ones [23, p.627, 635] and to locate bathing facilities within the urban fabric in order to reach the greatest number of users, also to satisfy the «hygienic needs of the population» and «to satisfy, at least in part, the demands of the new populous suburbs in relation to the continuous expansion of the city» (ACM, Fasc. 354-1931). A prototype of this model is the open-air swimming pool Umberto di Savoia built by Secchi in via Padova [22]. The main peculiarities of the system are: the supply of the pool with water from the underground and, for hygienic reasons, the   haracteriz of showers, as used in many pools abroad, so as to rinse oneself before entering the pool. These experiments were applied and revised, also on the basis of the themes discussed in the above mentioned article, in the design of the Milan swimming pools, which immediately became icons, both from a formal and stylistic point of view and for the technical innovations introduced. Among these, the Cozzi and Caimi pools play a fundamental role.

Fig. 3: Picture of the main façade during construction, © Aragozzini, in ASPM, Archive Secchi, Sect. A2, f. 33, 5.

3.   The indoor swimming pool dedicated to the Martinitt gold medallist: Roberto Cozzi

The Cozzi swimming pool was built by Secchi in 1934 in the area between Piazzale Fiume and Acquabella [13][14], one of the city's development routes, served by several tram lines and close to the main railway station. There were also no zoning restrictions, which made it easier to locate not only the swimming pool itself, but also the car park and green areas. In this building, every element was studied by the engineer to suit its function, in continuity with the models developed abroad [26]. The work stands out within the block for its compositional elements, carefully balanced between the masses so as to give the façades a slight movement, also thanks to a skilful use of colour [20, p. 243]. The austere lines are broken only by two lictor fasces framing the entrance on Viale Regina Elena and the central travertine relief depicting an allegorical scene (work of Silvio Zaniboni). From here you can enter a hall atrium decorated with four marble bas-reliefs depicting aquatic themes and an engraved phrase by d'Annunzio. From the entrance, the bathers go to the single and revolving changing rooms and then to the baths, after taking a shower in separate cabins with liquid soap dispensers and hot and cold water mixers. This leads to the swimming area,

the largest in Europe at the time. The space is defined by the large arches that form the framework of the vaulted roof, haracterized by four veils that can be opened during the summer months. «The solution adopted not only has the merit of lightening the vault and giving the interior a cheerful appearance, but also allows the swimming pool to be used during the summer season by opening the veils of the protective skylights above» (ASPM, Archive Secchi, Sect. A2, f. 20, p. 5). There are two pools under the vault, one for experienced swimmers and the other for beginners. The pool is haracterized by the careful use of colours, which are also related to the functions of the spaces; an haracte of this is the decision to use different colours for the paths, depending on whether shoes are worn or not [20, p. 248]. In addition, the combination of colours and the use of light give the surface of the water a blue-green colour, which is particularly relaxing for the user. This aspect is further enhanced by the solution of placing 32 illuminated portholes under the surface of the water, «also to create light and colour effects for decorative purposes in the water and the surrounding area» [26, p. 222]. The result of this choice is the almost total absence of decorative elements, limited to an engraved glass panel with fish and seaweed on the wall behind the beginners' pool. The attention paid to the definition of colours is also reflected in the choice of materials and technical and hygienic solutions [15] [25]. To make the environment more welcoming, attention was paid to the choice of heating system, with different solutions for the different rooms, whose temperature, like that of the water, was remotely controlled by a central heating system [35].
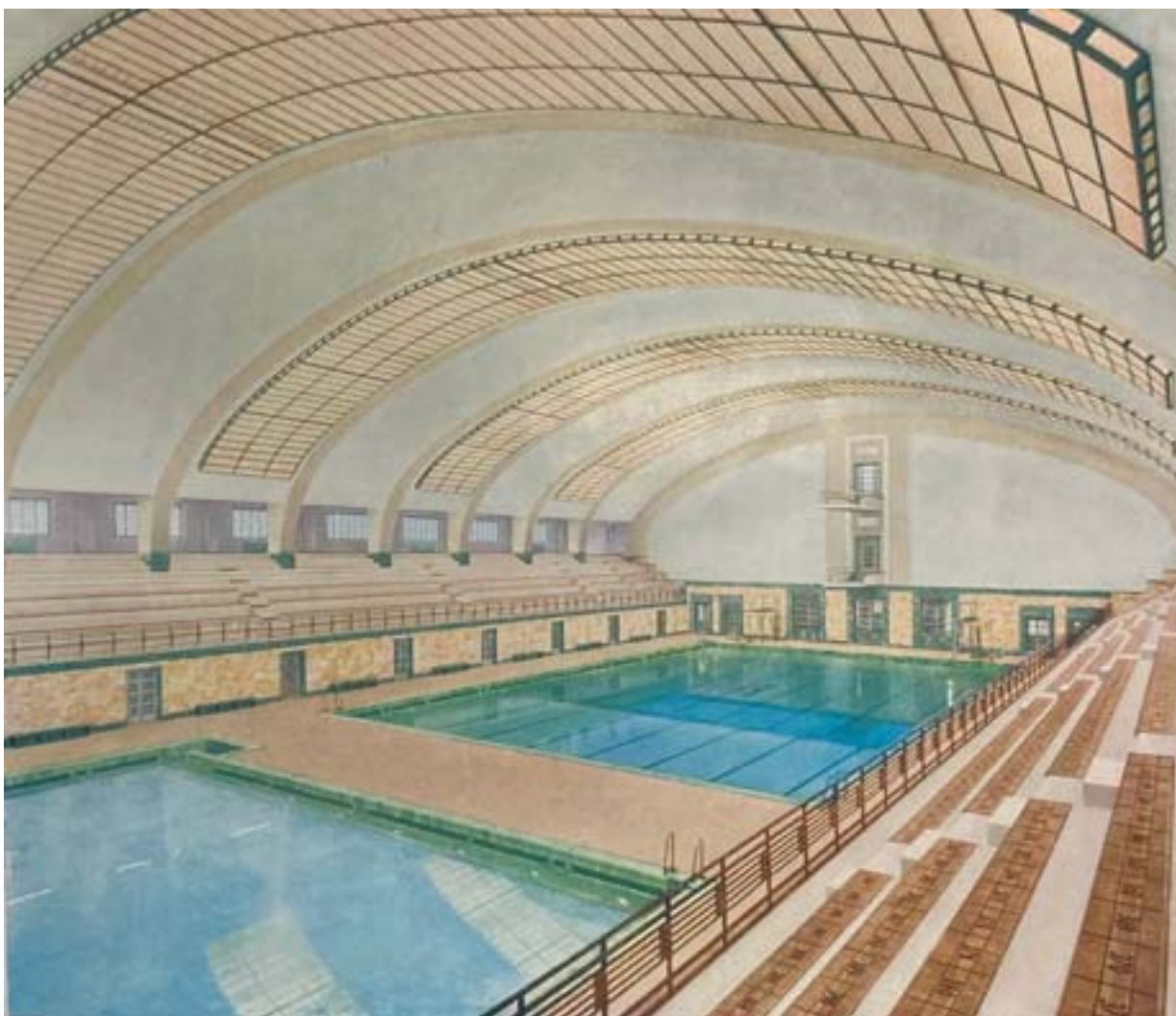
Fig. 4: General view of the Cozzi swimming pool [28, p. 28]

The sports centre was built in record time to be ready for the Littoriali on 2 May 1935. When the site was handed over to the company on 23 October 1934, the work was completed in 194 days, of which only 63 were working days, thanks to the rational haracterize of the site designed by Secchi. In fact, he considered the site as part of the design process, as it directly influenced the cost of the works [24].
Over the years, the building has undergone some haracterized, such as the mural by

Cattelan that distorts the sober balance designed by Secchi, but today, as on the day of its inauguration, the visitor is greeted by the warning of the poet Gabriele D'Annunzio: «All the Italians of the peninsula, drawn to so many shores and born in so many seas, must be easy masters in the practice of swimming».
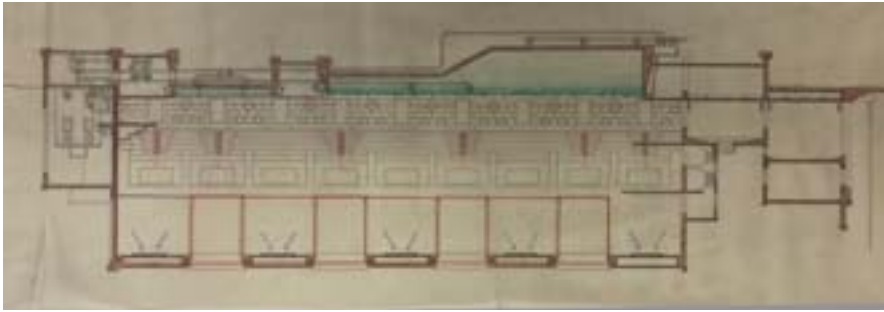
Fig. 5: Project section of Cozzi swimming pool, 1933. ASPM, Archive Secchi, Sect. A, 38, f. 27.

Fig. 6: Sketch of hall decoration detail of the public baths in the Cozzi swimming pool by Luigi Lorenzo Secchi, 1934 ASPM, Archive Secchi, Sez. A, 38, f. 39.

4.   The swimming pool dedicated to the footballer Giuseppe Caimi

Similarly complex is the Caimi swimming pool, inaugurated on 17 July 1939 in via Carlo Botta, near the IACP Cesare Battisti district (1933) [22]. It was a multifunctional complex that included swimming pools, a cinema and several gymnasiums for boxing and fencing. Its purpose was to 'occupy' the leisure time of the less wealthy classes who lived in the populous Porta Romana district, giving them a place to go, especially during the summer [17].

Fig. 7: The Caimi swiming pool, in https://artbonus.gov.it/riqualificazione-centro-balneare-caimi-milano.html

In Caimi, Secchi developed a formal and stylistic language in line with Fascist propaganda [27], using a few decorative elements to create a pleasant environment for society. The compositional principle used and the colours chosen are reminiscent of «marine architecture» [3, p. 319], in line with the purpose for which the sports complex was intended by the regime, namely to appeal to the «working masses and the demands of daily life in the city […]', offering 'physical and mental health to those who work […]» [34,

p. 405]. Secchi designed a functional route for the facility based on hygienic aspects: after leaving the changing rooms, users must pass under a shower system before reaching the pools, haracterized by the presence of a foot-washing channel [32]. The swimming pool consists of two areas: a deeper rectangular pool and a semicircular pool with a circular fountain with a jet in the centre, at the top of which is a copper statue representing two flamingos. Beyond the edge of the pools, there is a three- tiered quay crowned by a green area with lawns and geometric flowerbeds [31]. The presence of the terraces is also related to heliotherapeutic treatments, with eugenic and militaristic aims to build a stronger and healthier race.

Partly destroyed during the Second World War, the swimming pool underwent several conservation works and then remained closed from 2007 to 2013, when, with the arch. De Lucchi's project [2], the daytime pool became a mysterious bath at dusk, a place where water and spectacle coexist and intertwine.

Fig. 8: The pool for inexperienced swimmers at the Caimi swimming pool, © 2023 Galli

5.   Secchi: swimming pools

Thanks to his skilful analysis of international and national models, Secchi was able to define prototypes that were then used in various installations in Italy, as the documentation preserved in the Historical Archives of the Polytechnic shows. The importance of his installations is also evidenced by the various international publications that have featured his work, highlighting the careful correspondence between technical and aesthetic elements.
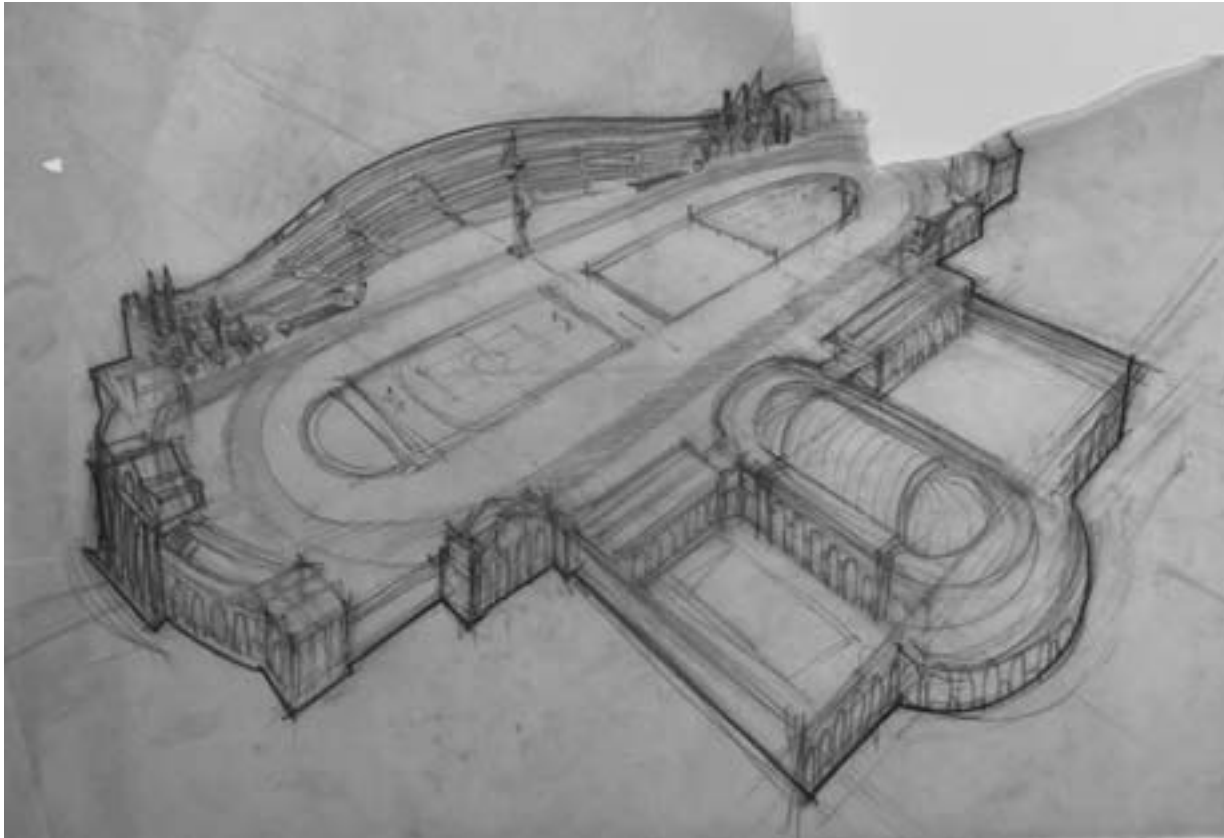
Fig. 9: Sketch of an outdoor swimming pool by Luigi Lorenzo Secchi, ASPM, Archive Secchi, Sez. A, 38, f. 39.

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* The chapter 1 and 2 are written by the second Autor and chapter 3-4-5 by the first author

** ACM: Archivio Comunale di Milano – ASPM: Archivi storici Politecnico di Milano.

Regeneration of City-Port Interaction - Areas: A New Method for managing a contested space.

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Abstract
City-port interaction areas represent a transitional space for urban development, characterised by complex *governance* and planning challenges. [1] [2] [3].
The first part of this contribution highlights, through an examination of the legal framework of Italian port planning, the *governance* models and tools of port planning.
The second part proposes an innovative methodology for city-port interaction areas, through a comparative analysis of some case studies carried out by means of a functional taxonomy and the resulting categorisation of city-port interaction typologies. Thus, the contribution not only proposes an innovative methodology for the regeneration of city-port interaction areas, but also stimulates a critical reflection on current governance models, highlighting the need for more flexible and integrated planning tools.

Keywords:Urban regeneration, urbanism, urban planning, city-port governance, waterfront & harbors

1.   Governance and Italian urban tools

Since the late 1990s, the role of ports and their infrastructure has been re-evaluated, acquiring a new social and urban dimension that emphasises the importance of a renewed dialogue between the city and its port [7] [8] [9] [10] [11] [12]. This perspective has influenced both theoretical paradigms and planning practices, calling for a closer integration between urban and port systems. Law no. 84 of 28 January 1994 introduced an innovative organisational model for Italian ports, distinguishing between planning and control functions, entrusted to the new Port Authorities, and operational functions, delegated to private operators, while maintaining public ownership of land and infrastructure (*Landlord Port Authority* model) [4] [5] [6].
This legislative change has led to the drafting of 'new generation' Port Master Plans (PRPs), which go beyond the simple planning of infrastructure works, aiming at a functional and strategic integration of the port with the surrounding urban and territorial fabric. These plans are oriented towards the development and diversification of the entire port system, including urban regeneration initiatives, identifying sub-areas of city-port interaction, areas of strategic interchange between the city and the port, and the integration of port functions with activities related to leisure, culture and tourism [13] [14] [15] [16].
Legislative Decree No. 169/2016 further consolidated this vision, defining a framework for

port planning that is even more integrated with urban and territorial planning. This decree and the subsequent Guidelines for the drafting of Port System Master Plans (PRdSPs) first in 2004[1] and then 2017 aim to coordinate the planning of port systems with that of adjacent urban and regional areas, promoting sustainable development, accessibility and urban regeneration.

In this context, the areas of city-port interaction is configured as a privileged laboratory for experimenting integrated urban-port development models, with projects ranging from the physical and functional recomposition of historic ports to those of new construction, from the increase in cruise and pleasure boating activities, to the harmonisation of traditional port functions with new functions linked to cultural and tourist activities and public space [17].

These approaches emphasise the creation of public spaces, the recovery of monumental structures, the construction of new infrastructures functional to a port 'open' to the city, and the enhancement of the identity link between port and city.

In conclusion, the transformation process started with the '94 law and consolidated by DL n. 169/2016 has radically transformed the approach to port and local planning, has ushered in an era of transformation for port-cities, oriented towards a functional, social and cultural integration of ports with their urban contexts, projecting the image of a 'port-city' as a centre of exchange and innovation, a liquid city where port functions are harmoniously integrated with urban life, nurturing a cultural and relational dynamism that strengthens the identity and competitiveness of maritime cities. [15] [16] [18]

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[1] '*Guidelines for the drafting of port master plans*' 2004 and 2017.

2. Rethinking Interactions in Port Cities: a new methodology

The methodology proposed in the research is divided into three stages: Survey and Evaluation, Integration and Application (Fig.1) and the present contribution is contextualised within the first phase, which in turn consists of three steps of analysis: Reconnaissance of port urban planning tools, functional taxonomy and categorisation of the types of city-port interaction.

This contribution examines and compares eleven Italian port cities (Monfalcone, Pescara, Ravenna, San Benedetto del Tronto, Taranto, Messina, Palermo, Fiumicino, Livorno, Piombino, Olbia) which represent the result of the first step of analysis: the reconnaissance of the port planning tools of the Italian context, characterised by sixteen Port System Authorities (AdSP) and sixty-two ports.

The purpose of the comparative analysis conducted on the eleven port cities is twofold: on the one hand, to assess the current state of port planning in Italy, and on the other, to verify the presence and effectiveness of planning tools, both at the strategic (DPSS, Strategic Planning Document) and operational (PRP, Port Regulatory Plan) level.

It is also intended to examine whether port planning tools have implemented the guidelines set out in the 2004 and 2017 Master Plan Guidelines. The latter made it mandatory to divide the port area into two distinct sub-areas: the Operational Port Area and the City-Port Interaction Area.

The result of the analysis is the identification of city-port interaction categories based on a functional taxonomy for each case examined, following a systemic approach.

Fig. 1: Proposed methodology. Source: Authors' elaboration

2.1 Functional taxonomy
Towards a New Categorisation of Interactions in Port-Cities

Specifically, the comparison was carried out in relation to three analysis steps (fig.2)

1. Port Urban Planning Reconnaissance, Governance: this step takes into consideration the endowment of the new generation of port urban planning tools (post 2004) and which have transposed and identified the City-Port Interaction Areas in the Technical Implementation Rules. This field aims to assess the capacity of port systems to adapt their governance system (tools and models) to the dictates of the 2016 reform;

2. Functional Taxonomy and Systemic Approach: this step makes explicit the functions characterising the city-port interaction areas present in the Technical Implementation Rules of each Port Master Plan and associated to the Environmental, Settlement and Infrastructural system and then associates the number of functions in order to quantitatively analyse the presence of functions for each system.

3. Categorisation: this step proposes a new categorisation of the areas of interaction between city and port, based on the identified functions that drive the transformation towards new models of coastal and port urban development.

The research activity thus resulted in the identification of *three possible categories of city- port interaction* (fig. 2) as presented below, and the reclassification of the eleven cities considered according to the systems mentioned above:

– Type of city-port interaction predominantly port;
– Type of city-port interaction predominantly urban;
– Mixed city-port interaction typology or 'urban port';

- Predominantly Port Interaction Typology: this category emphasises the main functions related to the port sector. It includes areas where infrastructural activities prevail, accompanied to a lesser extent by environmental or settlement aspects (Fig.2).
- Predominantly Urban Interaction Type: this category is characterised by the predominance of urban functions. These are areas in which there are functions mainly involving the settlement system accompanied to a lesser extent by environmental and infrastructural aspects (Fig.2).
- Mixed Interaction or Urban Port typology: This category represents a balance between urban and port functions. They are areas where different functions are present involving all three systems. Thus, they succeed in promoting a functional coexistence between city and port (Fig.2).

City-Port	First field of analysis: Port Urban Reconnaissance			Second field of analysis: Functional taxonomy				Third field of analysis: Categorisation
	Governance			Characterising Function	Systemic approach			Types of city-port interaction
	DPSS[2]	PRP[3]	ICP[4]		Environmental System	Settlement system	Infrastructure System	
Piombino *Sub-area city-port interaction* *(art.7, NTA, PRP)*	NO	Yes (2008)	Yes	Port business centre area (administrative, commercial, management and technical services related to the activity port-, security and control services, ship services)	/	/	X [1] *	*Type of city-port interaction predominantly port-based*
Fiumicino *Area of city-port interaction* *(para b, NTA, PRP)*	NO	Yes (2004)	Yes	Fishing harbour; Passenger service for ships and hydrofoils; Areas for public and connecting services.	/	X [1]	X [3]	
Livorno *Hinge areas of transition to urban space - Elementary Organic Territorial Units (UTOE)* *(art.7, NTA, PRP)*	Yes (2020)	Yes (2012)	Yes	Maritime Station; Recreational boating district.	X [1]	/	X [5]	
Olbia *Hinge areas of transition to urban space* *(Art.7, NTA, PRP)*	In drafting stage	Yes (2008)	Yes	Recreational boating; Areas for nautical technical assistance services; Areas for recreational boating equipment.	X [1]	/	X [3]	
Monfalcone *Transition hinge areas to the urban space* *(art.6, NTA, PRP)*	NO	Yes (2019)	Yes	Environmentally Protected Areas; Back-Port Areas for Integrated Logistics.	X [3]	/	X [8]	
Ravenna *Progetto unitario* *(art.4, NTA, PRP)*	No	Yes (2007)	Yes	Recreational boating district Distripark (logistics) Restructuring areas for port industrial and production activities Peninsula Trattaroli (terminal, storage) Porto Corsini (city waterfront)		X [1]	X [4]	
Pescara *Transition hinge areas to the urban space* *(art.7, NTA, PRP)*	Yes (2023)	Yes (2008)	Yes	Fisheries District; Commercial district; City waterfront.	/	X [2]	X [1]	*Type of city-port interaction predominantly urban*
S. Benedetto del Tronto *Area of City-Port Interaction (AICP)* * (Art.10, NTA, PRP)*	Yes (2023)	Yes (2014)	Yes	Services to fisheries and tourism; Services at the Tourist Dock; Tertiary activities; Commercial production activities serving fisheries.	/	X [6]	X [3]	
Messina *Urban waterfront interaction sub-areas (wat)* *(part i, art.2.3-2.4 - NTA, PRP)*	NO	Yes (2019)	Yes	Marina: Maritime defence and embankment works; Yachting activities; Cultural and recreational centre; Public Gardens	X [4]	X [1]	X [2]	*Mixed 'urban port' interaction typology*

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[2] DPSS: Strategic Planning Document
[3] PRP: Port Master Plan post 2004 Guidelines.
[4] ICP: Sub-areas City-Port Interaction.
[1] *: function numbers

				Mobility and connective green; Archaeological Park; Tertiary pole; Marine Science Park.			
Palermo *City-Port Interaction* *(Art.8, NTA, PRP)	Yes (2022)	Yes (2008)	Yes	Recreational boating areas, equipment and services for recreational boating.	**X [2]**	**X [2]**	**X [5]**
Taranto *Territory-port interaction sub-area o Territory-port interface sub-area* *(Art.1, NTA, PRP)	NO	Yes (2021)	Yes	Urban-nautical function; Service area (railway beam; multi-sector root); Customs gate function; Environmental protection oasis; Port services.	**X [2]**	**X [1]**	**X [5]**

Fig.2: Functional taxonomy. Source: Authors' elaboration.

3. Reflections and Conclusions

The result obtained from this first phase of the method highlights some shortcomings, particularly in the ability to highlight the complexity of the interactions between the city and the port and the integrated response by the urban planning tools. However, these very shortcomings open significant potential for innovation and improvement in research development. Each identified shortcoming in the functional taxonomy can be seen as an opportunity to develop more holistic and integrated approaches to port and local planning. Finally, the growing awareness of environmental sustainability and the need to mitigate the impacts of climate change offers a further opportunity to review and update port and local development strategies and look at port infrastructure as environmental infrastructure. Currently, there is a debate concerning the implementation of a *climate-proof* approach in local planning of coastal areas [19]. This concept becomes even more important when applied to port infrastructure.

In this perspective, the port assumes a central role not only as a logistical node but also as an environmental infrastructure. This approach turns ports into key pillars for strategies to mitigate environmental impact and promote sustainability. The idea of the 'port as environmental infrastructure' amplifies the need to integrate sustainable and *climate-proof* practices in the planning and management of coastal areas, encouraging solutions that reduce environmental impact and increase climate resilience in coastal port areas.

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Learning from the Ruins.
PelayosMonastry, B.i.c. heritage site. Reorganization of the cistercensian ruins as Cultural Center and new Museum.

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Abstract

This proposal focus on Contemporary architecture as answer for post-war urban and rural places and is inserted in *Contemporary Architectural and Urban design relationship with tradition and identity of Places* research carried out by the author. This objective is pursued working on architecture of museum typology and cultural centers, its variation over time, and with both theoretical and operative aspects.

Some of the Places that have been investigated by the research have as a common condition of post-war sites and some of themhave been recognized and protected by UNESCO in the Near East including Aleppo, Baghdad, Bamyian, Kandahar and Mosul. Some others have in common the Archeological Ruins held in Cultural Heritage context both by UNESCO and by local protection laws including Portugal, Tunisia, Italy, Swiss.

This abstract proposal presents the project for the refurbishment and the complete reorganization of the dimiss and abandoned cistercensian monastery of Pelayos, not so far from Madrid, promoted by an international competition started by the international association N.E.A. as well as a training course on Cultural Heritage in 2023.

The process that drove the design team is the core of this essay. Research work have been carried out trying to establish a deep bond with this far away and high emotional Place recognized as cultural heritage context. That part of the research has been focus on critical redraw of places and its main built architectures, in order to learn and understand natural and anthropic rules and traditions, to discover hidden metrical rules and space declinations, to unearth stratigraphy proportions and traces of landscape identity and memory.

Keywords: Memory, Archeological and Ruins site, Cistercensian architecture, Site Specific, Cultural Heritage, B.i.c law protection sites of Spain.

This paper focus on contemporary architecture as an operative answer for archaeological and ruins placesthinkas living traces in Contemporary Architectural and Urban design relationship with tradition and identity of Places research carried out by the author inside the University of Florence, Architecture Department - Dida.

The objective of the research is pursued working on architecture of Museum typology and Cultural buildings, its variation over time, its main relevance in urban transformations and as a tool for cultural heritage in urban recovery and refurbishment. Research is carried out deeply in theoretical aspects of Architectural and Urban Design bonding design process with Place, its memory and its synchronic and diachronicallydevelopment and with practical aspect of design.

The methodological structure of the research aimed to demonstrate the link between analysis and design, and on the other way to confirm that in some specific cases the design could be configured as an expression of an analytical interpretation. Investigations on urban contexts or archaeological contexts were aimed for studying the ideally stratigraphic nature of places

over time. They have been articulated on the identification of constant characters while reading main moments of transformations of places and in the definition of some key-figures on which the landscape has been built over time, defining its own and unique identity.

The identity and tradition of the places, their practices and their types, have allowed the project as operative phase of the research focusing on specific operational case studies, to take on connotations, forms, materials and figures to build a panorama of results. Placed at the center of the dual process between analysis and design, as a synthesis device of the system, the role of Memory has become the primary element. It acted as a powerful tool capable of influencing the deeper elements of design actions, avoiding direct results in formal configurations.

The immateriality and the difficulty of passing on through the exercise of memory have configured one of the most relevant aspects investigated by the research presented here with an in-depth analysis relating to a specific case study. In this critical condition, the research attempted to put into practice some tools of the urban/landscape phenomenon, in the primary attempt to provide a knowledgebasefor subsequent design operations. It has been based on the metric understanding of built spaces and on that of the intuitable spaces of the settlements, of their evolution based on typological principles and on the role of the immaterial limit of the area.

The operative dimension of the research started with the participation in international architectural and urban design Competitions promoted by public entities including Unesco. Some projects were developed for the construction of new buildings, mainly museums and cultural centers, some of which were selected among the finalists and prized, some of them published, some hosted in international architecture exhibitions.Some of the Places that have been investigated by the research have as a common condition of post-war sites and some of themhave been recognized and protected by UNESCO in the Near East including Aleppo, Baghdad, Bamyian, Kandahar and Mosul. Some others have in common the Archeological Ruins held in Cultural Heritage context both by UNESCO and by local protection laws including Portugal (Villa Romana de Rabacal in Penela), Tunisia (Carthage Museum site), Italy (Calvana mountain), Swiss (Ginevra) and Estonia (Tartu).

Fig. 1: Pelayos monastery (from competition brief 2023)

The case study here presented is about the project for the refurbishment and the complete reorganization of the dismiss and abandoned Cisternanian monastery of Pelayos, not so far from Madrid, promoted by an international competition started by the international association N.E.A. as well as a training course on Cultural Heritage in 2023.

The project here described has been developed in late 2023 by a research group at the University of Florence headed by Riccardo Renzi with Elena Ceccarelli, SouhaGasmi and DamlaIcyerand with the consultanthelp of Valentina Marras, Alessandra Marchetti, Gabriele Marinari and Jovana Markovic.

This project worked also as parallel exercise and as test for theoretical approach for another on-going fund research (p.n.r.r. winning research) based on the recovery as Museum of a medieval adbandoned small town up on the Calvana mountain next to Florence. That preliminary project held in the same research group led by Riccardo Renzi, as cultural renovation also was prized in another international competition during summer 2023.

Fig. 2: Design process explanation and main functions diagram

The monastery It is located 71 km from Madrid, in the small town of Pelayos de la Presa, close to San Martín de Valdeiglesias, where the Coracera Castle is located, built in 1434 by Don Álvaro de Luna, as we already mentioned, valid of King Juan II. father of Enrique IV and his sister Isabel, future queen of Castile in the 15th century.

Its construction, carried out by the Cistercian order, dates back to the 12th century, although it underwent improvements starting in the 15th century.

The Constable of Castile decided to build the castle, after purchasing the town and manor of San Martín de Valdeiglesias for 30,000 maravedíes from the monks of the Monastery of Santa María la Real, owners of the Abadengo lands, to which the entire region belonged. The lands and assets belonging to an abbey and the jurisdiction of the abbot or abbess were called "abadengo".It is close to the San Juan Reservoir, which was built in 1955 and it is now a tourist route that led visitors even to the ruins of the Monastery.

The Monastery's origins stem from 12 small hermitages where Benedictine hermits resided. It is said to have been constructed around one of these temples, now known as the Mozarabic Chapel. Comparing Santa María del Real's layout with the archetypal one published by Isidro Bango Torviso in 1990, significant differences arise. Nonetheless, the basic layout remained consistent, emphasizing the importance of water supply and the orderly arrangement of rooms around the church and cloister. There are numerous differences although the fact is respected that a settlement removed from civilization should be well supplied with water for cleaning and maintenance of the congregation, built from the church (main axis and the first to be built), next to which the cloister was attached that organized the rest of the rooms in an orderly manner.

Traditionally, the monastery's inception is linked to the Gothic kings era. Emperor Alfonso VII granted the hermit monks a Royal Privilege, establishing the Monastery of Valdeiglesias as a Benedictine community.Under Alfonso VIII's reign, the monastery transitioned to the Cistercian congregation, signifying a shift in attire and practices. This period also witnessed the emergence of neighboring towns and ensuing rivalries.

In 1434, due to conflicts with San Martin residents, the town was sold to Álvaro de Luna, sparking disputes over ownership.During Charles I's reign, the monastery flourished under Abbot Fray Jerónimo Hurtado's governance, marked by Renaissance expansions and artistic contributions.

A devastating fire in 1743 severely damaged the monastery, sparing only the church.Antonio PonzPiquer recounted the replacement of the Correa de Vivar altarpiece and subsequent

restoration efforts in the 18th century.The Mendizábal confiscation law of 1836 led to the friars' departure from the monastery.Despite receiving numerous Royal Privileges, the monastery faced disentailment in 1836 and subsequent neglect under private ownership.

In 1974, architect Mariano García Benito acquired the monastery, initiating its restoration.García Benito transferred ownership to Pelayos de la Presa in 2003, leading to the establishment of the Monasterio Santa María la Real de Valdeiglesias Foundation.

The monastery was declared by Royal Decree as an Asset of Cultural Interest in 1983, with state guardianship established to prevent further deterioration, and the resolution was published in the BOE on February 14, 1984.Efforts to restore the monastery faced funding challenges, delaying public access and museum creation.In 2013, the Community of Madrid allocated funds for restoration projects, culminating in the monastery's reopening to the public in 2021.García Benito's dedication revitalized the monastery, ensuring its recognition as a National Historical Monument and preserving its significance in Madrid's heritage.

The aim of the international competition set in 2023, that has a parallel course on ruins refurbishment, was to recall international attention on the monastery and its archeological ruins, in order to start a diffuse proposal of restoration, refurbishment and to amplify the use of its spaces that are now used for public open events.
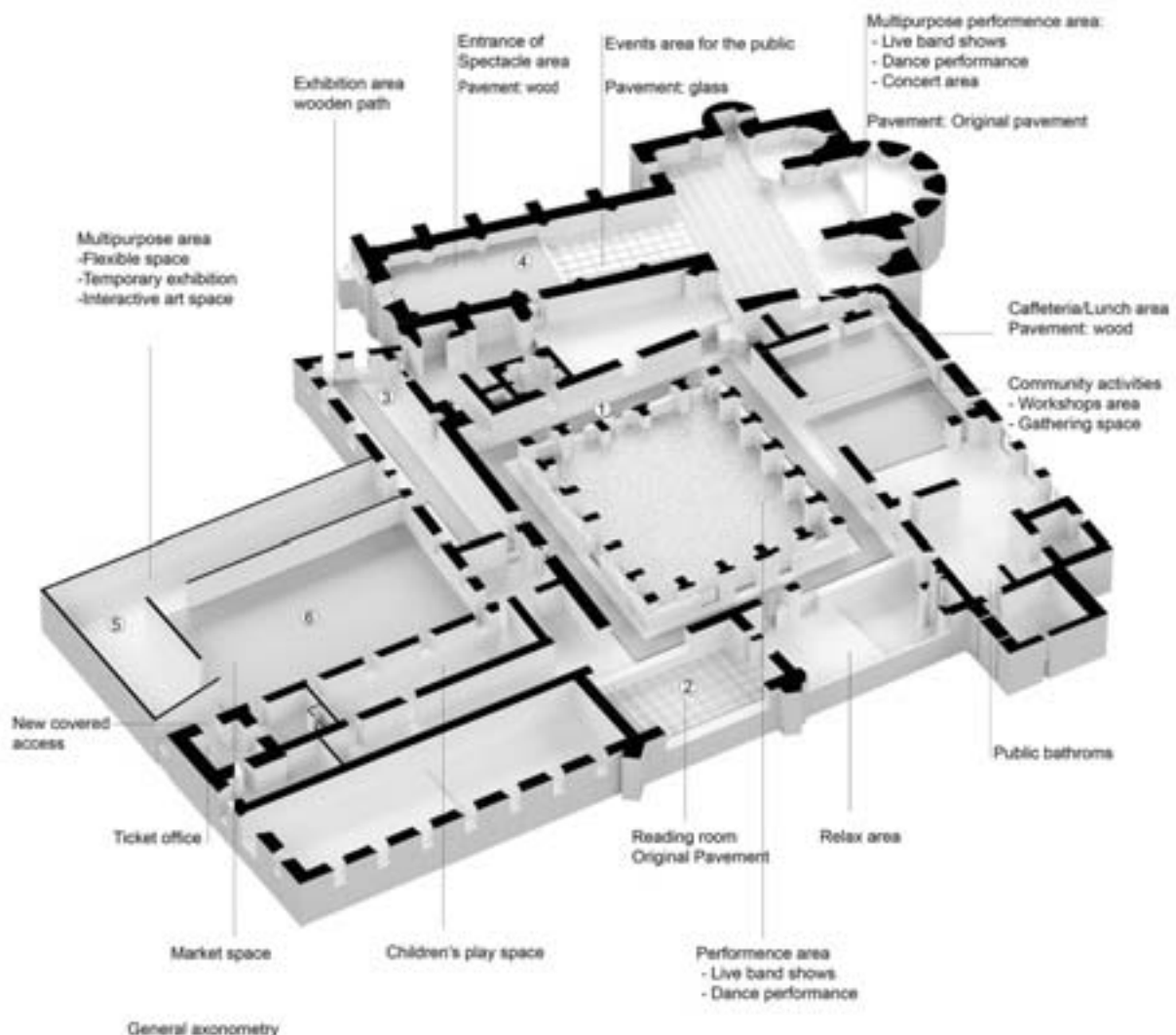
Fig. 3: General axonometrical scheme of proposal

The main purpose of the proposed project is to reuse the ruins of the abandoned monastery by
transforming it into a cultural center, Museum and working community hub that could host several public and young child-group activities. The functions thought to recover this large

and wide system of spaces have been addressed by the competion brief and thanrethinkedin order to find a compromise between the complexity of access of ambients and its possible use.

A way more interesting spark of the spaces has been to define a hierarchy order between them. A possible way to define this kind of approach was set by the actual situation of each macro-areas. Almost all of them are in fact without a cover-roof system and windows and cannot be considered as rooms or interior closed spaces. This led the design to be developed in a way that was possible to do not create a conflict with the existing stone walls of the monastery. So the cloister was reimagined as a light covered passage made with some dark red metal elements hanged on the walls. These covering elements were developed than in all the covering roofs where needed in the building.

Another main aspect of the proposed design has been developed after the idea of giving a full wheelchair accessibility to the complex, even if due to the complexity of high and pavement quote this was a very difficult design operation.

The idea has been so ledby these two aspectto conserve the original building characteristicsby covering the original pavements, adding metal roofs to contrast with the existing stone walls andadding a new volume and a new piazza that works independently from the old building.The old courtyard is surrounded by this covered exhibition gallery that has wooden floor paths toprotect the original pavement and to guide the visitors through the exhibition.

The overall hierarchy of the spaces led also the design strategy to define a new courtyard that could be used for daily market and for temporary museum activities. This operation was developed in order to fulfill the need of brand new services inserted in a not used space outside of the ruins.
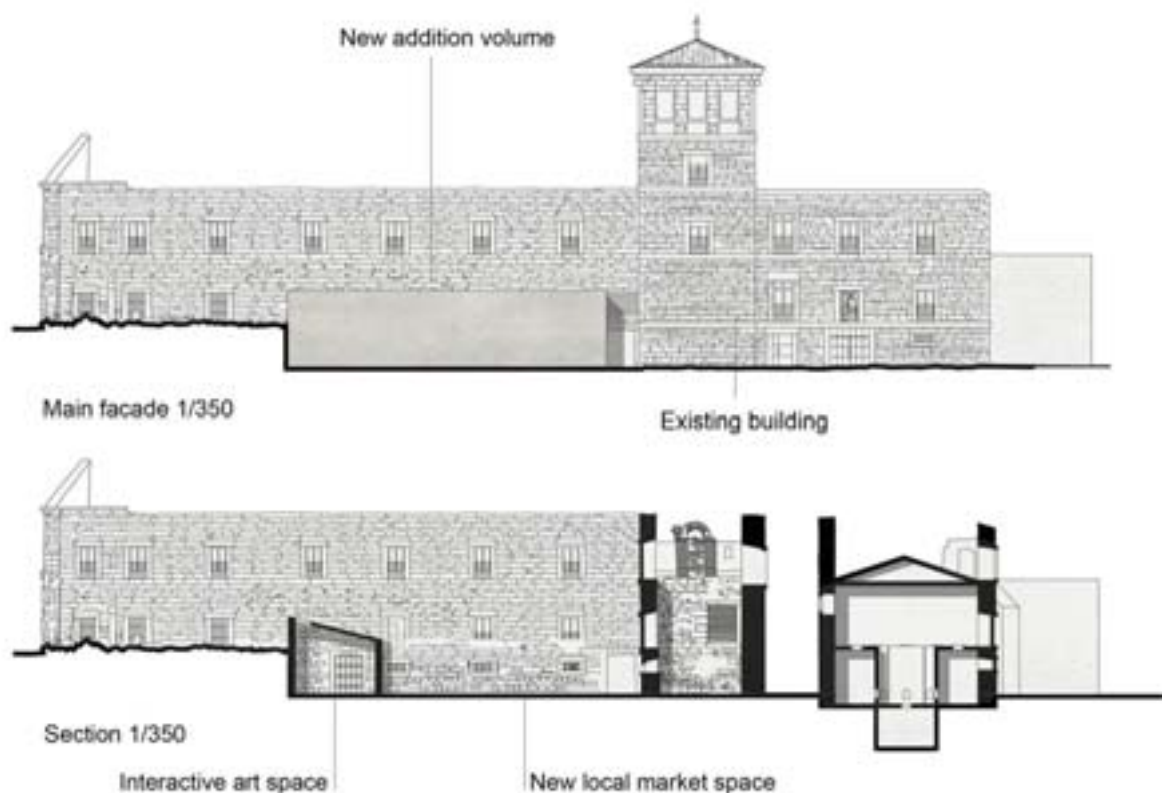
Fig. 4: Main sections on new courtyard

So to redefine the new cloister a new addition volume was developed as a two gallery building perfectly aligned with the existing courtyard and theold tower; this smaller building is set as low rise and closed wall system to enhance its secondary role compared to the existing building's walls. The rhythm of the new architecture respect the same proportions of the tower, and it represents the starting point of the exhibition gallery and theinteractive art museum.

Fig. 5: Courtyard exhibition area and library area views

The materials used for the new volume are concrete for the walls, steel andglass for the windows and the metallic roof has a slope that goes towards the central courtyards forthe water collection system.

The exterior façade of the building is made of concrete walls without any openings to emphasize the enclosed characteristic of the building and it has 2 glass doors facing the courtyard and a zenithal lighting coming from the side of the tilted roof.
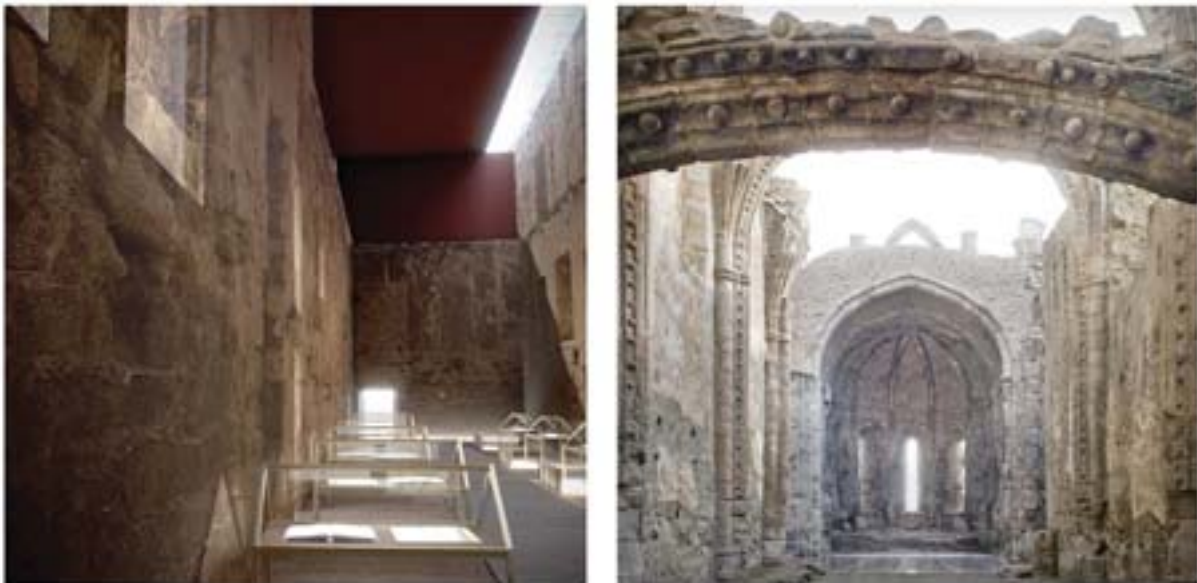
Fig. 6: Museum gallery area and stage performance (ex church) area views

The reading room, workshop area and coffeeshop have wooden floors and they are covered by a metal roofand the book exhibition room is covered by a metal roof with side glazing to provide zenithal natural light.

The old church, thinked as an open air stage system and read as the second main element of the ruins (the first one is the cloister) is lightly set up to became a performance area. This large spaceis thinkeddivided in twomain parts that can be work together as one. The nave of the old church is set as visitors route and public space for looking at the stage that is set in the center of the absidal part. This spaces are required from competition-brief to be used for live shows and concerts and the public area that can host up to 300 spectators. To fulfill this aim the original existing pavement is covered by a glass floor to protect it during stage-usage and visitor's route events and to keep the stone pavements still visible.

Fig. 7: New courtyard view

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The earthquake of 1783 in Calabria: reconstruction, transformation, forgetting.

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Abstract

The essay focuses the actions underway in the Serre Vibonesi in Calabria after the 1783 earthquake. The area of historical-architectural value features rebuilt and/or transformed cities and a series of silent nuclei. Attention is placed on the earthquake and the repercussions it had on some of these centres. The aim is to activate interest in the villages through their knowledge, preparatory to any conservation and recovery intervention for a renewed cultural and/or tourist re-usability.

Keywords: earthquake, knowledge, reconstruction/abandonment, villages, reuse

1.   Serre vibonesi and the 1783 earthquake

The essay focuses on the disaster of 1783 which affected Calabria and Sicily, and in particular tends towards a historical-critical reading of the Serre Vibonesi area, dotted with small centers on the hills, at the time pulsating and alive, some of which they are, today, in a state of abandonment or destroyed or rebuilt elsewhere after the disaster Fig. 1. The aim is the knowledge of the present villages, passing through the reconstruction action aimed more at the construction of new settlements than at interventions, where possible, of recovery and rehabilitation of the affected urban and architectural heritage.

The area of the Serre Vibonesi, of extraordinary landscape value, presents itself as a mountainous system between the Sila and the Aspromonte sloping to the east towards the Ionian Sea and to the west towards the Mesina river. To the south-east flows the Angitola river, which flows into the southern border of the Gulf of Sant'Eufemia. The area included in the portion of the Apennines that crosses Calabria is marked by a landscape full of potential Fig. 2.

The present settlements with their traces still tell today what they were in the past and, above all, what the event of 1783 was.

The seismic crisis ravaged the area for about three years. The sequence was characterized by several tremors, the strongest being that of February 5 (magnitude 7.10), February 7 (magnitude 6.74), and March 28 (magnitude 7.03).

The first in southern Calabria, while the other two spread in the central part [1].

Damage was estimated in around four hundred settlements, the death of over thirty thousand people and the destruction of 47.4% of the inhabited centres; data extracted from the report that Francesco Pignatelli sent, between 19 April and 28 June 1783, to the Marquis della

Sambuca. [2].

The force of the earthquake was such that it hit several territories of Calabria Ultra, with the destruction of entire cities in the Vibo, Catanzaro and Reggio areas. Vivenzio described this earthquake as a catastrophe that shocked the places with tsunamis, landslides and sinkings, forming new lakes and mountain chains [3].

The Bourbon government implemented welfare works by appointing the King's vicar general, Francesco Pignatelli, in charge of organizing first aid and following the reconstruction phase. He promoted urban reorganization actions of the affected nuclei, the construction standards for the rebuilding and also the financing methods. With a dispatch dated 4 June 1784, the Sacred Fund was established whose purpose was to administer the expropriated ecclesiastical assets, to be invested precisely in the reconstruction [4]. The government's orientation, of an Enlightenment nature, was to transfer the destroyed settlements to new, less steep places. They were thus conceived throughout the Calabrian Serre area: Philadelphia, Mileto, Seminara, Bagnara, Reggio Calabria and others [5].

2.   The historic villages of the Vibo area between abandonment and reconstruction

We want to delve deeper into the state of some damaged villages in the Vibo area, in a significant territory from a historical-architectural point of view as it is home to the centers of Serra San Bruno and Soriano Calabro and the two monastic complexes: the Certosa di Santo Stefano del Bosco and the San Domenico Complex. Numerous centers are located between the two settlements which, although showing different characteristics, are an expression of the variant and invariant signs present in the entire area. The area, starting from the town of Rocca Angitola and the river of the same name, retraces the road that from the Tyrrhenian coast goes up towards the Serre hills reaching the two urban centres. Around the historic route lie the villages marked and redesigned by the earthquake, with ancient nuclei such as Rocca Angitola, San Nicola da Crissa, and further south Sorianello, Spadola, Arena, Acquaro just to name a few Fig.3.

The force of the earthquake shocked these centers together with their communities, inducing, in most cases, the abandonment of the primitive places [6], towards more favorable sites. In all cases the new settlements arose near the first plants almost as if they were an extension of these to also favor proximity to the cultivated farms. A reality was created made up of two "*united and separate*" places [6].

These nuclei grew spontaneously without a pre-ordained geometric design, following the orographic trend of the places, spread over the mountains for defensive reasons. The network of roads, abutting the contour lines, was tortuous and difficult for vehicles to drive. They were rural centers where agriculture and pastoralism were practiced, but also the cultivation of mulberry trees and silk art (Arena). Basic construction was poor. The houses were minimal, generally with one and/or two levels and their walls were built with pebbles, stone and lime or with breste, sun-baked clay bricks and straw (Dasà, Ricadi, Soriano, Sorianello, etc.), huts, *casaleni*, *catuoi* were united. The patrician residences were called *case palaziate*, they were built with river pebbles and stone facings worked by local stonemasons, and there was no shortage of mills, millstones and oil mills close to the inhabited areas to highlight the rural-productive character of the places. At the same time there were episodes of architectural value such as churches, cathedrals (Gerace, Mileto, Stilo), convents, manors (Vibo Valentia, Pizzo, Bivona), coastal towers (Ruffa, Marrana) and stately buildings.

Among the villages, the emblematic example of Castelmonardo is remembered. The town was abandoned and the new settlement of Philadelphia was rebuilt nearby, in the Piano della Gorna area, completely erasing traces of the old centre, significant from an archaeological point of view. Over the years, excavation campaigns have been carried out which have brought to light the ruins of the walls, traces of churches such as that of Santa Barbara, remains of palaces together with the perimeter of the fortress, from which emerges the primitive structure of the historical nucleus before 1783.

The new city was designed according to the anti-seismic urban planning rules of the time, with an orderly layout with orthogonal layouts and square lots, a completely unusual setting for the towns of Calabria Fig 4.

Further south is the town of Arena, the oldest in the area, perched on a mountain along the side of the Marepotamo stream, with its linear layout. With the earthquake "*il paese fu distrutto negli edifizj*" [7] and the reconstruction took place in the same place. The Norman

castle suffered serious damage located on a rocky spur Fig. 5. The partially rebuilt manor today shows its traces including the corner towers and fragments of the perimeter walls. Of interest are the remains of the Norman Swabian aqueduct from the 12th century. The village features various buildings equipped with arched stone entrances [8].

Acquaro, a medieval farmhouse in Arena, was razed to the ground and completely rebuilt. Bruno Mussaro highlights that the engineer Winspeare believed that the lower part of the village should be abandoned and the higher area should be extended with a new system outlined by Pietro Galdo. On the contrary, the reconstruction began in the lower part of the town, which was later abandoned [9]. Remains of sacred buildings still remain in the village today (convent of Santissima Trinità, church of San Nicola).

The two major centers of the chosen area with their monumental monastic complexes also suffered damage. The historic nucleus of Serra San Bruno, originally called Terravecchia, was partly destroyed together with some factories of the Certosa including the sixteenth-century church of which the extraordinary granite façade remains standing. The inhabitants of Serra abandoned the historic village and concentrated on the other bank of the Anginale, building miserable shacks here. From this settling process, the area known as Spinetto later arose, the result of a planned intervention, characterized by straight roads that served the new neighbourhood. In the Certosa, the church was freed of the last traces of the walls, leaving only the façade, the cloister of the Procurators was cleared of rubble, and the ruined walls of the rear cells and the perimeter corridor were demolished. The nearby convent of San Domenico in Soriano suffered the same destructive fate, dissolving a significant architectural history. From Torcia's manuscript we can deduce the magnificence of the two structures which had the same importance in the territory: "*the opulence accumulated over several centuries in the hands of those cloistered ones had competed to ensure, together with the size and magnificence, the immortality of those buildings*" [10] Fig 6. In Soriano the cloisters and the late Baroque church were reduced to ruins. Today only the first order of the facade remains of the temple, divided into five bays marked by pilasters which create five fields occupied by aedicules Fig 7. As had happened in Serra, after the event many architectural and sculptural devices from the Dominican complex were stolen and reused in other factories. In Ultra Calabria they had the same fate: the cathedrals of Mileto, Gerace, Santa Maria di Corazzo and others. This brief review, still in progress, on the villages of the Vibo area affected by the 1783 earthquake intends to stimulate interest in these centers by analyzing the history of the disaster and the various actions carried out, sometimes in reconstruction, sometimes in abandonment. Knowledge of the area was proposed as a preparatory action for any conservation intervention of these nuclei, hoping for their recovery for renewed re-usability. The aim is summarized in their valorization and dissemination/promotion also through the creation of an interconnection network between the differentnuclei for the benefit of the local and/or cultural tourist community.
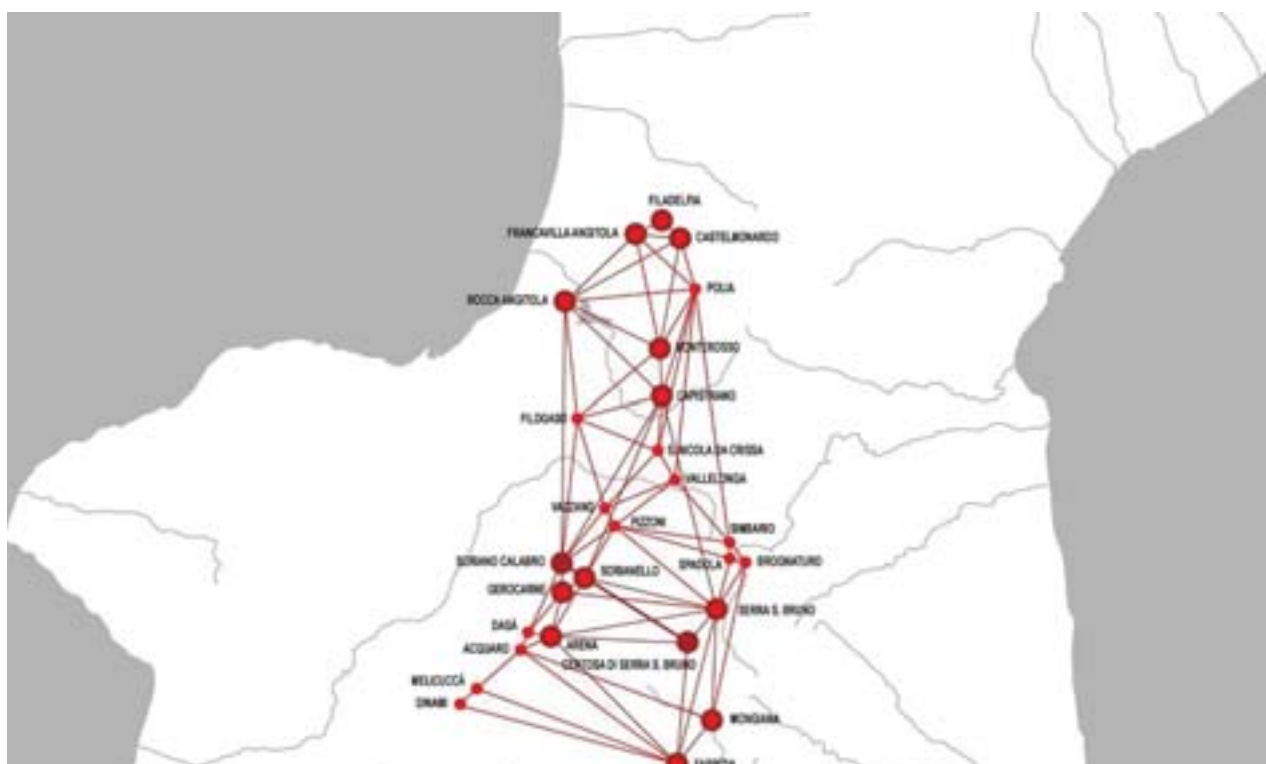
Fig. 1: constellation of villages in the Serre Vibonesi area, (drawing by A. Zappani)

Fig. 2: the area of the Serre Vibonesi is rich in centuries-old woods, rock dwellings (Zungri), megalithic presences (Nardopace).

Fig. 3: some villages in the territory of the Serre Vibonesi. Acquaro, Arena, Sorianello, Dasà, Monterosso, San Nicola da Crissa.

Fig. 4: view of the ancient Rocca di Castelmonardo and the city of Filadelfia.

Fig. 5: Arena, remains of the Norman castle.
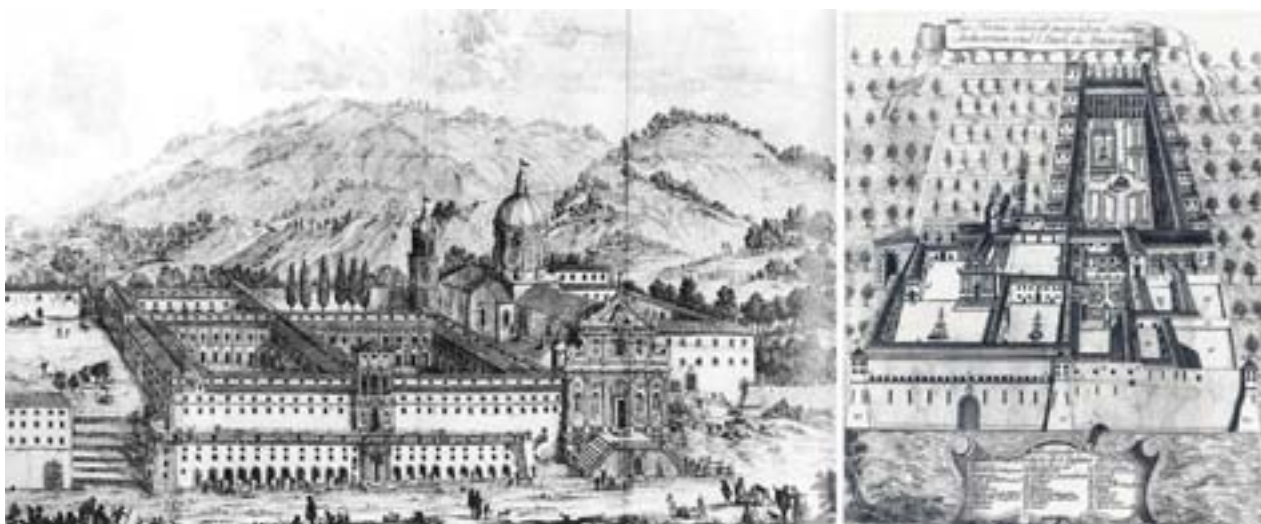
Fig. 6: the monastic complexes of Soriano and Serra San Bruno before the earthquake. Soriano: Bernardino Rulli, XVIII sec., Serra San Bruno: anonimo, la Real Certosa di S. Stefano del Bosco, XVII sec.

Fig. 7: remains of the facades of the sixteenth-century churches of Soriano and Serra San Bruno after the earthquake.

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World heritage declarations and tourism. Risks and opportunities as future strategies

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Abstract
The declarations of assets inscribed on the World Heritage (WH) list are, for the most part, highly outdated in terms of the identification of Outstanding Universal Values (0UV), which makes it difficult to carry out Heritage Impact Assessments (HIAs) in change management situation. Most of the dossiers were written in the 1980s and 1990s, at a time when this type of documents was limited to describing the assets and their characteristics, focusing on mainly material issues, without specifics attention to environmental and social aspects. The evolution of the concept of heritage, its complexity and that of environments in which these assets are located, require the updating of the significance/associated cultural values that complete the OUV included in the declarations. A task, as the Faro Convention (2005) points out, must be carried out hand in hand with the communities, implementing participatory processes with guarantees in terms of the application of methodological processes.
In this work we focus on the study the Guadalquivir River in Spain as a geographical axis, an example of a natural space that overlooks and supports heritage sites in Andalusia, specifically in the case study Royal Alcazar of Seville, declared together with the Cathedral and A General Archive of the Indies in the city of Seville.
This work is part of the national research project World Heritage: An approach to social sustainability by updating its cultural values (PID2022-140917OA-I00).

Keywords: World heritage, risk, tourism, values, participation.

1. Historic World Heritage cities: landscape and sustainable development
The historic urban landscape has established itself as an emerging category of transcendental relevance for the conservation of historic cities with their different heritage values, actors and cultural identities, particularly in World Heritage cities [1]. This view occupies a central place in the current international debate on cultural heritage, because of its interaction with built heritage, urban perspectives, natural resources and the historical identity of each city. Together, these elements make up the exceptional nature of a site and give it roots for its inhabitants.

The updating of the concept of heritage and the values for which the declarations of World Heritage are currently given are transforming and adapting to the new general global situations, as well as to the new issues of interest and action in society, and consequently those of governments of universal organisations. This is why both governmental and academic institutions are launching proposals and lines of work so that our heritage is capable of being updated to the new needs of society, forming part of this new contemporary reality in such a way that its imaginary is updated as an icon in the society in which it is inserted. In the case of World Heritage this does not vary, and it is even more vital that these sites become new examples of contemporaneity and sustainability from their heritage iconicity for the whole of global society.

In the specific case of Spain, Law 16/1985, of 25 June 1985, on Spanish Historical Heritage (hereinafter LPHE) defines historic areas as, "the grouping of properties that form a unit of continuous or dispersed settlement, conditioned by a physical structure representative of the evolution of a human community as a testimony of its culture or constituting a value of use and enjoyment for the community. Likewise, a Historic Site is any individualised nucleus of properties included in a higher unit of population which has the same characteristics and can be clearly delimited". The Autonomous Law of Andalusia Law 14/2007, of 26 November, on the Historical Heritage of Andalusia (hereinafter LPHA) states that "Historic Sites are groups of urban or rural constructions together with the geographical features that make them up, relevant for their historical, archaeological, paleontological, artistic, ethnological, industrial, scientific, social or technical interest, with sufficient coherence to constitute units susceptible of clear delimitation".

On an international scale, UNESCO defines the concept of "historic urban landscape" as a way of conceiving the city as a natural, cultural and socio-economic process and as a preservation of values and processes, "which refers to spaces, buildings and values that people develop within the city and which are configured through different relationships of symbolic meaning and which incorporate the dimension of permanent change within the framework of preservation".

In relation to the foreseeable future of cities, and in line with the search for sustainability proposed by UNESCO for all the sites on the List of World Heritage Cities, it is important to highlight the work that has been added over time along international lines. We refer to the "Faro Convention on the Value of Cultural Heritage for Society", (2011) of the UNESCO European Council, and other ICOMOS publications on "Guidance on Heritage Impact Assessments for World Cultural Heritage Properties", (2011) which study the impact that heritage has on our society, and how it is understood from an eminently European point of view, as well as the assessment of the impacts that the dynamics generated by these declarations have on the cultural heritages on the List, with possible ways to face these new challenges arising from our social dynamics. At the "Conference on Housing and Sustainable Urban Development" (Habitat III) in 2016 in Quito, UNESCO endorsed a paradigm shift, accepting that culture and heritage are means, not obstacles, to sustainable urban development, and presented at the same Habitat III event the publication "Culture: Urban Future". This document would demonstrate that the preservation of cultural heritage, the safeguarding of cultural practices and the protection of cultural and creative industries are implicit to sustainable development.

2. Tourism and World Heritage declarations

During these years, tourism was integrated as a relevant issue in the urban agenda, an expressly tourist policy was configured, and the rest of the urban policies assumed the tourist discourse as their own. [2] The planning of a cultural development model assumes as a principle that tourist activity must be an economic activity governed by the principles of quality and sustainability, capable of contributing to the maintenance and conservation of cultural heritage, [3] avoiding the deterioration of assets and respecting habitability conditions. However, this last criterion is not always well received in cities that aspire more to the economic profitability of the sector, and less to the conservation of their public spaces based on sustainability criteria.

3. The historic city of Seville and the risks of the 21st century

Seville is a historic city located in Andalusia, a region in the south of Spain, currently the most populous and second largest autonomous community in the country. As the capital of Andalusia, Seville is the most populated city in the region, with a census population -year 2019- of 688,592 inhabitants (INE, 2020).

In this context, the city of Seville, like so many other cities, has undergone important transformations over the last century. Changes that not only stem not only from the need to accommodate population growth but also through various transformations of the inherited urban fabric that are questioned in the face of the risks of the 21st century. Among them, the growing gentrification suffered by the historic centre of the heritage city of Seville has been accentuated by an urban development specialised in channelling road traffic which has ended up isolating areas recognised by specialised agencies as having historic and/or picturesque value, distinguishing them from others which are merely residential or which maintain an urban character not linked to tourism. There are many risks to which the city of Seville has to respond, but the most relevant at the urban level are the effects of climate change, tourism and the loss of value in its historic landscape as a result of developmentalism.

Fig. 1: River Guadalquivir as it passes through Seville. 2023. Own authorship.

Climate change in the 21st century brings with it changes in the frequency of extreme weather events, which in some ways requires coordination in the drafting and search for solutions to mitigate and adapt society to climate change and the climate risks associated with urban planning. Risk and emergency management is a broad process of great depth and relevance as it is a discipline that deals, on the one hand, with adverse and unpredictable phenomena and circumstances that can be of a high calibre, and on the other hand, with heritage, which is as valuable as it is fragile.

At European level, as in many regions of our country, awareness of the increasing frequency of extreme weather events and their calamitous consequences has highlighted the need to lay the foundations for a concrete global climate policy that includes adaptation measures to reduce and manage the risks associated with climate change. This concern led the European Union to undertake a series of initiatives which, in April 2013, materialised with the adoption of the European Climate Change Strategy and the subsequent European Council Conclusions of 13 June 2013 A European Strategy for Adaptation to Climate Change. This strategy requires all Member States to reassess the current concept of vulnerability, review critical risk thresholds at national level and measure their capacities for resilience to the effects of climate

change through policies based on a local approach and a strong involvement of economic actors (European Commission Directorate-General Climate Action, 2013).

The urban landscape has a strong identity value. There are many cases in which heritage buildings are at the centre of a community or a city, in some cases even becoming elements of national or international identity and being recognised as such. This important load of values forms the basis for its protection against circumstances that could damage it, or even eliminate it altogether, and thus enable it to endure. It therefore concerns us to investigate the most important risks that act on the historic urban landscape of the city of Seville and its protection as a world heritage site, namely climate change and tourism.

With regard to the first of the risks mentioned, it is important to remember that the historic city of Seville was designed at a time when passive functioning was very necessary and its behaviour in the heat was better than that of the new neighbourhoods, as verified by many studies. The slight topography of the Seville site has given rise to a general shape of the city that spreads homogeneously on the plain. The river Guadalquivir, which crosses it, divides into two branches in the north, at San Jerónimo, and rejoins at Punta del Verde, at the southern end. The Darsena creates a wide curve that surrounds the city to the west, which has been an important obstacle to its extension in this direction.

The historic centre of the city of Seville preserves the primitive Muslim structure with its network of narrow, non-aligned streets and compact, albeit low, and apparently unordered houses. The old quarter of Seville corresponds almost exactly to the interior of the walled city, as well as some suburbs, including Triana and San Bernardo, and the area around the Parque de María Luisa. In the northwest quadrant of the old quarter, the San Vicente district has an orthogonal street plan. From the squares of Europa and Santa Catalina, two radial street plans start out. There are only two small operations of greater amplitude, from north to south the Avenida de la Constitución, from east to west the Campana-Laraña-Imagen axis. The only wide spaces clear of buildings are La Alameda de Hércules, La Plaza Nueva and the gardens of the Alcázar-Murillo and María Luisa, as well as multiple small squares that are barely perceptible on the plan. However, this drastic separation between historic and non-historic areas is far from reflecting an underlying urban reality.

If we consider the historic site of the Plaza de la Encarnación as the natural geographical centre of Seville, we can see that the centre of gravity of the urban mass is clearly shifting eastwards, showing the misleading growth trends of the city as it moves further and further away from the river Guadalquivir. Both the inner ring road that surrounds the old quarter, the intermediate ring road on old roads or canals and the outer ring road, as well as the main intercommunication routes that lead from the outskirts towards the centre, have suggested the shape of the city as that of a wide fan, which, resting on the banks of the river, unfolds with a certain irregularity from the San Jerónimo district to the north, through Santa Clara, to Amate Park to the east, Cerro del Águila, the 3,000 dwellings and Heliópolis to the south. The implications of this late 20th century urban development with regard to pedestrian mobility have been reflected in various specific studies carried out in academic circles where a series of case studies were identified which, according to the analysis of previous data, represented a space of pedestrian disconnection between different neighbourhoods of the city [4].

As can be seen in the engraving of the view of Seville from the Atlas of the cities made for King Philip II by George Braun and Frans Hogenberg in 1588 (fig.2), the city of Seville at that time, despite the forceful presence of the city walls, could not be understood without the complex territorial relations outside the city walls.

Fig. 2: View of Seville from the west bank of the Guadalquivir with the Tagarete and Tamarguillo rivers flowing around the eastern edge of the city. George Braun y Frans Hogenberg. Colonia 1588.

The plan of modern Seville does not, however, have a dominant structure. A more detailed analysis makes it possible to distinguish different types of plans: rectangular, radiocentric, functionalist, although all of them are interspersed and without apparent connection. The best examples of rectangular plans are found in neighbourhoods with very different characteristics, such as Los Remedios, Nervión and Cerro del Águila; many smaller ones are distributed throughout the city. There are few examples of radio-concentric plans: there are two minuscule examples, one in the area around Plaza de Cuba, another in Ciudad Jardín de Nervión and a third in Amate, all of them incomplete. Special types are the examples of garden cities, such as Heliópolis, Santa Clara or some of the urbanisations in Seville East.

On the other hand, the orography determined by the riverbeds that poured their waters into the Guadalquivir on the southern and eastern edges of the city, the need to bring drinking water from the cornice of the Alcores through the aqueduct, and the increasingly urbanised countryside of market gardens and almunias that had been generated in its wake, showed a historical city that was larger and richer in mixed urban spaces than we currently see delimited in the urban development plans. Most of the heritage areas, such as the one under study in this case, have maintained very close links with the nearby territorial areas since their origin, in some cases with very present and visible historical structures such as the aqueduct of the Caños de Carmona, the pavilions of the access roads such as the Cruz del Campo and other urban infrastructures. Many of these structures can still be seen perfectly present in Manuel Galiano Parra's 1839 Plan of the outskirts of the city of Seville (fig.3).

Fig. 3: Map of the outskirts of Seville with roads, suburbs, bridges over the rivers, orchards and surrounding infrastructures. Manuel Galiano Parra. 1839

This urban area, which also assumes the declaration of the declared World Heritage properties, has historically been treated as a border, and has had since the foundation of Roman Híspalis itself a boundary character, being then a bordering urbanisation of a port character that was associated with the bed of the Tagarete, a small river that flowed into the Guadalquivir and which had a constant supply of water, but was less affected by the constant floods and periodic floods that affected the "big river". The topographical configuration of this border can be seen in various studies such as the urban development of Híspalis by the University of Seville professor Ramón Corzo [5] or the geo-archaeological study carried out by researchers from the University of Huelva [6].

In Roman times, an important river port was located on this border, founded in the 1st century B.C. by the Emperor Julius Caesar, of which part of its palisade foundations have been found under the grounds of the current access to the Reales Alcázares. [7].

The configuration of the city wall in its south-eastern section from the Jerez gate to the Carmona gate therefore responded in its different historical phases to the presence of the Tagarete river and the different urban structures that crossed it. The void provided by the riverbed itself was used in more recent times to house all kinds of urban infrastructures, from the defensive channelling of the walls and later of the area around the Royal Tobacco Factory built in the mid-18th century, to the enclosure of the walls to the Royal Tobacco Factory built in the mid-18th century. XVIII century, to its enclosure and use for the passage of the railway line to the south and east of the city, transforming what was a watercourse outside the city walls into a sunken railway crossing that consolidated the isolation between the urban fabric of the historic centre and the peripheral neighbourhoods that were growing to the east, first San Bernardo and later Nervión (fig.4).

Fig. 4: San Bernardo Neighborhood views. 2024. Own authorship.

The monumental structures of the historic centre were once again enclosed and disconnected from the surrounding neighbourhoods, which developed around infrastructures of great historical value. As a result of these recent road transformations to channel road traffic and in the absence of a social sensitivity that would have drawn attention to the need and potential of preserving the old Tagarete riverbed as a green area for the citizens, the eastern edge of the historic city has become an asphalted ring road with four lanes in each direction, perhaps also over-dimensioned, which maintains the disconnection between the historic centre and the other neighbourhoods that were its immediate surroundings.

Most of the population of tourists and visitors who periodically come for a few days to see the city are therefore confined to this area of the historic centre, living with their backs to the periphery, when these tourist areas could be less concentrated if they had been sewn together with a greener, more pedestrianised landscaped strip specialising in channelling road traffic. The basis of the heritage value of an urban complex cannot derive exclusively from the existence of a monument or complex, but from the historical process of the city itself and its relationship with them and with other heritage of different types and periods. Therefore, a connection could be established, accompanied by the necessary actions for the conservation and enhancement of the magnificent historic structures outside the city walls, such as the aqueduct of the Carmona pipes, or the historic factories of the Royal Artillery Factory, the Almunias and gardens of the Buhaira, or even the historic houses in the San Bernardo neighbourhood, which would allow the heritage attraction of the city of Seville to be extended and understood, diluting the concentration of tourist housing within the city walls and avoiding imbalances between the different urban areas and the problem of gentrification.

The urban life of these river spaces has, however, been defended in other parallel cases, such as the defence carried out by citizens' organisations of the Dehesa de Tablada at the beginning of this century around the living riverbed of the Guadalquivir River to the west of the historic centre of Seville. Its defence as a green area for public ownership and use has also been the subject of various specialised studies by the University of Seville [8] and has borne fruit and has been included in the city's latest General Urban Development Plan [9].

Conclusions

Demographic changes, mass tourism, commercial exploitation of heritage and climate change have meant that cities, which are eminently dynamic in character, are subject to pressures and problems associated with development that did not exist when the last UNESCO recommendation on historic areas was adopted in 1976, and the consequent evolution of a conception centred mainly on architectural monuments, both at state and autonomous community level. In a now dynamic vision, where a transformative, multi-scale and multi-faceted approach to heritage city management is proposed, which takes into account the interrelationships between physical forms, spatial organisation and connections, natural

environments, and the social, cultural and economic values of the ensembles, we defend a heritage work methodology where the values of urban form are recognised as key pieces in the work of urban resilience in world heritage cities.

In this intervention methodology, the principle of sustainable development implies the preservation of the existing resources in historic cities, so that their future depends on the planning and effective management of these resources and ways of being. A scenario where the concept of resilience does not refer exclusively to risk management and goes beyond the critical particularity of knowing a system exposed to disaster present in the first historical meaning, where the resilient character remained associated with the very capacity to carry out an external action to maintain and stabilise its functions [10]. At that time, the consideration of urban heritage as a social, cultural and economic capital characterised by the historical stratification generated by different cultures in a living process of continuity was not taken into account. Now is the time.

Resilience, associated with urban environments, thus refers to the capacity for change in order to safeguard one's own persistence over time [11]. Persistence and change are terms that are not far removed from the process of recovery, improvement and enhancement of the historic urban contexts in question. A path where the integration of conservation strategies in the processes of planning and urban landscape becomes necessary, but also from the knowledge and valuation of the urban plots in their historical exercise, today denied and largely forgotten.

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Digital Connections Between Educational Contexts for a Sustainable Cultural Heritage: Protection, Innovation, Training

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Abstract
Safeguarding, valorization, and enjoyment are core values underlying Italy's vast cultural heritage. With the ongoing process of computerization and digitization of heritage, there is the possibility of making tangible and intangible cultural assets accessible to a wider pool of users. Through the introduction of, for instance, artificial intelligence or NFT (Non-Fungible Token) technology, it is possible to visit museums through augmented and mixed reality, interact and 'immerse' oneself in them, document, catalog, preserve, monitor, diagnose and even create art itself. But what role can the digital context play in this panorama of actions for the protection and enhancement of cultural heritage? Can these new media act as a link between educational institutions and territorial resources such as museums, archaeological sites, etc. for heritage education? This study, carried out by a meta-analysis, attempts to analyze to what extent the use of new technologies in cultural heritage can make them more usable, immersive, and accessible to an increasingly heterogeneous population and, at the same time, they can become the element that characterizes the collaborative nature between different educational contexts to create a broader vision of culture and education beyond the individual and specific functions traditionally assigned to them to train future citizens of the world to respect and protect the common heritage.

Keywords: Innovation, Digital innovation; Educational Technology; Training

Introduction
While acknowledging that the school shouldn't be the sole educator and that educational diversity is vital, cultural and artistic heritage remains a significant aspect of education, bridging formal, non-formal, and informal learning. Research, including through digital tools, underscores the school's role as a unifying force in society, leveraging cultural and educational resources for the common good. Understanding, preserving, and celebrating cultural heritage fosters a deep connection to our roots and cultivates civic competence. Art, as Dewey

emphasized, stimulates creative energy, observation, memory, and imagination, nurturing critical thinking and problem-solving skills essential for individuals and society.

1. Cultural heritage education: an *in fieri* poietic process

The school, while having a history of engaging with cultural heritage, often lacks systematicity and continuity in its approach, often due to bureaucratic hurdles or disconnect with the community. It struggles to develop aesthetic skills in students necessary for personal growth. Cultural heritage education requires a long-term perspective, aiming to uncover deep meanings and values. The school's role is to analyze, observe, and interpret cultural heritage, understanding its profound significance, whether it's a painting, sculpture, church, or artifact. [1]. The responsibility for transmitting knowledge about cultural heritage cannot rely solely on motivated teachers or museum institutions; there must be a joint effort to address the educational needs of users. This requires diversifying educational offerings beyond traditional museum functions and school curricula. Creating a fruitful partnership between educational institutions and local resources like museums, exhibitions, and historical sites is essential. Schools must take a leading role by developing varied and meaningful pathways that leverage the opportunities offered by the local area for knowledge, protection, and preservation of cultural heritage. This involves integrating cultural heritage into education not just as supplementary material but as a fundamental source for interdisciplinary learning across formal, non-formal, and informal contexts, enriching the educational experience for all. [2]. New media plays a crucial role in advancing this vision by enabling the creation of virtual itineraries that transcend physical limitations and bring distant content to users with just a click. These platforms actively engage visitors, inviting them to participate in the non-traditional exploration of cultural content and fostering a dynamic cognitive process [3]. These new digital technologies become the element that characterizes the collaborative nature of the entire process between the various educational contexts intending to create a broader vision of culture and didactics beyond the individual and specific functions traditionally assigned to them to increase the role and power of the educational impact of each and all in a perspective of multiple literacy [4].

2. Leveraging Digital Technology for Heritage Preservation and Accessibility

The integration of digital technologies into cultural heritage preservation not only enhances accessibility but also facilitates the conservation and documentation of heritage sites and artifacts in line with the CAST (Cultural Accessibility Standards and Tools) accessibility guidelines. Augmented reality (AR) and virtual reality (VR) technologies (Trunfio, et al., 2022) [5], for instance, offer immersive experiences that allow users to virtually explore archaeological sites, historical landmarks, and museum collections from anywhere in the world. These technologies provide opportunities for individuals who may be unable to visit physical sites due to factors such as distance, mobility limitations, or financial constraints to engage with cultural heritage in meaningful ways. Moreover, digital platforms enable comprehensive documentation and cataloging of cultural artifacts, ensuring their preservation for future generations. High-resolution imaging techniques, 3D scanning, and digital archiving allow for the creation of detailed digital replicas of artifacts and monuments, mitigating the risk of damage or loss due to environmental factors or human activities (Kantaros, et al., 2023) [6] Artificial intelligence (AI) algorithms can assist in the diagnosis of conservation issues and the development of restoration strategies, optimizing the preservation efforts of cultural heritage professionals. By leveraging digital technology for heritage preservation and accessibility, cultural institutions and heritage organizations can expand the reach and impact of their conservation efforts, ensuring that cultural heritage remains accessible and relevant in an increasingly digital world. The digitalization of cultural heritage not only revolutionizes preservation but also opens doors for collaborative educational endeavors across diverse institutional and territorial contexts. By integrating digital technologies into educational curricula, students are afforded the chance to explore cultural heritage in interactive and interdisciplinary ways (Xia, et al., 2024) [7], thus gaining a more comprehensive understanding of history, art, and society. Using online platforms and virtual collaborations, educators can exchange ideas, co-create educational materials, and develop innovative teaching methods. This collaboration not only enriches the educational experience for students but also

strengthens ties between academic institutions and cultural organizations, fostering a culture of knowledge-sharing and collaboration (Purnatara, et al, 2023) [8].

3. Meta-Analysis of the impact of New Technologies on Cultural Heritage and Education

Meta-analysis, a rigorous quantitative research method (Leary, et al., 2018) [9], was employed to investigate the efficacy of new technologies in enhancing the usability, accessibility, and collaborative nature of cultural heritage preservation and education within the field of education. The meta-analysis aimed to provide a comprehensive understanding of the impact of digital technologies on heritage education and preservation, thus informing future educational practices and policies. The meta-analysis encompassed a systematic review of existing literature, wherein relevant studies were identified, selected, and critically evaluated based on predefined inclusion criteria. These criteria ensured the selection of studies that investigated the integration of new technologies, such as augmented reality, virtual reality, and AI-driven platforms, in cultural heritage settings. Key outcome measures included the usability, accessibility, and collaborative nature of cultural heritage experiences facilitated by digital technologies. Data synthesis was conducted using statistical techniques to quantitatively analyze the aggregated findings from individual studies. Effect sizes were calculated to assess the magnitude of the impact of digital interventions on cultural heritage preservation and education outcomes. Additionally, subgroup analyses were performed to explore potential moderating variables, such as the type of technology used, the educational context, and participant demographics. The results of the meta-analysis revealed significant positive effects of digital technologies on enhancing the usability, accessibility, and collaborative nature of cultural heritage experiences. Augmented reality, virtual reality, and AI-driven platforms were identified as particularly effective tools in providing immersive and engaging educational experiences for diverse audiences. Moreover, digital connections between educational contexts were found to facilitate collaboration and knowledge sharing, leading to enriched heritage education practices. By systematically analyzing the collective findings from diverse sources, meta-analysis enables researchers to draw robust conclusions and identify areas for future research and practice improvement in cultural heritage preservation and education.

Conducting a meta-analysis involves several systematic steps to ensure the reliability and validity of the findings.

Here's a general outline of how to conduct a meta-analysis:

1.	**Define the Research Question**:	Clearly define the research question or hypothesis that the meta-analysis aims to address. This ensures clarity and focus throughout the process.
2.	**Literature Search**:	Conduct a comprehensive literature search to identify relevant studies that address the research question. In this research, multiple databases such as Google Scholar and Eric were used to select all existing research products, articles, and quantitative and qualitative analyses on the topic.
3.	**Screening and Selection**:	In conclusion and exclusion criteria were identified by selecting only Theme-specific contributions and not related ones; Only research products produced in the last 5 years were identified; Screening should be conducted independently by at least two researchers to ensure reliability.
4.	**Data Extraction**:	Relevant data on an Excel File were extracted to selected studies using a standardized data extraction form. This includes study characteristics (author, year, sample size, Universities or research center, and nationality), intervention details, outcomes, and a synthesis. Data extraction was also performed independently by each of us researchers to minimize errors. After that, the research teams realized a synthesis of each analysis.
5.	**Quality Assessment**:	To evaluate the quality of the included studies the research team decide to use a quality assessment tool such as a checklist.
6.	**Effect Size Calculation**:	The effect sizes were calculated for each included study based on the reported data using a common scale for comparability.
7.	**Statistical Analysis**:	Subgroup analyses or meta-regression was conducted to explore potential sources of heterogeneity.
8.	**Assessment of Publication Bias**:	The presence of publication bias was analyzed and avoided to create a correct research dataset.

9.	**Interpretation and Reporting**:	Subsequently, the research team the findings of the meta-analysis in light of the research question and objectives; discussed the implications of the results, including strengths, limitations, and areas for future research; and prepared a comprehensive report.

Fig.1: Meta-analysis outlines

This meta-analysis systematically evaluates the impact of new technologies on cultural heritage preservation and education. It shows that digital tools like augmented reality, virtual reality, and AI-driven platforms significantly enhance cultural experiences by improving accessibility and collaboration. There's a strong link between digital technology use and collaborative educational practices, enriching heritage education and preparing students for a globally connected world. Embracing technology can create inclusive experiences, promote cross-cultural dialogue, and safeguard cultural heritage in the digital age.

5. Conclusion

In conclusion, the integration of digital technology into cultural heritage preservation and education holds immense promise for fostering inclusivity, sustainability, and collaboration in heritage stewardship. Through interactive experiences, virtual tours, and digital archives, individuals worldwide can now engage with cultural artifacts and sites in unprecedented ways, transcending geographical barriers. Moreover, digital connections between educational contexts facilitate collaboration and knowledge-sharing among educators, researchers, and cultural professionals, enriching heritage education with diverse perspectives and resources. This transformative potential underscores the importance of continuing to explore innovative ways to leverage technology in heritage conservation and education. By embracing digital innovation, we can ensure the accessibility, engagement, and preservation of our common heritage for future generations. This necessitates ongoing research, investment, and collaboration across sectors to maximize the benefits of digital technology in cultural heritage preservation and education, shaping informed and conscientious global citizens committed to safeguarding our cultural legacy.

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Aeroponics/soilless crops

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Abstract
In recent years, due to the various climate changes and the need to satisfy a consumer increasingly attentive to the production process of what he is buying, new cultivation systems are being born, and, in some realities, are already in the production phases.
In this article, among the "soilless crops" we will examine the cultivation techniques that are implemented in the absence of common agricultural land and in which the supply to the plants of water and nutrients, generally takes place through the administration of a nutrient solution of macro- and micro- nutrients.
In particular, we will study soilless or aeroponics crops dividing them into two groups: crops in bare root nutrient solution (without substrate) and those in containers on natural or artificial substrate.

Keywords: Aeroponic crops, agriculture

1. A Brief History of "Soil Crops"

Boyle (1666) was the first to experiment with the cultivation of plants in water.
Later, John Wooward, in 1699, grew plants in water with a different degree of purity and saw that those placed in water, containing soil, grew better than those kept in distilled water alone.
Justus von Liebig (1803-73) established the importance of mineral salts in plant nutrition, but the two German scientists, Sachs (1860) and Knop (1861), can be considered the true founders of hydroponics. They studied the influence of mineral elements on plant growth by demonstrating that normal development could be achieved by adding mineral elements to the water, in particular nitrogen, phosphorus, potassium, sulfur, calcium and magnesium.
Hydroponic crops were further improved with Tollens (1882), Shive (1915), Hoagland (1919), Arnon (1938), who used new nutritive solutions, still in use.
The first to apply hydroponics (Deep Water Culture) on a commercial scale was Prof. W.F. Gericke, physiologist of California, in the period between the two world wars of the last century, as an alternative means to land cultivation, linked to problems of soil fatigue (Jensen, 1997).
Gericke's work gained recognition all over the world, also thanks to the newspapers and magazines that exalted the merits of the new cultivation system.
The same Hoagland and Arnon wrote a relation (The Water-Culture Method for Soilless Growing Plants), in which they listed the information necessary for the preparation of the nutrient solution, specifying that the technique remained in the experimental field, considering it not suitable for a large-scale application due to the high costs of installation and possible root hypoxia.
During the Second World War, the US Army made use of hydroponic crops for the production of fresh vegetables for the troops in Japan, essentially for hygienic reasons, because in that country, farmers used human sewage for the fertilization of vegetables, and this allowed their

use only after cooking. Later, Japanese experimenters refined Gericke's original version and spread it among local growers (Deep Recirculating Culture).

To overcome Gericke system's problems, in New Jersey, the system of cultivation on sand or gravel (Sand and Gravel Culture) was developed, thus starting the development of crops off soil on substrate.

Despite the changes made and the positive impact on sales, there was not a satisfactory spread of the cultivation method due to the high costs of cement pallets.

The acidic nutrient solutions quickly corroded the iron and/or galvanized components and smoothed the metals contained as impurities in the culture beds causing phytotoxicity phenomena.

The introduction of plastic in agriculture, around the sixties, simplified some aspects of construction (pipes, channels, etc.), and again aroused the interest of operators in soilless crops.

In the 1960s and 1970s large hydroponic plants were developed in the deserts of California, Arizona and Abu Dhabi.

In Europe, despite the first plantings of soilless crops had been realized already in 1963, it is only in the seventies that commercial production off soil begins.

Peat was used for new organic substrates and mineral wool, perlite, pumice, volcanic lapillo, etc. for artificial or natural substrates improving the physico-chemical characteristics compared to sand or gravel.

In 2000 soilless crops in the world covered about 22,000 hectares, of which over 60% in Europe with a higher percentage in Northern Europe of 20/50%, while in the countries of the Mediterranean Basin of about 5%.

In Italy the soilless crops remain little used with a percentage of 3% over the whole protected area.

The first Italian plants used Dutch or Danish technology, no considering the different climatic and economic condition where the companies operated, which were equipped with expensive computerized systems clearly oversized compared to business needs.

Soilless crops, although not very widespread in our country, surely will be adopted by farmers, especially for the imminent prohibition of the use of methyl bromide and the limitation of the consumption of phyto-medicines.

2.   Systems of soilless cultivation

The introduction of plastic in agriculture, around the sixties, simplified some aspects of construction.

In the field of hydroponic crops, various cultivation systems have been developed that differ in:
• volumes and details of water supplies;
• nutrition management;
• shape and size of growing modules;
• presence or not of a substrate of different nature;
• costs or investments.

The many systems currently adopted are, in fact, are of two large groups:
1) **cultivation systems without substrate**;
2) **systems of cultivation on substrate**.

The first group includes **NFT** (Nutrient Film Tecnique),

Aeroponics: technique has little application at the production level and is mainly aimed at vegetables crops of limited growth.

The support to the plants is provided by means of plastic or, more simply, polystyrene panels, arranged horizontally or on inclined planes, held by a supporting structure.

Fig. 1: Chrysanthemum cultivation in an aeroponic system with a rectangular section: overview (A), detail (B).

Floating system ("floating" cultivation on nutrient solution tanks).
The latter are further distinguished in:
• **cultivation systems on natural organic substrates** (peat, coconut, marc, algae, etc.);
• **cultivation systems on inorganic substrates** (lapillus, pumice, sand, perlite, vermiculite, rock wool, expanded clay);
• **cultivation systems on synthetic substrates** (polyurethane, polystyrene).
A second classification of soilless techniques may also be based on management of the nutrient solution distinguishing:
1) **Open cycle systems**, involving the feeding of to every plant fertirrigation, a "fresh" solution without recovering the share of the same cultivation modules;
2) **closed-loop systems** which, on the contrary, involve the recycling of the drainage after replenishment of EC (electrical conductivity) and pH values.
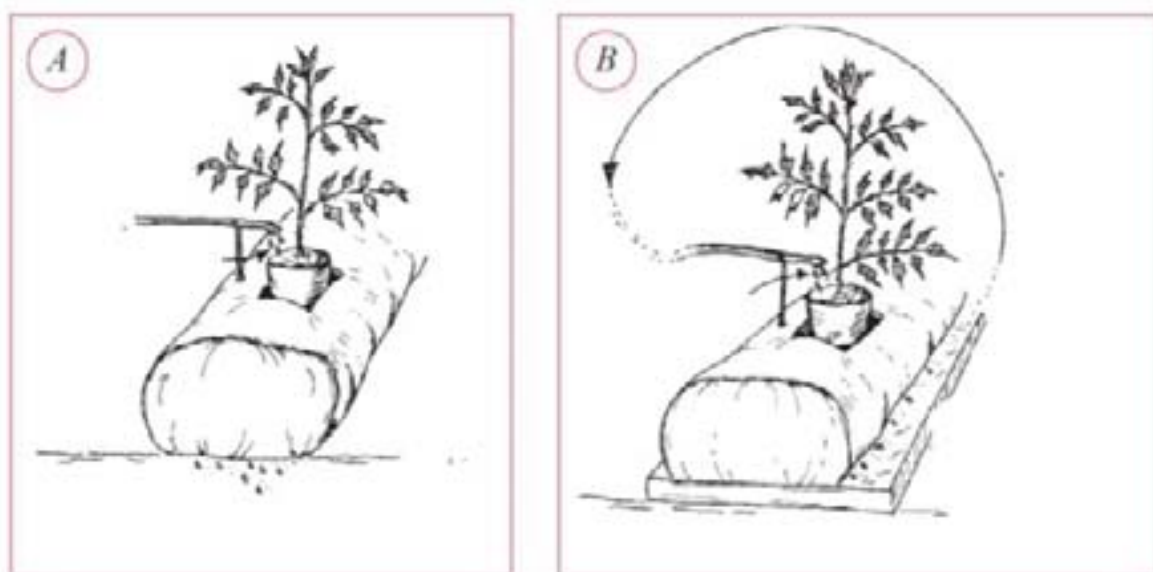
Fig. 2: Diagram of a cultivation system: open cycle (A) closed cycle (B)

In England in the 70s, Cooper developed the NFT technique representing the classic system of hydroponic cultivation, which was initially developed in the countries of Central and Northern Europe, such as Belgium, Denmark and Germany and then suffer a drop in interest for the spread of cultivation methods on open cycle substrate, more manageable.
The principle of this system is to circulate, within modules of cultivation (channels), a nutrient solution so as to create a thin film of 1-2 mm in which the root system is partially immersed.
The technique involves the recovery of the solution that, after having provided nourishment to all the plants, is conveyed to a tank and then returned, after reintegration, to the cultivation modules.
Just the absence of substrate is the main advantage of the NFT system because it allows a significant saving of water, nutrients, a reduction in environmental impact and the elimination

of the cost of the substrate. On the other hand, the lack of substrate takes away from the nutrient film technique every chemical-physical characteristic and therefore, precisely for this reason, can determine a block or an alteration to the flow of the solution.

In addition, due to the high development of the root system, exposed to premature aging and loss of function, there is a greater application limit for long cycle crops, which can be overcome by performing more crop cycles in the year (interplanting).

This system, therefore, is not suitable for cultivation in environments with a high radiation and temperature (southern areas of the Mediterranean Sea).

The main stages for the construction of a NFT system are:
• arrangement of the soil within the protective equipment;
• arrangement of cultivation modules;
• construction of the irrigation system;
• delivery and management of nutrient solution.

Soil arrangement: it is certainly the most delicate phase to achieve a homogeneous slope of about 2% to ensure proper absorption of the nutrient solution without the risk of stagnation.

The slope can be obtained with:
1) soil modelling;
2) soil surface paving (not very cheap);
3) the use of adjustable metal supports.

Fig. 3: Cultivation of lettuce in channels arranged on adjustable supports.

3.   How to manage the nutrient solution
General aspects

The management of the nutrient solution is characterized by a set of interventions closely linked to the control of qualitative and quantitative variables affecting directly or indirectly on one or more chemical-physical characteristics of the substrate or soil, all to ensure optimal conditions for the cultivated species, according to the phenological stage and the desired product type, in an appropriate microclimatic context, depending on the different types of soil or substrate.

The main role is played by fertilising irrigation, so it is necessary a continuous and careful evaluation of the nutrients, added with the irrigated water for the necessary corrections, according to the reference guide parameters, namely EC and pH of the circulating drainage solution.

The changes in EC, pH and humidity of the substrate must be highly considered and be corrected with a good management of irrigation intervention that is quickly manifested also with crop reactions to the interventions provided.

During the hottest hours of the day, the problems associated to the high temperatures and often to irrigations for sprinkling with only water with air conditioning effect, are very important.

Regarding the photosynthetic efficiency, it can be said that it is strongly influenced also by:
• low light intensity;
• low temperature;
• high relative humidity;
• poor evapotranspiration;
• excess water in soil and/or substrate.

4. Project of cultivation enhancement of the terraces and educational experimentation of the "school beyond the class" project

The Training Agency has drawn up a project, in two lots, to redevelop some terraces for the construction of two hydroponic greenhouses.

The two greenhouses, in addition to ensuring the availability of raw materials, are very useful teaching tool, for teachers and students. During the A.S. 2016/2017 seven classes for a total of 140 students had the opportunity to carry out part of their school curriculum outside the classes and in direct contact with the cultivation in a hydroponic greenhouse. The C.F.P. (Vocational Training Center), in fact, has long joined the "School beyond the walls of the class" project, which allows a more engaging teaching approach, replacing the classic frontal lesson in the classroom. The aim is to bring children and their teachers out of the traditional school walls, offering a more stimulating and less structured learning environment, decreasing the distance between school experience and learning mechanisms especially for students who have difficulties in acquiring skills and dropping in attention. In this form, partly "unstructured", even the teacher support is recognized as the contribution of a professional figure of great experience, at the service of the training of students. Girls and boys attending the C.F.P., thanks also to the numerous hours of training in the local companies are more inclined to manual skills than theory. With "School beyond the classroom" it is given students the opportunity to "learn by doing", without depriving them of a fundamental part of the school path, rather, guiding them to follow alternative paths that can achieve the same result by supporting what are the peculiarities of young students. "School beyond the classroom" also involves other schools in the area; in fact, pupils will have the possibility of interdisciplinary exchanges with other schools of different types and trainee exchanges, both at a local and European level. In order to implement the original project, it is necessary to realize some fundamental and predominant elements, such as the **"didactic cubes"** and **the furnishings connected** to them, **the green tables**, as well as all the parts necessary for the use and achievement of both greenhouses and cubes, that is **paving, handrails and parapets**, the building of **new stairs** and the **arrangement of terraces** for the placement of new crops on the ground, the consolidation of some slopes, **the lighting** of new spaces and paths**, irrigation** of terraces and the dissemination and **multimedia presentation** of the project.

Description of the works to be realized:

THREE TEACHING CUBES - dedicated spaces "BEYOND THE WALLS OF THE CLASSROOM", where students can find a moment of study, training, and aggregation beyond the confined space of the class. The volume drawn in the space by the three teaching cubes, wants to be the attempt to customize and create a place, otherwise not used and little exploited by school users. Open forms are used to help students overcome their sense of constriction and compulsion in times of school commitment reducing their desire to learn.

The didactic cubes are made with steel tube frames, assembled in place and bolted, while the stands are fixed with plates and dowels on a concrete base.

FURNISHINGS – their aim is to make the new space designed by the cubes welcoming.

GREEN TABLES - they are square tables with central basins to accommodate plants that can become the object of study and comparison.

PARAPETS - they are necessary for the safety of students.

STAIRS – they are necessary for the achievement of the improvements of the terraces affected by the hydroponic greenhouses.

FLOORING - it is part of the building works necessary for the proper use of the new spaces.

LANDSCAPE REDEVELOPMENT INTERVENTION - consolidation and planting of the terraces of recognised historical value and which, as a result, must be protected.

Among the interventions carried out:

PLANTERS OF KNOWLEDGE: insulated and coloured iron tanks enriched by the presence of cut flowers.

WELLNESS PLANTERS: equipped spaces dedicated to the cultivation of aromatic and officinal herbs.

CLIFFS: they are safeguarded through a landscape operation that consists in maintaining the natural conformation of the terraces.

5.   Conclusion

About eighty years have passed since the first soilless crops on a commercial scale, but still worldwide they are little widespread and represent a very small portion of the area devoted to crops. This means that, in the field of plant physiology, the question of turning a research tool into a commercial scale cultivation system, which is technically reliable and cost-effective too, has not been solved.

Undoubtedly, the decrease in quantity and quality of water resources and the environmental policies of central and local governments, at least in developed countries, are factors in favour of the spread of these technologies. On the other hand, we cannot forget that, in Italy as in the whole world, crops are based on small farms and that the current international socio-economic situation is very unstable with continuous recession phenomena. All this makes it very risky to invest in these new cultivation techniques.

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The fresco in the inner loggia of Palazzo Petrucci at Carinola: survey of a lost work of art

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Abstract

In this period, when rational thought seems to have been replaced by irrationality and violence, art is often damaged or destroyed and the memory of that which is lost, however detailed, is never anyone's truth: neither of who describes the work of art, nor of those who are described, because the memory isthe unconscious drawing of the work of art.

The research in Palazzo Petrucci at Carinola, a medieval building belonging to an urban reality that is among the most original as regards its Catalan architecture, was undertaken with the intention of attempting to recover the primigenial image of the scenography of its court, now lost due to the neglect and violence of man, and to halt the memory of the unconscious.

This paper describes a methodology aimed at the virtual recovery of the wall paintings that originally decorated the walls of the palace's inner loggia, a process of knowledge and documentation carried out through metric and photogrammetric survey using software of the latest generation, in which the modules were developed for the reconstruction of the perspective view.

The documentation produced describes the wall painting in its original position. These are evocative photographs, which we believe can contribute to strengthening the collective memory and sense of identity of this community, and from which, adopting the appropriate precautions, one can read a chapterof the medieval history of the Province of Terra di Lavoro.

Keywords: cultural heritage, Catalan architecture, wall painting, photographic survey, prospective reconstruction.

1.   Introduction

During the history of Southern Italy, political and administrative changes not only brought to the fore a new governing aristocracy, but also new traditions and customs, and with them often came different conceptions of architecture, which when grafted onto the local building style contributed to defining inhabited places and civilised spaces. Among these towns rich in history is Carinola, situated in the northern part of the Campania region, once part of the 'Provincia di Terra di Lavoro'. Indeed, in the archives at Carinola there are traces of such changes, but it is interesting that there is also evidence of a process of an artistic renewal [1],

which occurred during the 15th century when the Neapolitan King Alfonso V of Aragon, Ferdinand his son and heir to the throne, and Eleonor, King Alfonso's daughter [2], chose this town as a place for periodic stays; this choice led to the opening of extraordinary building sites for the creation of residential and leisure structures, which favoured the entry into the local buildingtradition of the Catalan architectural language, as occurred earlier in Naples [3].

One of these new constructions was the residence of Count Antonello Petrucci, then secretary to Ferdinand of Aragon, whose decorative scheme of Catalan inspiration today arouses great interest.

2.   Palazzo Petrucci

The palazzo belonging to Count Petrucci of Carinola was built after 1471 [4] and from its origins was destined to house a residence and activities for transforming and conserving the agricultural products grown on the Count's lands. Today, most of the building belongs to the local administration and has become a multipurpose structure used by the local population for meetings, conferences and exhibitions (Fig. 1).

The palazzo is entered through a gateway, which clearly references Catalan architecture, from via Armando Diaz. The gateway leads into a vestibule, which in turn leads to the courtyard, the heart of the building. This open area within the building is a quadrangular architectural space of limited dimensions, characterised by walls and corners that all differ. Their façades appear rather austere and disharmonious to the educated architectural eye due to the sort of "compositional anarchy" that allowed the builders of the time, educated in the late Gothic architectural language, to use arches, doorways and windows of various styles and sizes, and to place them one next to the others on the exterior faces of the walls [5]. Of the four sides facing onto the courtyard, the northern one has the greatest emotive impact. On this side, next to the straight staircase leading up to the piano nobile we find two pointed arches that form a portico covered by a cross-vault. These structures are surmounted by two flat arches forming the loggia; the space which is the main focus of our interest as scholars of architecture (Fig. 2).

Fig. 1: Photograph of Palazzo Petrucci taken from piazzale del Vescovado, Carinola (CE).

Fig. 2: Photograph of the courtyard, Palazzo Petrucci, Carinola (CE).

Observing this façade, one has the clear sensation that the loggia is not simply a space that adds individuality and aesthetic-artistic value. It is positioned beyond the gaze of the population of Carinola and at the same time opposite the courtyard entrance. Such position indicates that this space was used by the aristocratic Neapolitan family not simply as a link between the residential areas but also for some outdoor recreational activities (Fig. 3).
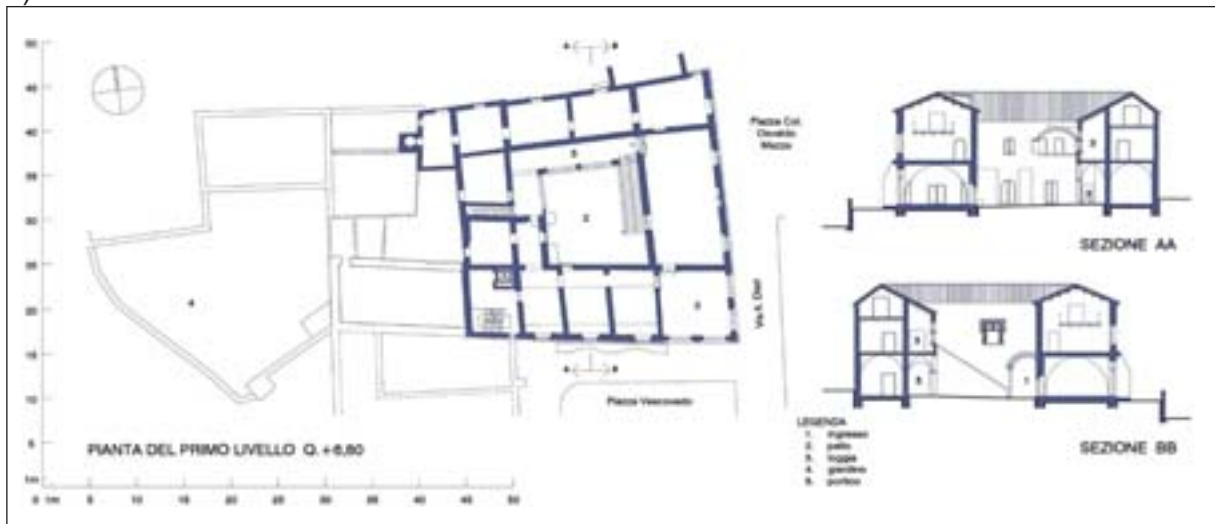
Fig. 3: Plan and sections of Palazzo Petrucci, Carinola (CE).

Fig. 4: Historical photographs of the inner loggia, Palazzo Petrucci, Carinola (CE).

With this image of the internal loggia fixed in our minds and mindful of the common thread that unites the domestic spaces in a single architectural organism, we believe it is possible to concur that architectural decoration must have been present in this open but roofed space in the Petrucci residence, nor could it have been any different in expressive and artistic quality from that present in other rooms in the residence, which render this building immediately recognisable and highly semantic [6]. However, the achievement of this objective was not undertaken with the same plasticity and exuberance of the sculptural elements typical of this space, rather with wall paintings that are today largely lost. A solution that appears original, but whose history is however difficult to interpret due to the absence of documentation. In any case one hypothesis that may be suggested sees this choice as an attempt to increase the palazzo's artistic dowry undertaken by the aristocratic family sometime after the completion of the construction, probably when Count Petrucci was at the height of his personal prestige and courtesy visits by the local aristocracy resident in the 'Terra di lavoro' were no longer sporadic. In these circumstances the rear wall of the inner loggia constituted the perfect backdrop.

3.   Preliminary activities prior to the recording of the painting

Upon careful observation of the fragments of painted fresco in the inner loggia of Palazzo Petrucci and at the same time of the photographs documenting its state of preservation in the second half of last century (Fig. 4), one senses that originally the painting was enveloping, polychrome and had a narrative structure based on several carefully detailed geometric-naturalistic motifs, which repeated in cycles gave the artistic creation a constant expressive rhythm that was pleasing to the eye.

The possibility of making a virtual reproduction of the courtyard's original scenography presented itself during a visit to the private residence situated in the northern rooms on the first floor of Palazzo Petrucci, when observing the painted walls of those domestic spaces we noted that they contained base elements identical to those visible in the historic photographs of the loggia (Fig. 5).

Fig. 5: Interior of one of the residential rooms on the first floor, Palazzo Petrucci, Carinola (CE).

Our intention was to limit the field research to the area of the painting, due to its unusual composition, however, the recording of the spatial data required a great deal of time and great attention to detail. The reason for this was that during the preliminary visit we noted that the natural light was insufficient, while artificial lighting falsified the colours.

Having rejected the idea of artificial illumination using professional lighting, both because of the bulky equipment and the potential difficulty in correctly orientating the beams of light on the surface to be recorded we realised that we would have to document this cultural work using natural light, putting off finding the solution to the lighting problem until later and in another way.

4.   Instruments used for recording the painting

With reference to the above and to the scientific connotation we wished to imprint on the entire operation, we identified three objectives to accomplish in the field: the extrapolation of the metric and geometric data of the residential rooms characterised by the presence of wall paintings, those relating to the base module of the painting and its photographic documentation.

In this journey of knowledge and documentation the metric recording was rapidly carried out using the direct system with the canonical measuring instruments and callipers with a digital cursor. The aim was to create a series of spatial data to use in the planning of the photographic survey and for managing the photomosaicatura of the fresco in the post-production phase.

On the contrary, the photographic survey required a different sort of energy and dedication. The images of the painted rooms were taken at the same time as the metric survey, while those showing the details were taken in a second session a few days later. In both cases we used the body of a Nikkor D850 and two lenses: the Nikkor AF-S zoom 14-24 millimetre, f/2.8 G ED, with aperture angles between 114°-84°, for the images of the painted rooms, and a Nikkor AF-S 58 millimetre, f/1.4 G, aperture angle of 40°51', for close-up images. The equipment also included a Manfrotto kit comprising a telescopic tripod model 058, a three-way 410 junior geared head and 338 model tripod plate.

Exploiting the camera's technical characteristics, the photographs were registered on two different mass memory devices using image quality Nef (Nikon Eletronic Format) – Nikon Raw – and Jpeg (Joint photographic experts grup). Overall, 60 photographs in digital FX large format, image size 8.256x5.504 pixels were taken.

As regards the exposure, we chose to use the 'Automatic with aperture priority' mode, setting a shutter speed of f.5.6 for the photographs of the frescoed rooms, while using the value of f.2.8 for the close-up photographs of the paintings. The use of these shutter speeds produced different settings for each photograph, both in terms of the sensitivity of the ISO (International Standard Organization) photographic sensor and exposure times, given that the lighting of the scene influences both. Furthermore, to ensure a correct chromatic scale we took several test images using the XRite ColorChecker Passport Photo2 table of calibrated colours so as to determine on the computer the colour profile file with the correct balance of white (Fig. 5a).
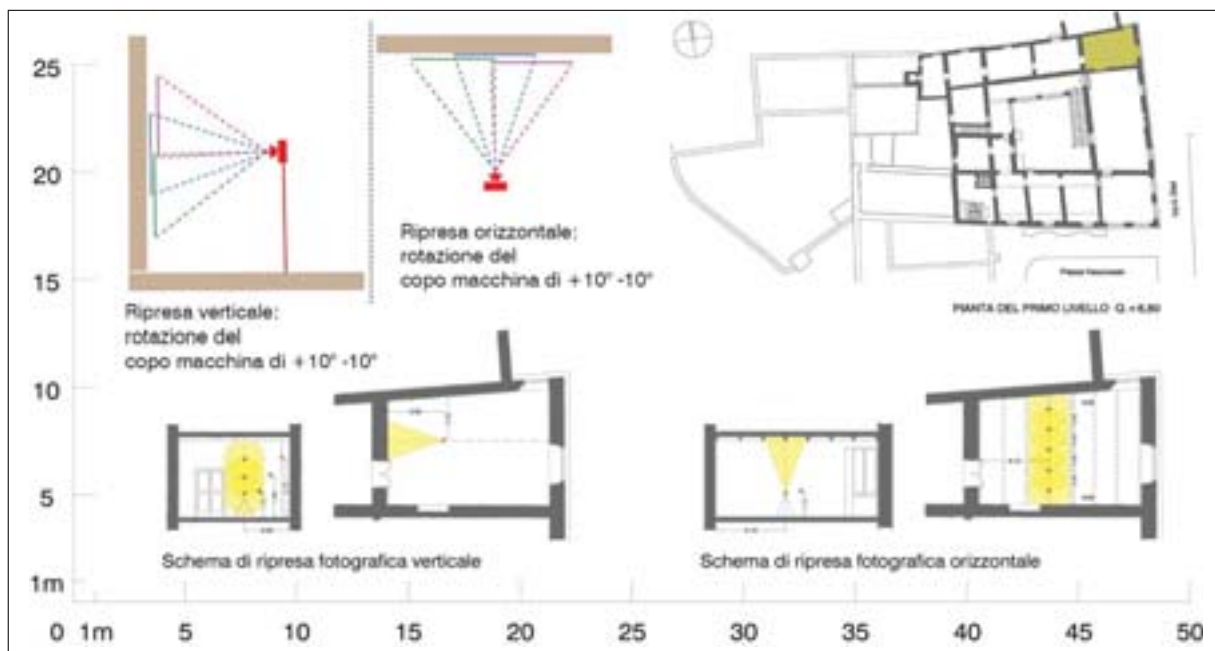
Fig. 6: Graphics showing camera positions for photography of the wall and ceiling paintings chosen as samples for the reconstruction of the original state of the inner loggia, Palazzo Petrucci, Carinola (CE).

From the project survey of photographic it was found that in order to adequately document the part of the fresco chosen as a sample it was sufficient to position the camera station at 250 centimetres from the wall, and three photographs were needed to cover its total height, one shot with the camera at 110 centimetres from the ground and the other two at 185 and 270 centimetres. In order to record the ceiling paintings it was seen that five photographic stations arranged in a line at the centre of the area, the first and the last station both placed at 62 centimetres from the walls and the others at 95 centimetres one from the other, and in from each of these stations it was necessary to take the photograph with the camera positioned at 110 centimetres above the floor (Fig. 6).

Among the preliminary decisions was that of taking additional photographs (alongside two series of digital images) varying the position of the lens' axis by 10° in each of the four

canonical directions. In the end, the project created for the occasion suggested that 15 photographs be taken in order to document the portion of the wall painting and 25 for the ceiling; the remaining 20 images of the 60 that were taken overall, were hand-held shots taken freely in the frescoed rooms, of which 8 were taken with a 58 mm lens and 12 with a zoom. The remaining two images were those taken to test the fixed camera station with the calibrated colour series.

5. Processing the data collected on site

The phase of processing the data collected in the field concluded with the drawing in CAD of the metric survey undertaken in the northern rooms on the first floor of Palazzo Petrucci. The drawing made it possible to go ahead with the planned photographic project with which we established the position of the photographic stations, their number and the number of photographs necessary to document the chosen areas of the paintings. Once the photographic campaign was completed the data processing continued with saving the images from the camera's memory firstly on the computer's hard disk and then as a backup copy on an external memory. Next, we developed the Nef reference images for balancing the white using ColorChecker Passport Photo2 software. This first operation generated the DNG (Digital Negative) of the colour profile corresponding with the photographic session with which we synchronized all the partial images of the paintings using the operational capacity of Adobe Lightroom software, thus obtaining a set of photographs with the correct colour reproduction. Following this we began creating the photomosaic ofthe frescoes using Adobe Photoshop.

For this process, we began by importing the graphisc resulting from the drawings of the metric survey, which we had previously exported from CAD in PDF format at a scale of 1:20, into the photographic processing software. In addition to presenting the geometric space of the domestic environment of the paintings to be reconstructed, the drawings imported in Photoshop were supplied with the diagrams of the project's photographic layout, which were indispensable in this phase in order adjust to scale and assemble the images.
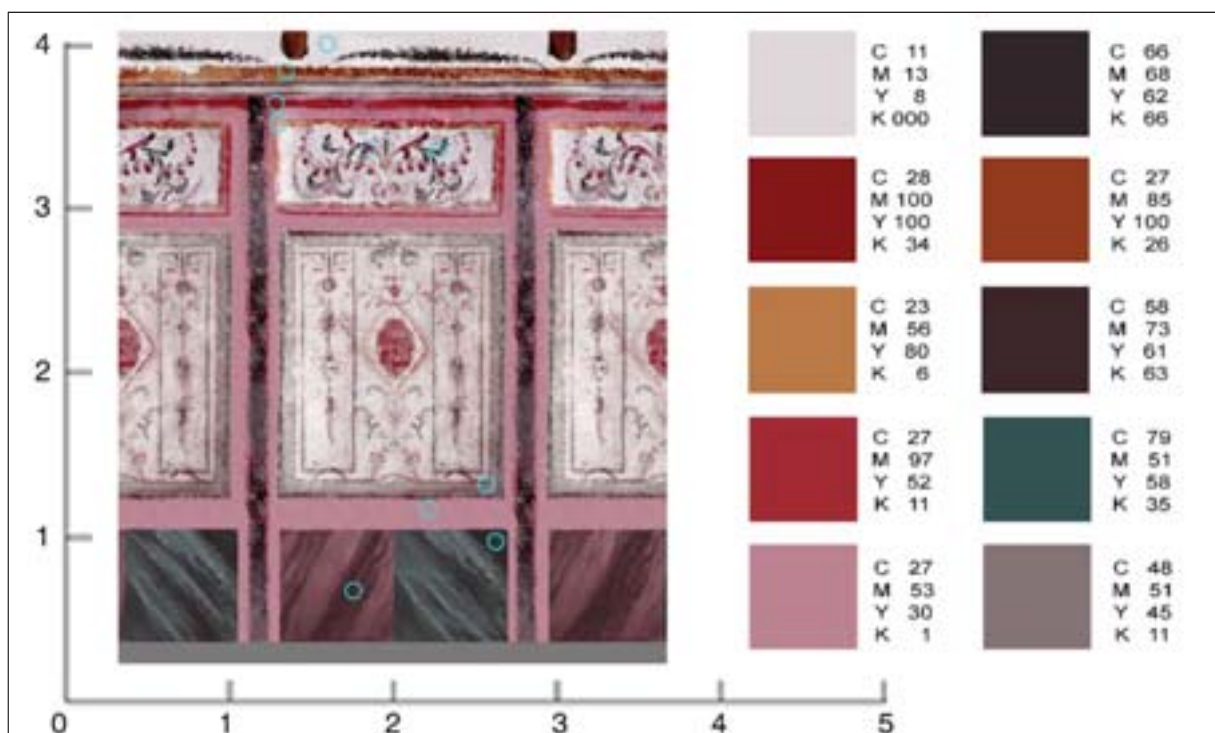
Fig. 7: Base module for the paintings with the main chromatic range, Palazzo Petrucci, Carinola (CE).

Fig. 8: Transverse section with wall paintings inserted in the inner loggia, Palazzo Petrucci, Carinola (CE).

In this last step we paid attention to identifying the homologous points present in consecutive images, for which the idea of overlapping the photographs as they were taken was a valid help, therefore we overlapped them with pixel precision using the command that effects the colour value of each single image (Fig. 7). This process produced optimal results particularly when looking at an overall vision of the scene in order to evaluate the visual effect at a relatively small scale (Fig. 8).

Once the photographic reconstruction of the painting's base module was on screen, the various photographs it comprised were joined in a single image and this was cloned several times, in order to produce a complete motif, as only a part of the module survived. Subsequently, letting ourselves be guided by the photographs documenting the loggia in the second half of last century, we reconstructedthe entire fresco (Fig. 9).

Fig. 9: Photographs of the courtyard before and after the insertion of the wall paintings, Palazzo Petrucci, Carinola (CE).

6.   Conclusion

As scholars of the historical-architectural memory we are aware that such research activity presents a number of critical issues due to the interpretative freedom that the state of the paintings in Palazzo Petrucci imposed upon us. However, we wished to find an alternative to the subconscious memory as a way of leaving to future generations witness of this part of Carinola's historical memory. This impulse to act that took shape from our perception of the painted fragments in the inner loggia as elements supporting the hypothesis attributing the creative exuberance of Catalan influence to the decoration of that space. In a sense, just as on the exterior of the building the refined stone decorative systems overlay a simple and logical static scheme so in the interiors the pictorial ornamentation ennobles an entirely essential and predictable plan articulation [7].

Today, with war again prominent in the news, the themes of awareness and the safeguarding of Cultural Heritage have become increasingly present in our lives, and in this worrying climate, in which logic seems to have been replaced by irrationality, the reconstruction of the

original scenography of the loggia in Palazzo Petrucci finds its space in the process aimed at consolidating the identifying value of the community of Carinola, as, with the necessary caution, from these digital images one can re-read a chapter of the medieval history of the territory of the 'Provincia di terra di Lavoro', which Man's negligence, like war, has damaged and destroyed leaving an incomprehensible void.
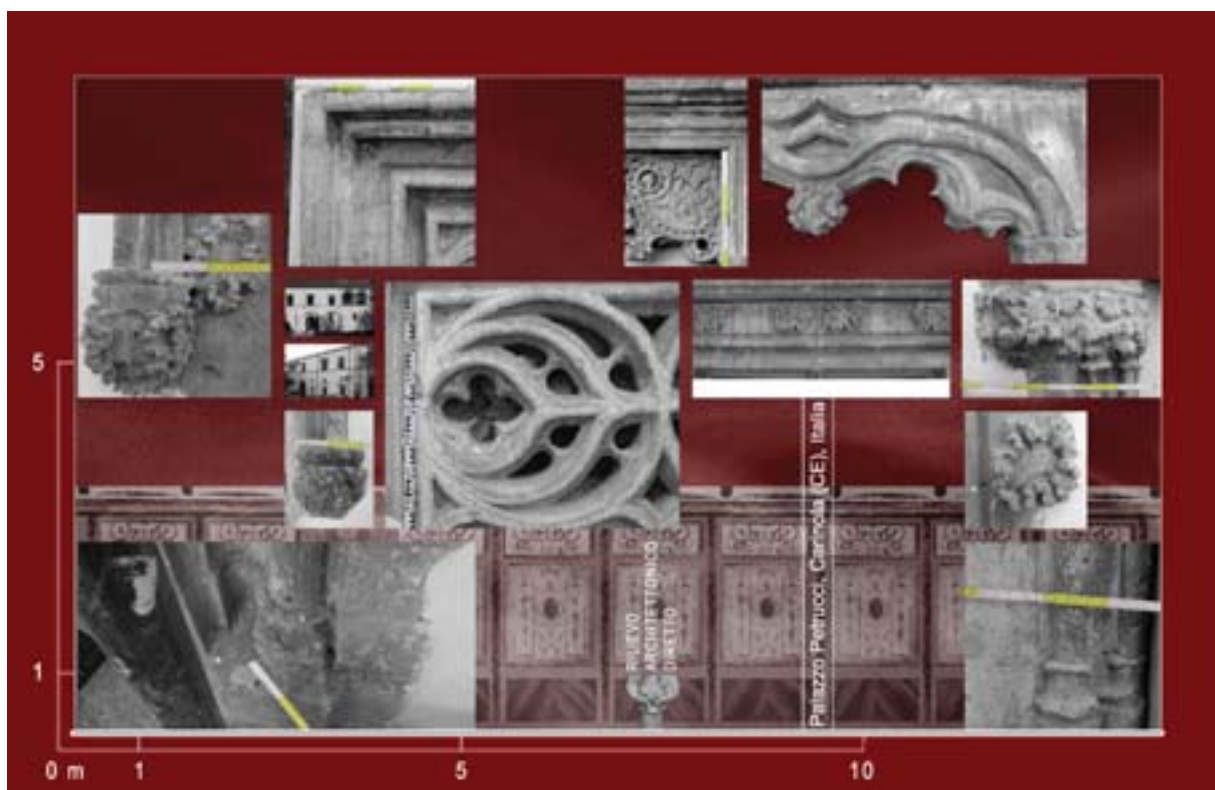
Fig. 10: Details of the stone cornices on the windows, Palazzo Petrucci, Carinola (CE).

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Combining Missions and enhancing Tourism Cultural Heritage between sperimentation and innovations

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Abstract

The pandemic emergencies and conflicts that are characterizing these last few years lead to a dislocation of physical space as well as a weakening of social inclusion. Planning today requires the implementation of an integrated public government strategy aimed at regeneration through the cultural valorization and social revitalization. An important occasion was the announcement by the Ministry of Tourism "Fund for small municipalities with a tourist vocation"(2023), for innovative interventions in field of accessibility, mobility, urban regeneration and environmental sustainability.

The PDTA Department of La Sapienza University of Rome oversaw the participation of numerous municipalities designing technical proposals for the municipalities of Capodimonte and Arlena di Castro (Vt), Cellere (Vt) and Ortezzano (Fm), for Anticoli Corrado (Rm) and Bevagna (Pg), aimed above all at enhancing local identity and prevent depopulation through the valorisation of the cultural and naturalistic environmental heritage and by focusing the projects on the identity aspects of the intangible cultural heritage, strengthening forms of sustainable mobility and promoting both the diffusion of shows and theatrical forms and the artisan activities linked to the primary sector. All projects combined both the missions of the university (first, second and third mission) and those of the PNRR based on digitalization and innovation, ecological transition and social inclusion.

Keywords: cultural heritage, social inclusion, accessibility, urbanism, academic missions.

1. The theme of small municipalities with a tourist vocation: from protection to development opportunities for internal areas

Each territory is unique and feeds on its past, lives on the relationships of the present, projects itself into the future through the actions and initiatives that the population who lives and works there knows and manages to express [1]. The pandemic, the environmental

emergencies and the conflicts that are characterizing these last years have led to an expansion of the physical dimension of the territory and a disconnection from the social and economic dimension; generalized conditions of marginality and social inequality have consolidated which no longer reflect only the very concept of "periphery", understood as physical distance and in contrast to the central areas [2], but a condition of urban otherness which sees in a changed approach to urban planning, landscape and environment, a geography, the definition of a new "urban question" [3]. If on the one hand the large urban conurbations still express an offer of competitive services and infrastructures, they are contrasted with an archipelago of small settlements with a strong identity, the villages, held back by a loss of population, functions and constant but they often manage to re-propose forms of innovative industriousness in which cultural languages, history, traditions and landscapes themselves become a measure of social relationships and the quality of life.

In Italy the Internal Areas constitute approximately three fifths of the entire national territory and are characterized by great natural, landscape and cultural riches. The smaller towns are suffering progressive abandonment and an increase in the average age of their inhabitants with negative consequences for the protection and protection of these territories. Small municipalities, or villages, are territorial administrative entities whose population does not exceed 5,000 inhabitants according to a consolidated definition subsequently also adopted by the ANCI (National Association of Italian Municipalities).

The regeneration of villages [4] is today at the center of an increasingly lively debate, also stimulated by the interest of local populations, by increasingly significant tourist flows and by the investment prospects opened up by the PNRR. In recent years, the concept of valorization of the historical heritage of the villages has been joined by that of innovation, employment development and inclusion in use, in other words of territorial regeneration.

Fig. 1 Scenography of Medieval life

As part of the PNRR interventions, the "National Village Plan" was introduced in 2021, a program to support the economic/social development of disadvantaged areas based on the cultural regeneration of small towns and on the relaunch of tourism, through the financing of integrated protection projects of the territory, enhancing its attractiveness and adapting to climate change. An important opportunity for the continuation of the National Village Plan was the announcement by the Ministry of Tourism called "Fund for small municipalities with a tourist vocation", released in July 2023 and intended for municipalities below the threshold of

five thousand inhabitants, aimed at encouraging innovative interventions in the field of accessibility, mobility, urban regeneration and environmental sustainability.

The call is aimed in particular at the creation and promotion of new itineraries (e.g. thematic itineraries, historical routes), at the recovery of the historical heritage, at the redevelopment of open public spaces (e.g. eliminating architectural barriers, improving street furniture), to the creation of small cultural services also for tourist purposes, also financing cultural, creative, tourist, commercial, agri-food and artisanal activities, aimed at relaunching local economies by enhancing the products, knowledge and techniques of the territory.

1. Projects to enhance the municipal cultural heritage

The Department of Planning, Design and Architectural Technology of La Sapienza University of Rome oversaw the participation of numerous municipalities in the tender in collaboration with local associations. The projects involved small municipalities in three regions: Lazio, Umbria and Marche and for some of them large-scale projects were prepared which involved municipalities in different regions, located several kilometers apart, but united by historical identity elements and urban development which have allowed us to develop common design strategies. There were 7 projects presented as main designers: Capodimonte with Arlena di Castro (Vt), Cellere (Vt) with Ortezzano (Fm), Anticoli Corrado (Rm) with Rocca Santo Stefano (Rm), Bomarzo (Vt), Corchiano (Vt), Bevagna (Pg) with Montecastello di Vibio (Pg), Vallerano (Vt).

Fig. 2 Reinassance Troops in Palazzo Orsini in Bomarzo

All projects, in line with the Call, aimed to enhance the cultural and naturalistic environmental heritage present in the various territories, focusing the projects on the identity aspects also of the intangible cultural heritage, strengthening forms of sustainable mobility and promoting both the diffusion of events, shows and theatrical forms and craft activities linked to the primary sector.

Fig. 3 Logo of Capodimonte's project

In Capodimonte and Arlena the project mainly focus on the accessibility of the lake system; in Cellere and Ortezzano the historical resources and the illustrious history of local characters are strengthened; in Anticoli Corrado the iconic image of the "Sentiero delle Modelle" is perfected; in Bevagna the "Mercato delle Gaite" is enhanced and strengthened, a faithful representation of a glimpse of medieval life. In all municipalities the wayfinding

system is redesigned, digital accessibility is completely redesigned both from the outside, via the new web portal, and from within through the provision of augmented reality and holograms to support the accessibility of places of culture. In all the projects there is also a large representation of the Third Sector which demonstrates both the desire to create synergistic cooperation to obtain lasting results and multi-year best practices and the desire to create those forms of inclusive democracy that allow the optimal definition of all design choices and is evidence of a path of universal accessibility that could be so strong as to become a strategic model of good integrated and inclusive design.

Fig. 4 Capodimonte's Waterfront

All projects combined both the missions of the university (first, second and third) and those of the PNRR based on digitalisation and innovation, ecological transition and social inclusion.

2. Urban Design Strategies

The priority aim of all the programs was urban regeneration and valorisation through a system of innovative interventions linked to the accessibility to the use of public spaces, the promotion of local traditions, the production and dissemination of events and demonstrations. Addressing the issue of these "minor territories" requires the implementation of a unitary and integrated public government strategy aimed at the regeneration and cultural and economic valorization of the territory's identity.

The idea for the valorization of historic villages is the proposal of a strategic plan, which does not result in an increase in tourist flows but which uses tourism as a driving force for a recovery both internal and external to the villages; the challenge consists in transforming the historic villages into laboratories to deal with tourist valorization processes which do not only attract resources for specific operations, but which trigger an overall regeneration project which, starting from tourism, reverberates on the surrounding territories by developing the idea of economic, social and cultural sustainability of the internal areas. The aim is to amplify the effects produced by "internal" tourism in individual municipalities towards the valorization and use of cultural heritage, producing "external" beneficial effects, in favor of the territory as

a whole [5]. The programs of proposed interventions, while articulating the interpretation of the peculiarities of individual territories, a model in which innovative and non-invasive infrastructures and technologies configure networks to support immersive and pervasive interaction of the traveler with places, objects and other travelers involved in activities related to local tourism, adopting and following the criteria of Universal Accessible Design, taking into account a wide range of users and considering people with disabilities as an active integral part of society.

Fig. 5 Reproduction of Reinassance life scenes

3. Brief description of some projects

3.1 Bevagna and Montecastello di Vibio: the measurement of space and time for the valorization of ancient traditions

The two centers of medieval origin which profoundly marked their development and traditions are places in which physical and figurative "measure" dictates the rules of common living and determines the conditions of their future development: both centers have built over time activities and initiatives on these same traditions. In Bevagna the Gaite Market, one of the most evocative events of reconstruction of the medieval market, recognized by the Umbria Region as a "Historical Re-enactment of regional interest" and by the Ministry of Culture as an "Event of national interest"; in Montecastello di Vibio the small Teatro della Concordia which with its 99 seats is the smallest in the world and, in an admirably reduced and harmonious proportion, proposes all the elements of the Italian-style Goldoni Theater [6]. The valorization project starts from the great work already done in the two centers and proposes itineraries, activities and experiences that combine local traditions with a narrative of the peculiar stylistic features of the places, with a view to environmental sustainability, attention to the territory, promotion of the imagination and emotional involvement of users.

Fig. 6 Capodimonte's Harbour

3.2 Capodimonte and Arlena di Castro: for a lakeside, tourist and inclusive area

The main aims are the valorisation, strengthening and deseasonalisation of the tourist offer and the expansion of the tourist offer for the benefit of people with disabilities who, if this project were financed, would benefit from the creation in Capodimonte of a tourist port and of a new slide for bathing in the waters of the lake, as well as numerous swimming and sailing courses in agreement with the Italian Federation of Sail (FIV) and managed between the Capodimonte and Arlena di Castro offices.

For disabled people it would be a very important result because currently there is no possibility of navigating the lake in a canoe or sailing boat within a radius of many kilometers while the implementation of this project would start, in collaboration with the Italian Sailing Federation, a route that would allow disabled people to participate in nautical schools or carry out naval excursions on the lake.

Fig. 7 Mergonara, ancient Farnese's harbour

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The Rendano theater in Cosenza (Calabria). Notes on post-war restoration

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Abstract

This article aims to analyse, through a historical-critical reading, the city of Cosenza hit by the Anglo-Americans during World War II, and particularly the Alfonso Rendano theater bombed in August 1943. Through the reading of archival documents and a photographic repertoire, it is possible to analyse the state of ruin after the bombings and to highlight the project criteria and intervention methods used for the restoration of one of the city's architectural and cultural symbols.

Keywords: Second world war, destruction-reconstruction, theater in Cosenza

1. The bombings in Cosenza

The essay focuses on the damage suffered by the city of Cosenza during World War II and the reconstruction efforts of one of the identity symbols of local culture, the Alfonso Rendano Municipal Theater.

Towards the end of the war, the city was badly hit by several bombings that lasted from April to August 1943. Particularly, the damage affected the arteries of communication. The railroad was disrupted as were many of the bridges that connected the banks of the Crati and Busento rivers. Ecclesiastical symbols of the historic core, such as San Domenico, San Gaetano, San Francesco D'Assisi and the Cosenza Cathedral, were partially or totally destroyed. Also affected were public buildings, such as the Regie Poste, the Royal Carabinieri barrack, and numerous private homes. Entire portions of the historic building fabric were reduced to rubble. Although Cosenza was among the cities included in the II list of municipalities to set up a reconstruction plan, reconstruction action was very slow. The measure issued by the Ministry of Public Works in the present case also coincided with a new expansion of the city. A series of urban plans determined the construction of new neighborhoods in the northern direction and the process of abandonment and decentralization of the historic core perched on a hill and bordered by two rivers [1]. However, the buildings symbol of city's culture and identity placed in the old city were not abandoned. These included the twentieth-century municipal theater, which was half-destroyed by a bomb that was intended for the nearby Norman-Swabian castle, headquarter of the anti-aircraft.

1.2 The Rendano Theater

Theater history in the city of Cosenza has very ancient origins. Initially, performance venues were established in noble buildings, or in structures adjacent to them and owned by private citizens. The largest number of theaters arose within the historic core of the city between the nineteenth and twentieth centuries. Between 1819 and 1826, one of the most prominent theaters of the time was established within the suppressed Jesuit church. It stayed in business until the mid-1800s, when the clergymen returned to the city and repossessed their Collegio and all its property [2].
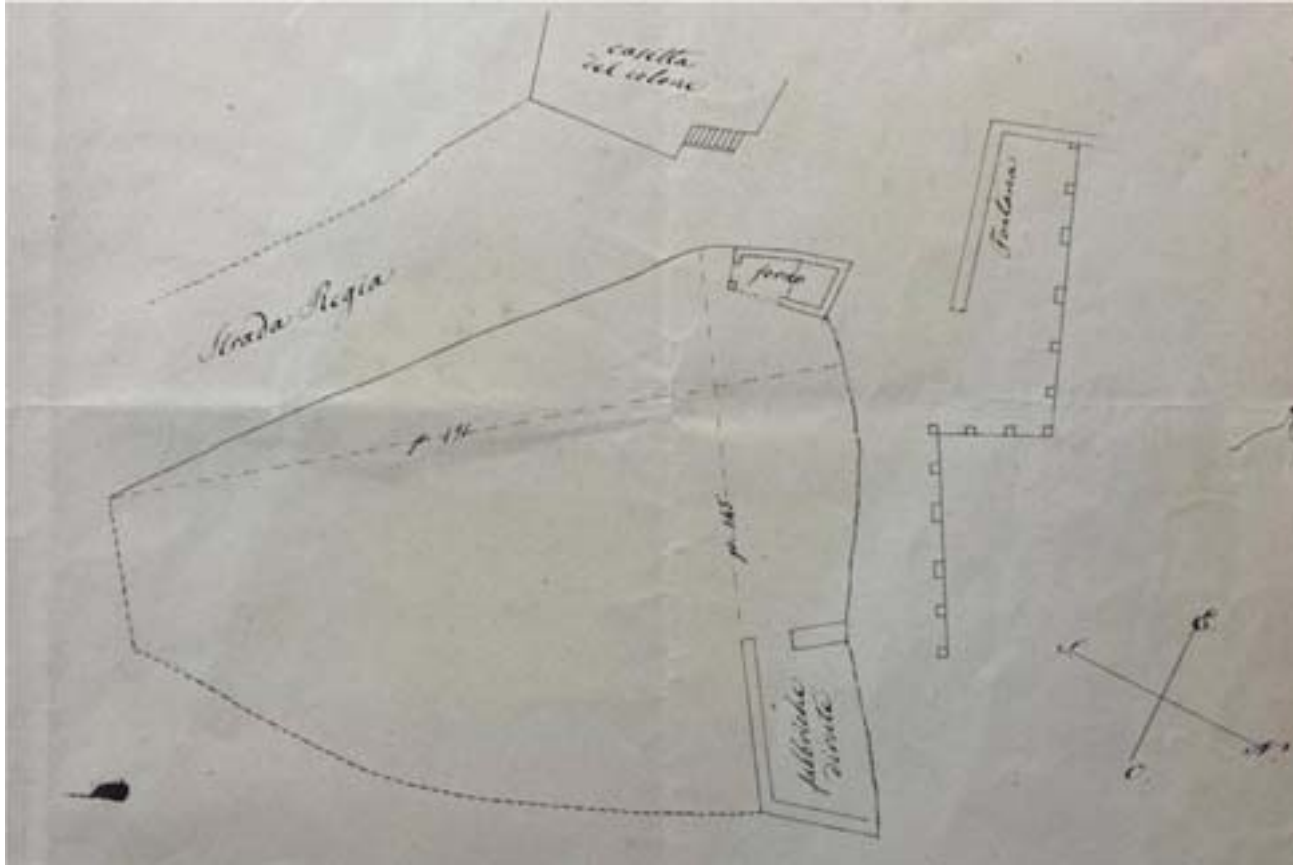
Fig. 1: Plan of the Fondo Paradiso (A.S.Cs)

Between the middle and the end of the century, two other, temporary, unwelcoming structures made of wood followed one another, both located nearby the Collegio del Gesù. The temporariness of these structures, demolished a few years after their construction, was also linked to the already emerging need to establish a municipal theater that could meet the city's cultural demands. Indeed, as early as 1853 the municipal institution asked the Royal Secretariat of Naples for permission to grant funding for the new construction [3]. The choice of the site was quite lengthy because the conformation of the historic city did not present many free and level areas, and because the chosen site should have been representative, safe, and easy to use [4]. The place historically called largo Paradiso was chosen, corresponding already at the time to the square where the Intendancy was located. The estate, which was privately owned, was expropriated for 21602 square palms, the plants and small buildings present were cut down, and the ancient Paradiso fountain was moved from its original location.

On the same site was later built the Vetere Hotel, a landmark for dancers and thespians who performed in the nearby performing arts structure. The same was a shelter for displaced families during the war but was later demolished in the second half of the 1900s.

A series of plans followed for the new theater (Eng. Del Vecchio, Eng. Sicoli, Arch. Zumpano), initially planned to be named after Ferdinand II, as a token of the devotion and gratitude of all the inhabitants. Its architectural structure was based on the most modern and beautiful neoclassical buildings in the south. The facade was marked in the lower part by a covered portico lined entirely with smooth ashlars; the upper level denounced the presence of the concert hall with three openings interspersed with pilasters. The statement closed with a large framework with decorated balustrade. The hall was horseshoe-shaped, with three tiers of boxes and a gallery. The new theater was designed in every detail, with careful

construction criteria, endowed with the most modern equipment and facilities. Inside, it was finely decorated with stucco and pure gold designed by the artist from Cosenza Enrico Salfi. In particular, the ceiling was decorated with five allegories representing the various theatrical arts. No expense was spared and at the end of construction it was counted among the most beautiful and important in southern Italy [5].

Fig. 2: View of the Rendano Theatre and the Vetere Hotel (Postcard from the collection by F. Gentile)

It was inaugurated in 1909, but during the First World War it was used only for showing was films. In the same years the premises were converted into barracks and were heavily damaged [6]. It was after the restoration that the municipal was finally named after the musician Alfonso Rendano.

The theater's turbulent and fluctuating history was marked by the Second World War. In August 1943, the building was affected by numerous bombs that erupted in proximity and damaged the exterior walls, plaster, decorations, and almost all exterior fixtures. Until, a bomb, intended for the nearby Norman-Swabian castle, damaged it irreparably. The device penetrated the theater and exploded in the stall, blowing up the floor with chairs and seats. The supporting structures of the various rows of boxes and galleries with attached services collapsed, causing almost the disruption of the entire structure.

Fig. 3: Inside the bomb damage theatre (A.S.Cs)

Fig. 4: View of the theatre after the bombing (A.S.Cs)

Fig. 5: Theatre damaged by bomb (A.S.Cs)

The effect of the blast also extended to the stage and proscenium, ruining the floor, stage anchor planes, sound boxes, stage area and all other equipment. The roof also collapsed almost completely, resting on the perimeter wall of the central ring, and resulting in the landslide of the side corridor vaults [7].

The bombing caused severe damage to the supporting structure. Subsequently, the few rooms that remained intact were occupied by military troops, which resulted in the total unavailability of the theater. The need for reconstruction was immediately felt by the citizenry. In December 1946 it was decided to hold a national architectural competition for the renovation. But it was not until 1953 that the administration drawn up a basic plan forwarded to the ministry. The idea was executed by Neapolitan architect Enzo Gentile, a specialist in the restoration of valuable properties [8]. Attached to the original papers and drawings, now kept at the State Archive, there is a copious photographic series attesting the state of ruin caused by the bombing and the development of the restoration of the property [9].

The start of the work took place in 1959 with the contract of the first phase but was supplemented several times to intervene on the precarious stability conditions of the structure. In the first phase of work, the intention was to demolish the damaged parts and reconstruct the boxes, corridors, and roof trusses in reinforced concrete. Compared to the original conformation, the project did not include many changes. The wooden and clay tile roof was planned to be terraced with a slight slope, the supporting structures integrated with reinforced concrete elements, two extruded lateral wings containing the gallery stairs were eliminated and integrated into the overall perimeter. The main access staircase remained placed in the atrium while other connective elements for the boxes were tangent to the stage. Each row of boxes contained nineteen, except for the first, which had three fewer. In the center of the second tier was the royal box. The hall had a maximum length of 18 m and a width of 20 m, with an overall height of 16 m. There was a difference in height of 2.75 m between the stalls and the first-floor boxes. The proscenium area was being enlarged [10].

Fig. 6: Theatre reconstruction project plan (A.S.Cs)

Fig. 7: Details of interior decorations (A.S.Cs)

Rounding out the rooms available to the structure was the square-plan foyer, located at the windows of the statement, above the entrance hall and accessible from the third tier of boxes. Decorations followed in the footsteps of the old theater, but individual parts were replaced with prefabricated elements. Particular attention was paid to stuccoes, paintings, velvets, and upholstery. The entrance hall provided protruding pilasters with Ionic capital and decorated upper panel, painted with opaque glaze paint, oil patinated with gilding of the capital, upper panel, and base. All doors were framed with stucco frames. Inside the hall, numerous foliage decorations were placed at the full parapets of the different levels. In addition, about 60 plaster putties, 40-45 cm high, painted in opaque glaze with golden wings and patinated, surrounded the end of the pilasters with capitals of the gallery [11]. The complexity of the work and the need to raise substantial funds led to numerous delays in execution. It was not until 1966 that work was completed and the new theater was finally inaugurated in the following year.

2. Conclusions

In the postwar period, the city of Cosenza demonstrated all its fragilities. Added to the bomb damage were the problems of poverty and difficult sanitary conditions. Although reconstruction was slow, the city felt the need to reconfigure, restore and safeguard its building fabric and architectural heritage. The enhancement of cultural identity symbols such as the theater assumed in this sense an important significance for the associated life of a community. The void created by the war was an identity and anthropological void. The reappropriation of places was as much a physical act as a symbolic one. "*The entertainments of a people are its education and at the same time its portrait*" [12]. This was the wording in the construction report of the municipal theater in Cosenza, testifying that the reconstruction of a place for entertainment became a symbol of the rebirth of a community.

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Preserving a disused tobacco factory

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Abstract
The sites of disused industries offer an opportunity for territorial redevelopment as they are endowed with relevant architectural features to return spaces of aggregation to the community. The study of disused industrial buildings addresses multidisciplinary issues that embrace different aspects: technological, social, aesthetic and historical.
The proposed text, the result of academic research work, investigates the theme of decommissioning in relation to the project for the conservation and re-functionalisation of the former Tabacchificio Salvati, located in Eboli, in the province of Salerno.
A conscious methodological approach is adopted, through adaptive reuse and proactive protection, respecting the building's history and architectural qualities while transforming it into a functional place for current and future needs, outlining three main design strategies.
After a careful analysis of the Sele Plain territory and its peculiarities, the design decisions focus on different and new functions affecting both material and immaterial actions. These actions are aimed at improving economic, social, cultural and scientific aspects. Optimising brownfield sites is a key objective in urban regeneration.
The sustainable approach to the restoration of these areas can lead to a better management of resources and the environment, reducing the negative impact on the surrounding nature and creating more eco-friendly spaces.
The valorisation of abandoned places emerges as a key theme in urban regeneration, and in building a resilient and sustainable society.

Keywords: Conservation, Valorisation, Industrial heritage

1. Intoduction

The sites of disused industries, often connoted as a "toxic legacy", offer an opportunity for territorial redevelopment as they are endowed, in several cases, with relevant architectural features that would allow spaces to be returned to the community of potential interest.
The study of disused industrial artefacts addresses multidisciplinary issues that embrace different aspects: technological, social, economic, aesthetic and historical.
The text investigates the theme of decommissioning and deals with the proposed conservation through the re-functioning project of the former "Salvati" tobacco factory.
This structure was built in the 1940s, in the midst of the fascist era, and its history is intertwined with the human, social and economic history of an area - the Piana del Sele - that is one of the most dynamic and flourishing areas in the entire south of Italy.
To make it clearer, the remains of the tobacco factory are located a few hundred metres from the Real Casina di Caccia of Persano, built in 1752 by Carlo di Borbone, King of Naples, and near the archaeological site of Paestum.
Tobacco cultivation was introduced to the Plain after 1920 by the Società Agricola Industriale Salernitana and the Società anonima stabilimenti riuniti tabacchi americani, which set up 12
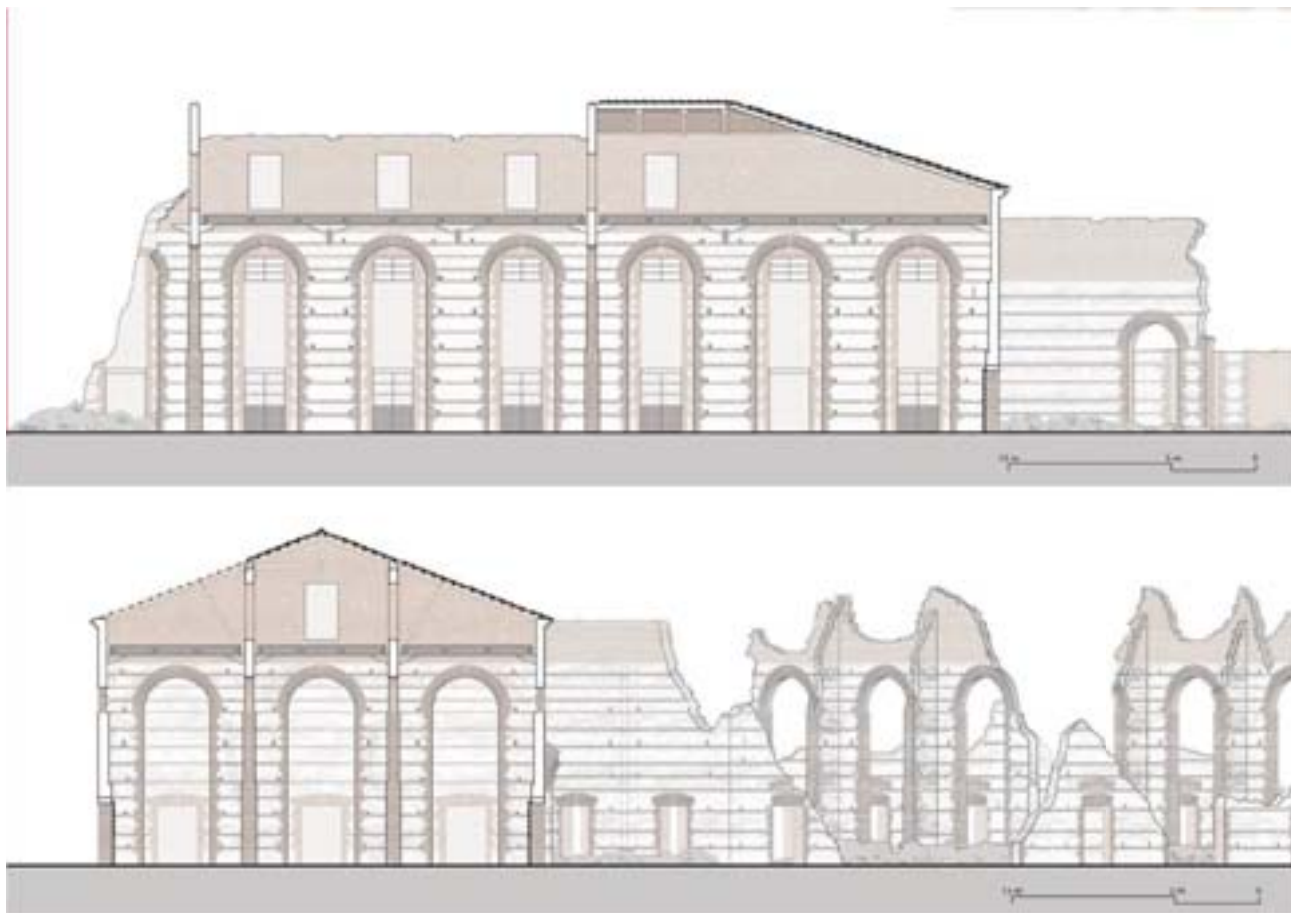
Fig. 1: Architectural survey sections_1

tobacco factories located between Pontecagnano and Paestum. From the union of the two companies, SAIM (Società Agricola Industriale Meridionale) was born in 1935, directed by Carmine De Martino, a future exponent of the Democrazia Cristiana.

During the Second World War, like other buildings, it suffered considerable damage from bombing.

From 1960 onwards, the company's fortunes worsened with the appearance of the peronospora tabacina, the so-called blue mould of tobacco, an infection that took on an extremely epidemic character, leading to a veritable collapse of tobacco growing [1].

To date, the state of conservation of the surviving tobacco factories varies - most are in a state of abandonment -, those in the best condition are the Centola tobacco factory in Pontecagnano, for which a restoration project was presented and implemented a few years ago by the Neapolitan architectural firm Corvino+Multari, and the one in Capaccio-Paestum in the Cafasso area, which currently serves as an attractive centre for exhibitions and various events.

2.   History and characteristics of the factory

In its active phase, the building is described as a theatre enclosed by side walls delineated by the rooms used for drying, creating an architectural structure that is fascinating and unique. With its tall buildings all made of masonry, pillars and internal arches, the building has construction features that distinguish it from other tobacco factories in the area [2].

In September 1943, a violent clash between the Anglo-American invasion troops and the German occupation troops took place near the tobacco factory, an outcome that was to have a positive impact on the Italian campaign and is thought to have been one of the most important battles of the entire "Operazione Avalanche" [3].

The tobacco factory had a large circular central courtyard that made it unique compared to other tobacco factories in the area.
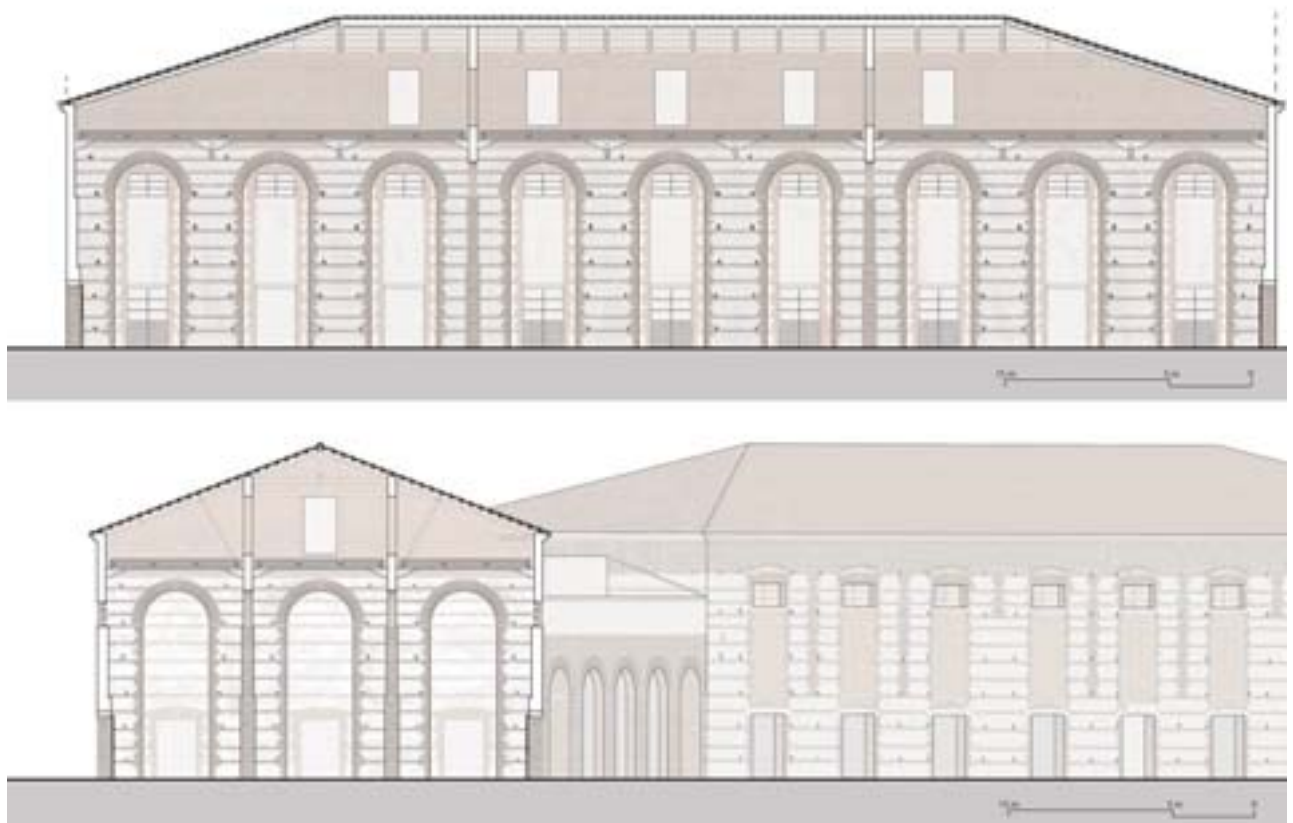
Fig. 2: Architectural survey sections_2

It consisted of modules of two different heights, arranged in an alternating polygonal sequence. The main volumes have a base dimension of 55 x 20 metres and a maximum height of 15 metres, while the smaller, trapezoidal, connecting modules have a short side of 20 metres and a long side of 35 metres with a maximum height of 11 metres.

Today, after its final closure and subsequent abandonment, the complex presents itself with some collapsed portions, while other parts are characterised by superfetations added by the new owners since the 1970s.

Fortunately, much of the complex can be salvaged and the characteristics of this important architectural work should be preserved.

The architectural survey clearly shows how the various parts can be read. (Fig. 1)

The perimeter walls are characterised, in the case of the rectangular modules, by a load-bearing masonry of local stone mixed with brick battens with a wall thickness varying from 60 to 40 centimetres, while in the case of the trapezoidal connecting modules, the load-bearing Salernitana and the Società anonima stabilimenti riuniti tabacchi americani, which set up 12 masonry is predominantly solid brick with a unit thickness of 60 centimetres. Brick is chosen for its thermal-acoustic, breathability and fire resistance capabilities.

The main rectangular modules are marked in the longitudinal part by nine arches with a height of 8.50 metres at the impost and a width of 3 metres, while the transverse part is punctuated by three arches of the same dimensions. Above the arches, at a height of approximately 9.5 metres, there are corbels, which emerge from the masonry, to support the wooden deck. (Fig.2)

The evolutionary analysis carried out shows the difference between the original and the present layout. The original had two mirror-image buildings, parallel to the street front, flanked at the extreme corners by two semi-circular towers. In the huge central courtyard there were metal stands on which the tobacco leaves were dried.
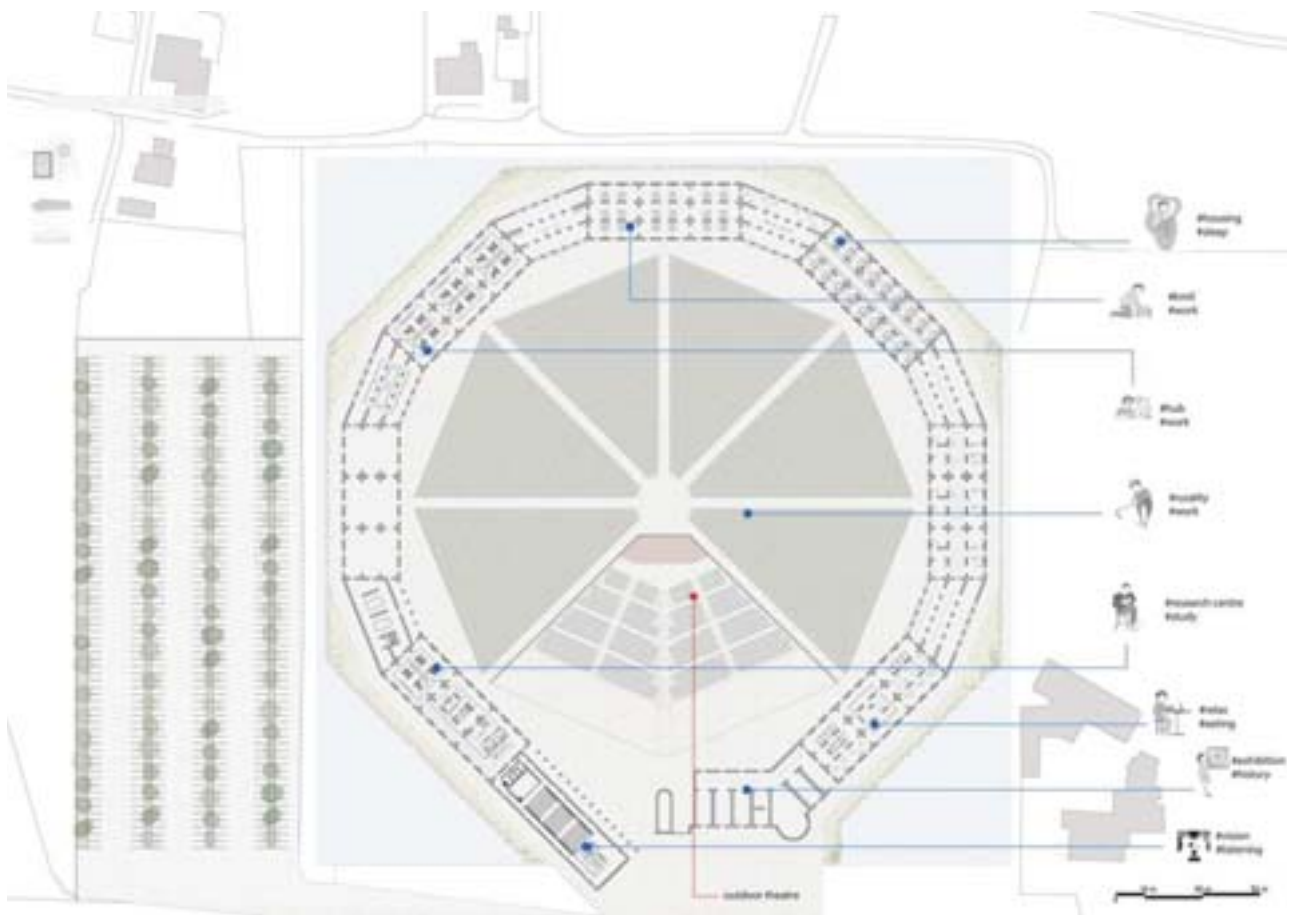
Fig. 3: Project plan_Ground floor

3. Design intervention proposals

After a careful and detailed analysis of the territorial context and an in-depth investigation of the various aspects such as architectural, social and economic ones related to the building in question, the project proposes a comprehensive intervention that aims to address the multiple issues that emerged during the research phase. The main objective is to adopt a holistic approach, combining adaptive reuse and proactive protection, in order to preserve the historical memory of the building and at the same time provide new development opportunities for the surrounding area.

This integrated approach not only enhances the intrinsic characteristics of the building and its surroundings, but also offers an opportunity for the functional renaissance of these structures. Through adaptive reuse strategies, an attempt is made to recover the original qualities of the building and adapt them to modern and sustainable needs. At the same time, proactive protection aims to safeguard the historical and architectural integrity of the building, preventing degradation and ensuring its preservation for future generations.

The general design plan shows that the outdoor spaces are designed to accommodate different functions, including areas for vegetable gardens, a theatre, zones, the ruin left as a theme park and various connecting paths. While, the interior spaces house an auditorium, the research and experimentation centre for products from the Plain, the Hub for monitoring, control and management of the agri-food sector, a covered market for the sale of local products, tourist accommodation, an eco-museum and refreshment points. (Fig.3)

Three main design strategies were outlined according to the state of degradation of the artefacts. These range from the preservation of the ruins, given the limited possibility of reuse, to the reconstruction with an almost paraphrasing tone of the collapsed parts of the building and through the re-functionalisation with reinforcing interventions of all structures.

The restoration work aims at recognisability, maintaining the characteristics of the original layout while respecting the pre-existence [4].
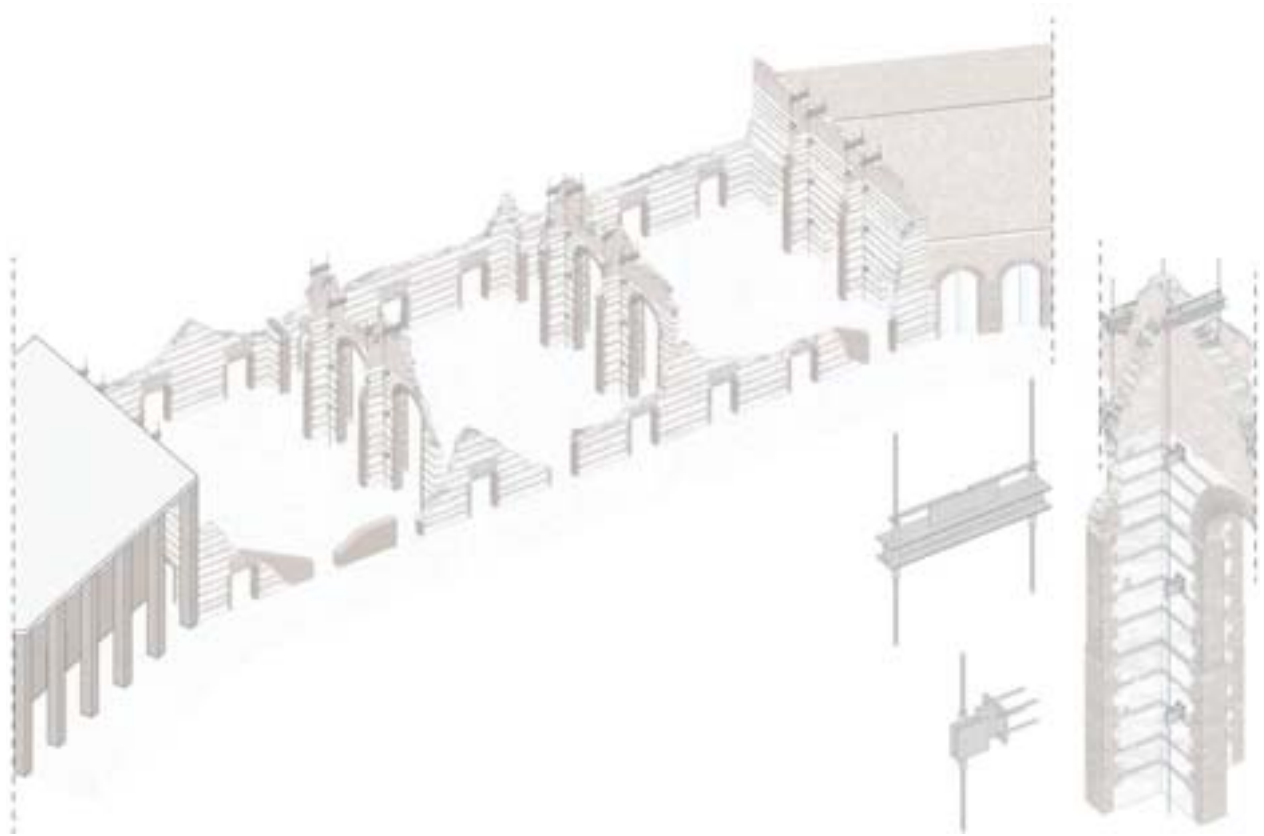
Fig. 4: Architectural and structural consolidation work on the ruin

In the project, the ruin that will house the theme park is restored on the surface with stuccoing and stylising. It is also planned to rebuild the wall ridges with traditional mortar, pave with Idro Drain materials and consolidate the walls with a stay system. (Fig.4)

The following new interventions are applied to the other buildings (Fig.5):

      - Static reinforcement of the masonry;
      - Insertion of 40x60 cm reinforced concrete portals (2 for each bay);
      - Cleaning of all masonry with water spray;
      - Grouting of joints;
      - Demolition of the infills obstructing the windows and replacement with 550x200 cm frames.

The idea is to regenerate this place with actions that are both material and immaterial, i.e. those that can induce an economic and social strengthening of this area, in the vision that the city will give small towns a substantial role, given the fragility that large cities demonstrate.

4. Outcomes and conclusions

The chosen methodological proposal aims to emphasise conservation while taking into account the specific characteristics of the heritage to be restored and its context. In general, a careful and conscious approach is adopted, taking into account the history of the building and its architectural qualities, but at the same time transforming it into a functional and accessible place for today's and future needs.

The project respects the characteristics of a predominantly agricultural area and therefore certain functions are related to this. But there is no lack of cultural functions, or those related to scientific-experimental research, or accommodation, refreshments and recreational activities.
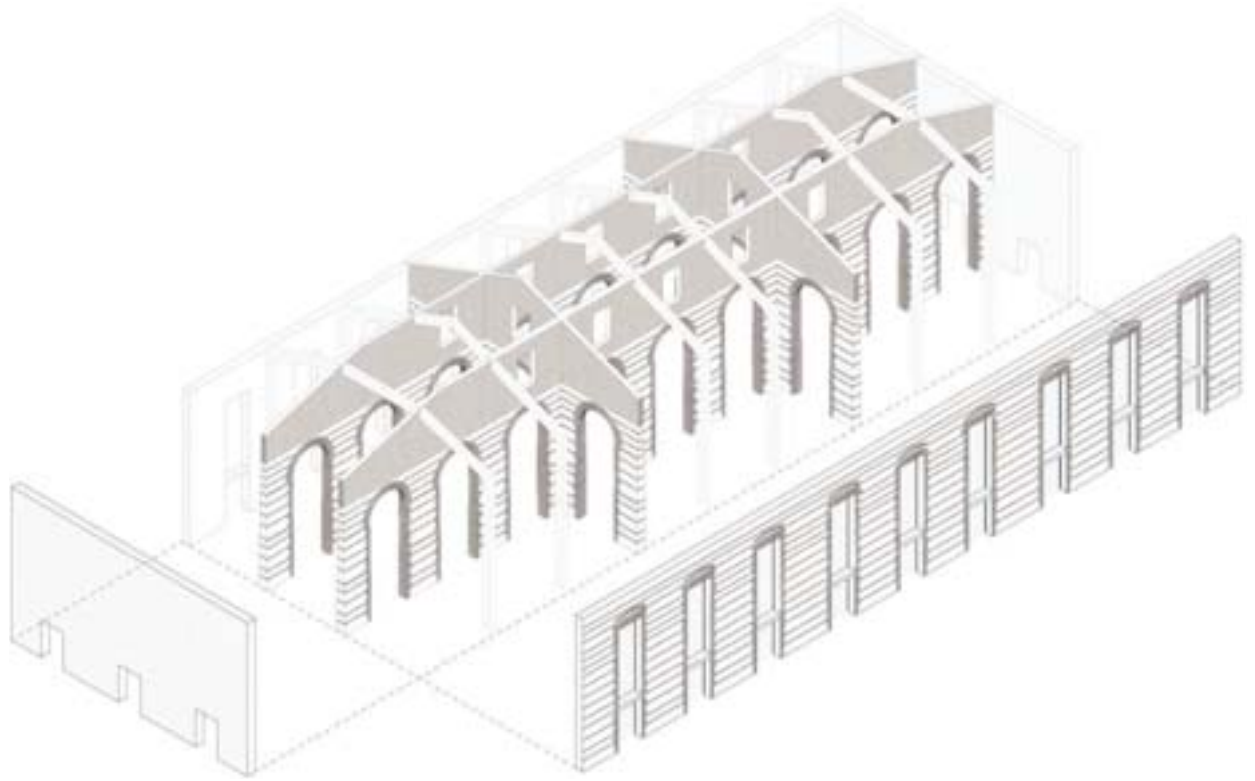
Fig. 5: Architectural and structural consolidation work

Fig. 6: Rendered project views

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A REHABILITATION PROJECT FOR PEACE EDUCATION. THE RECOVERY OF THE WAR WOUNDED HOUSE OF CATANIA

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Abstract

At the 1937 International Exhibition in Paris, Le Corbusier stated that the world should not produce war but architecture, in short, create and not destroy. The Second World War was a huge tragedy; in Italy, it produced spaces with popular and propaganda purposes whose language defined buildings that distinguish our cities. Today, at a time characterized by wars even quite close, these buildings are a reminder of emotions and events not easy to manage. In the historic center of Catania, overlooking one of the most important squares of the city, in a state of neglect, there is the House of the Mutilated, a building erected as a temple of sacrifice and a place of memory, as a container of services for assistance to former invalid fighters.

The research aims to study the rehabilitation of buildings constructed for specific educational-social purposes, in the period of the Second World War, to make them a social incubator of peace, culture andinnovation.

If the future is an eternal present, the past can direct the present not to make the same mistakes, but to use it as a lesson in life. The research, in summary, intends to propose a reinterpretation, in terms of design and technology, of the physical and social history of the building with the help of innovative communication strategies. In this sense, the theme of rehabilitation is declined starting from buildings that represented the values of an era of war and it can be the best allies for education to an era of peace.

Keywords: Reuse, Peace, Communication, War, Education.

Fig. 1: Some Houses of War Wounded in Sicily.

1. Introduction

In architecture, war assumes both the concept of construction and destruction: construction interprets the city as an expression of civilization and evolution; destruction is certainly understood as a clear and cathartic separation between analysis/knowledge, design and construction, and contemporaneity, decertified and transformed by destruction. War is not just a before and an after. There is a period of gestation, the imposition of ideas and rules necessary to understand the phenomenon in an integrated sense. This concept was already strong in the masters of contemporary architecture, in fact at the 1937 Universal Exhibition in Paris Le Corbusier stated that the world should not produce war but architecture, in short, create and not destroy. Unfortunately, socio-political conditions cannot always be directed towards construction; sometimes wars begin and inexorably produce destruction of human lives, buildings, cities.

From a pedagogical point of view, the experience of recent years has confirmed that the development and strengthening of planning and participation are the best tools for educating for peace and democracy. It is necessary to envisage and build a process of networking between family, territory, school, university and Third Sector to co-build new models of communities based on inclusion and peace [1]. Knowledge and new technologies are the tools available. To these are added dialogue and education, as also affirmed by Pope Francis at the LV Day of Peace, in 2022 [2]. In particular, the pontiff, with great foresight identifies education as a factor of freedom, responsibility and development.

Well-established social studies say that locating our knowledge in the real context in which the problem arises is the best way to learn, understand and give life to that fundamental but mysterious mutual exchange that we call education [3].

Another fundamental aspect of the process of strengthening the ideals of peace concerns communication: Being means communicating. Being means being for the other and through the other, for oneself. Man does not possess a sovereign internal territory. He is integrally always on a frontier: looking inside himself, looking into the eyes of others or through the eyes of others» [4].

Education, communication and formation thus becomes the fundamental construct on which to base relations for peace. Some scholars have suggested to draw up an "alphabet of peace" that becomes a common language for all peoples [1] starting from the dissemination and knowledge of our past.

2. Considerations on buildings for the war in Italy

Italy hasn't been affected by a war in over 70 years, fortunately. The heritage of buildings designed for war refers to those of the so-called Twenties. Today we can say, quite quietly, that the Italian architecture of that period did not suffer from the transition from democracy to fascism and today we do not notice important discontinuities between before and after 25 July 1943. The merit is of great and far-sighted architects, such as Luigi Piccinato, Virgilio Testa, Cesare Valle and others, who played an important public role [5]. In particular, the relationship between war and architecture, born around the Second World War, is expressed in the creation of buildings for popular purposes and propaganda that were built to celebrate both the greatness of power and the heroes of the homeland. The reasons for these projects were the dissemination of fascist thought and the creation of cities strongly characterized by representative buildings, such as the cities of the Roman Empire.

Today, the monuments built in Italy just before World War II have lost the clear appeal to the Regime thanks to the elimination of busts and statues that were destroyed when the regime fell.

These buildings, today, can be considered architectures, conscious presence of the past, in the perspective of the future. Conscious because memory is and must be a critical act» [6].

Ignazio Gardella still highlights the close relationship between the two dimensions of time not present (the past and the future) and states that they are united by a secret kinship, of which the present is a link. For an architecture to take on this value of a link, there must be in it the conscious "presence of the past", in the perspective of the future. Conscious because memory is and must be a critical act» [6].

For many decades, buildings designed for war or post-war purposes in Italy have been ignored and discredited. Today they take on a value that goes beyond the idealistic motivations of fascism and can be considered as a work of foundation of a new city. Today they can reveal more freely and immediately the main aspects of their architectural nature [7].

From this point of view, the importance of buildings built during and/or for the war compared to the consolidated city, lies not only in their historical value but above all in the prospect of bringing to light a way of living, of building, of living the architectural space. It is important that settlement projects designed and carried out outside the urban space are adapted to the characteristics of the places they occupy and that they are necessary, so to speak, armed with a capacity for knowledge and control of the space of the territory that cannot be the same that guided the construction of the city and its architecture. Since the value of the works and of the architecture have been realized in a past time, it is useful to follow its tracks.

Fig. 2: Original elevation by engineer Ercole Fischetti and the House of War Wounded in Catania

3.   Architecture of World War II

The buildings designed and built in this period are characterized by the Littorio style. With this term, critics intend an architecture that wanted to communicate the magnificence and importance of the symbols of the Regime using simple and rational architectural forms. A concept of architecture linked to classicism but enriched by a progressive note [8]. This architecture of the Twenties is a rhetorical celebration of a rite of death; it ends up having an involuntary didactic function because of the icy and impending spaces it proposes, because it recalls the uselessness of every act of war [9]. This last statement becomes the guide of research.

The architecture born and developed in Italy during the Fascist Twenties has been able to combine the most advanced design trends of the time with the lines of art and imperial Roman architecture; it is today considered a splendid example of the union between modernism and classical art. It is known that from 1936 onwards the Italian government, through Minister Bottai, promoted the social value of art by integrating it into national politics; this date marks the beginning of the direct intervention of the State in issues of art and architecture [10].

The architecture produced in this period of time is affected by the need for renewal strongly desired by the Italian architects that was implemented through the rationalist movement and the artistic avant- garde. In this context, the exaltation of classicism was nurtured without exaggerating and accentuating the excesses. The use of noble materials such as travertine and marble helped to make more elegant and less "militaristic" designs typical of Fascist architecture.

Today we talk about distinctive traits that characterized the buildings of the Twenties and in general we can identify two lines of thought: functionalist rationalism and neo-Roman classicism. The first, developed between 1920 and 1940 within the International Modern Movement, is inspired by Roman architecture, Vitruvian concepts and the Renaissance poetics of Leon Battista Alberti. The second is inspired by eighteenth-century classicism, the exaltation of ancient architecture in general, both Greek and Roman. In the twenty years the concept of monument was linked to the concept of building with strong emotional significance: "if they are not warmed by the throbbing heart of the people, (the monuments) are sepulchre stones, cold, naked, sterile. Our faith must always be present around these symbols of our perennial remembrance" [11].

Fig. 3: Territorial Framework for the House of War Wounded in Catania.

4.   The House of War Wounded in Catania

It is the memory of a tragic past and, at the same time, the evocation of a difficult period for humanity. It is a building realized to praise the Heroes of War, the survivors, whose mutilations were a source of pride. Its realization is part of a national plan to accommodate the war mutilated, which the Italian state

implemented between 1931 and 1959 and which led to the construction of houses of the mutilated in 7 Sicilian cities. As evidence of this recognition to the fighters, impressive public buildings were erected with innovative and exuberant geometries, with expensive materials and statues, with bas-reliefs and various decorations. Inside them there was a shrine, a sort of secular chapel to commemorate the dead and the great war wounded, considering the mutilated military examples to imitate.

The house of the War Wounded has an interesting history: for its construction was chosen an important square, one of the living rooms of the city, Piazza Vincenzo Bellini and to give the building the importance it required was demolished a noble residence that also extended on the current square. It was a building owned by the Dukes of Tremestieri, later known as Casa Ardini, and attributed to the great baroque architect Giovan Battista Vaccarini. Its demolition was authorised on condition that the most representative elements of the façade were saved and placed on the facades of the new building [12]. After these events, the house of the War Wounded in Catania was built between 1936 and 1939, designed by the engineer Ercole Fischetti, a leading figure in the cultural scene of Catania and a great admirer of the past.

Fig. 4: Ideal reconstruction of Casa Ardini in Catania, through the straightening of an old photo.

Fischetti, a lover of the past and far from the forms of the new architecture of the time, accepted the challenge by designing a monumental building with a large, monumental arch on the facade, a clear reference to the model of the triumphal arch that the regime liked.

The building stands out in the architectural context of Piazza Bellini in shape and size, in stark contrast to the eclectic Massimo Bellini theatre and the neoclassical Palazzo delle Finanze The great triumphal arch, more than 12 meters high is surmounted by plaster statues of soldiers representing the African War (1886), the Libya War (1911), the First World War (1915), the march on Rome (1936), the conquest of the empire (1936), the Spanish War (1936)works of sculptors Giuseppe D'Angelo, Salvo Giordano and Salvatore Juvara.
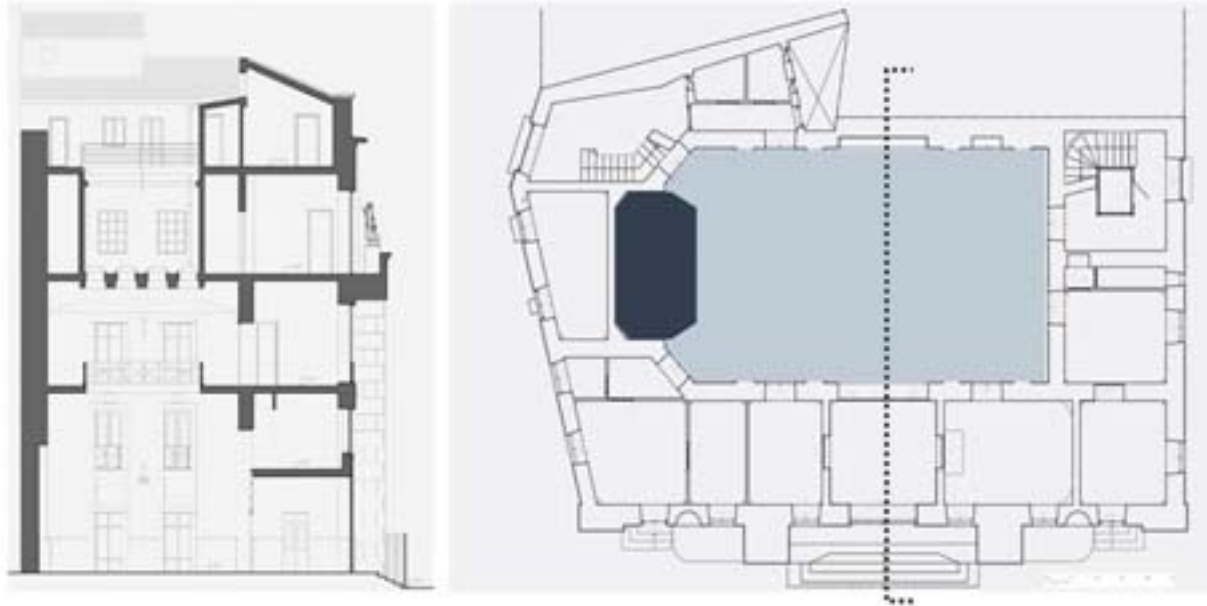
Fig. 5: House of War Wounded in Catania, ground floor and section.

The facade itself is also defined by seven vertical bands of windows, alternating with niches and pilasters that give it momentum. The side facades present simpler schemes on which the elements of Casa Ardini are inserted, according to the prescriptions of the Royal Superintendence of 1933.

The plan develops all around the large meeting room, with numerous rooms used as offices and service rooms. It has a triple elevation and is characterized by a wooden balcony that distributes the space to the upper floors. There is a ceiling skylight. There are also great frescoes by the artist Roberto Rimini representing scenes from the First World War.

Fig. 6: Side Elevations of House of War Wounded in Catania. Highlights the architectural parties recovered from the Ardini House

The House of the Mutilated was inaugurated on 23 May 1939 and survived the end of the war thanks to its transformation into a non-political public association. Since 1978 it has become a private association. The business of the company was closed in 2006 and the building was purchased by the Sicilian Region. Today it is closed and abandoned.

From the technological point of view, the structure is in load-bearing masonry, made with large blocks of lava stone and lime mortar; it has a white stone outer coating and an internal coating with plaster treated as a trowel; the floors are in c.a. and are covered with precious marbles with geometric patterns. Very interesting interior fixtures, with two knockers, with mirrored glass, in fine woods, with round crowning and considerable height.

5.   The research

From the above studies and further thematic insights comes the idea that the buildings of the most recent wars, present on our territory, can have a new meaning linked to processes of urban regeneration. It is an effective and complex tool that transforms the original meaning of places and directs it towards contemporary scenarios, focusing on a new consciousness and a new sensitivity. Using one of the buildings that represented the value of war can help to understand the necessary transition from war to peace. the buildings used for the war mutilated provide some important interpretations of the passage from the architecture of a monumental city, which wanted to appear strong and indestructible, towards a concept of life linked to the needs of the community and not to domination. Legacies from military culture and its promotion can be re-evaluated and reused as objects of a new archaeology but also as strong references for possible architecture without a city [7].

The idea of a new humanism capable of recalibrating the instances of the present man who has a desperate need to return to his roots to fill the void generated by well-being and by an ignorant and superficial society, based on image and appearance has emerged. A vacuum that makes the process of knowledge difficult and sterile [1].

The reuse project takes as a basic element the concepts of education, communication and training. It is aimed primarily at young people; it bases the functions and arrangements on their interests. It is an analytical/design path that enhances the memory of the building and interprets it in a contemporary key, through a communication technology that affects, involves and interests. This is fundamental in an

image-obsessed world and disrespectful to the past, to events that have dramatically changed people's slives.

The research directs the project towards an evolving communication, smart, touch, friendly, able to emerge among the many images of which young people are surrounded.

The pedagogical approach and communication technologies try to capture the attention of younger audiences to make them aware.

An examination of the newest and most interesting Italian multimedia museums (M9 in Mestre, Parco della Poesia in San Mauro Pascoli, Museo Storico dell'Arte in Bergamo, Museo Multimediale di Caprarola, Museo Multimediale città di Cosenza, Nuovo Museo Multimediale di Carloforte in Carbonia Iglesias, Museo Multimediale di Barga) and international (NXT Museum in Amsterdam, MAMM in Moscow, Mori Building Digital Art Museum in Tokyo, Ninenties Berlin - Multimedia Exhibition in Berlin) highlighted the strengths and weaknesses of this type of exhibition. In particular, functional ageing is one of the most striking cases. If not renewed, these fittings show their age and lose interest. These are the foundations of the reuse project.

6.   The project of education for peace: a multimedia museum in the House of WarWounded

The objectives of the project, linked to education, communication and knowledge, lead to placing functions according to a study of the territory, its shortcomings, its needs. It is a matter of applying the passage according to which a monumental architecture can have socio-cultural functions on a human scale.

Fig. 7: Project for a Multimedia Museum in the House of War Wounded in Catania.

In this sense, the project expresses the will to recover the house of the War Wounded and to activate projects of public/ private partnership with cultural and popular aims for peace education. Up to now, the various war museums have played only a didactic function, in some cases sterile. Today, communication gives us the opportunity to add emotions to what we see and learn, an element considered fundamental to sensitize the community.

In this sense, the project transforms the building into its history and becomes an emotional narrative to arouse emotions, never too strong, of wonder, curiosity, danger. It is a new type of emotional museum, oriented to multimedia that characterizes everyday life today. It can renew periodically and embrace historical themes, ethno-anthropological demos, artistic, scientific, in an immersive way and with the support of the image. The project respects the requests of the Sicily Region and the constraints imposedby the Superintendence.

The project is organized by communication areas, differentiated by plans.

Ground floor: the meeting room and the shrine will tell their story and can be enjoyed by visitors as an extension of the square in front, with free wi-fi. The other rooms will host functions to support the museum function: ticket office, InfoPoint, cloakroom and luggage storage. The design project includes furnishings that have accompanied Italian culture, recalling works such as "the ideal city of Urbino", the metaphysical scenography of Giorgio De Chirico, but also taking up details of famous architecture such as the "Palazzo della Civiltà Italiana" in the EUR district of Rome: armchairs by Carlo Scarpa, lamps by Davide Groppi come together in a path of memory enhancement.

Mezzanine floor: permanent museum Casa del War Wounded with newspaper pages animated by photos and 3D reconstructions, vintage videos and immersive drone shots.

Fig. 8: Project for a Multimedia Museum in the House of War Wounded in Catania.

First floor: multimedia museum with modular LED panels with voice control (or analog for silent users), with tactical tables with audiovisual panels, back-lit walls in forex with prints and illustrative graphics, Virtual augmented reality tools with VR headsets installed on telescopic ceiling mounts, to reach different user heights; 3D projectors and 8D sound system for thematic listening sensory experiences led by gestures like those of the conductor. The project also includes a multimedia museum that takes advantage of the surrounding landscape, supported by three-dimensional scanning of objects of different sizes. It will take place through holographic prisms that create the illusion of a three-dimensional object floating in a circumscribed space and orientable to 360.

Second floor: multi-screen room dedicated to the reproduction of small thematic documentaries, indoor video mapping, for an immersive experience at 360, with touch screens and animations that respond to the touch.
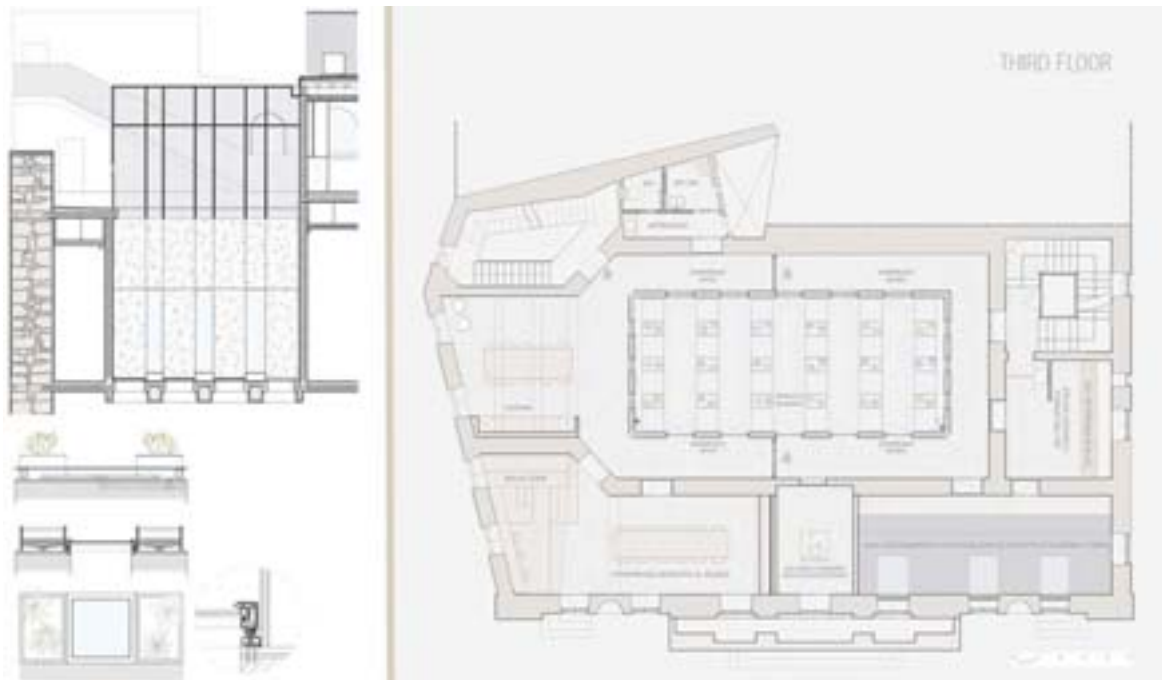
Fig. 9: Project for a Multimedia Museum in the House of War Wounded in Catania.

Third floor: multimedia co-working spaces and laboratories, terrace/garden.Fourth floor: restaurant and roof-garden.

The project includes a study on outdoor lighting for maximum enhancement of the building.

Finally, this institution form allows the museum itself to change, through the constant development of different thematic exhibitions, intended not only for tourists, but also for the city, encouraging the population to enter several times in the same year, finding new scenarios, different in theme and interactive approach.

Fig. 10: Project for a Multimedia Museum in the House of War Wounded in Catania.

7.   Conclusion

The research proposes a reuse project that can have an important educational and inclusion function, based mainly on knowledge and dialogue. The advent of multimedia has helped to communicate. Buildings rich in history and events, more or less important, can become places of experimentation of cultural and social dissemination. In fact, putting knowledge in a real or virtual context helps learning and awareness. In this sense the project can become leisure and resource.

The project, starting from the history of the building under consideration, proposes a thematic path on war and its consequences that becomes a tool for learning, deepening and dissemination, but also awareness of the consequences that such a violent act can cause.

The research aims to propose a cognitive approach of war starting from a representative building, to raise public awareness, to stimulate awareness of events so far in time, to educate for peace. In particular, numerous sociological studies show that recounting the past helps to place it in the right perspective and to stimulate reflection. Starting from this, and taking inspiration from the requests of the Sicilian Region, the project of reuse directed towards a destination of contemporary use, with strong communicative power that, with special measures, manages to raise awareness on the issues of peace. In conclusion, you can say that you can remember the past to grow, to treasure the past experience and choose, accordingly, how to organize your future.

Peace is the responsibility and commitment of all. The social sciences in support of the architectural project can activate action-research processes able to sensitize young people with a view to lifelong learning.

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Contemporary City and Archaeological Areas: towards an integrated urban regeneration project

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Abstract
The paper focuses on the relationship between the contemporary city and territorial cultural frameworks, with particular reference to archaeological areas, within innovative governance and planning systems based on an integrated multidisciplinary approach. This relationship, although debated at an architectural scale, is still insufficiently deepened in recent reflections and experimentations.
Archaeological areas are often considered as heterotopies, separated entities in opposition with the active city. This exclusion, increasingly when they constitute an infrastructural layer in the landscape, turns into fragmentation, indifference and, consequently, degradation following a process that is both material and immaterial as involves the community and its identity values.
This issue should be brought back to the centre of the debate in order to pursue an integrated and sustainable territorial development, capable of generating employment, stimulating creative activities, increasing social inclusion and cohesion.
The paper compares different case studies selected to define an experimental proposal of methodological and operational references related to an integrated regeneration project. Looking to deepen in the actual cultural and social frame the concept of musealisation in opposite to trivialization, the conclusion identifies potential and limits of the design solution in terms of innovation, integration, regulation and management also considering the socio-economic costs and the feasibility of the process.

Keywords: heritage; cultural frameworks; new urban question.

1. Contemporary city and archaeological areas

The paper focuses on the relationship between contemporary city and territorial cultural frameworks [1], with particular reference to archaeological areas based on an integrated approach. This relationship, although widely debated with reference to the architectural scale [2], still does not seem to be sufficiently central in disciplinary reflections and experimentations. Today's metropolization processes [3] determined discontinuities in the urban form, dissolution of public spaces and fragmentation of environmental networks that modified the pre-existing balances homogenizing and trivializing the historical cultural systems. A loss of inestimable values that created degraded "historical waste landscape" [4]. The "historic territory" [5] is affected "by old and new threats, in the face of which existing regulations show weakness and inability to offer adequate solutions" [6]. The threats often diverge according to the physical and socioeconomic contexts (tourism/abandonment, musealization/marginalization), which require up-to-date skills in interpretation, planning, management and governance. With regard to archaeological areas, both within the compact city and spread over the territory, these are often seen as "enclaves of the past" [7], "relics now devoid of context" [8], heterotropies separated from the active city: an exclusion that can turn into indifference [9] and consequently into degradation and neglect. The lack of an integrated transdisciplinary view, as of a reinterpretation of our past coherently with the new socioeconomic context, handled the historic landscape to conservation (material and administrative) and archaeological as only disciplines allowed to intervene on those territories. The following consequence is a sort of passive stasi [10] as a prevalence of a specific approach unable to consider the context in its plurality [11]. This autarchy of conservation produced enclosed spaces, foreign and detached to the daily life: a sort of internal periphery, an interruption in the continuity of the urban landscape [12]. This homologation produces a loss of complexity, a degradation [13] , a condition where those areas are not anymore capable of any interaction with the surroundings.

Archaeological areas, through an urban and territorial regeneration project, can become emblematic spaces whose redesigning can transform them in possible centralities able to rebuild the tangible and intangible, the anthropic and natural as the links with the city and the territory. In order to contribute to the definition of an integrated planning framework, the paper focused on two Italian cases highlighting criticalities and conditions that can be exploited within the proposed multidisciplinary infrastructural view of the heritage as infrastructural opportunity for our territory.

2. Case studies

2.1. Hinge and limen: the Largo Argentina archaeological area

The Argentina archaeological area stands as a void, an unstitched scar located in the heart of Rome: a wound opened during the works held to modernize the young capital image and functionality [14].

After its original role as holy area ended (III century a.C.), the area is swollen by the functional and symbolic reuse of monuments that characterized the catholic Rome. This condition was questioned at the end of the XIX century. Rome is the new capital of the newborn country, the area of the hinge of the new axes that connect San Pietro with Piazza Venezia and Trastevere. After first excavations and findings, works are stopped and Antonio Munoz re-configures the area following the fascism political and ideological program that uses the ruins as a scenography, image of the power and privileged link between the new city and its glorious past.

Today's morphological configuration is still coherent with this past, few modifications have been done, the most of them are about the layout of sidewalks and bus stops while, recently (2023), a private sponsored project opened for the first time the archaeological pit with the realization of a pedestrian accessible path [15]. The area despite the recent interventions still behaves as a detached space, a sort of scar in the floorscape poorly connected with the public space. The prevalence of the traffic flows is still evident, while its role as possible element of the "public city" [16] is still underrated.

If these themes have been discussed by Manieri Elia in the proposal of the new layout for the area (1998) [14], another debate has been issued with the proposal for the new subway line stop. In both cases the idea of reconnecting the archaeological layer with the urban context physically and functionally remained undone, confirming the resistance to evolution as typological characteristic that prevents any vision capable of going further the punctual role of the monument.

To face this condition the project, way before its architectural scale, has to behave as filter able to manage the specific disciplines, as a "valorization tool that has to find new relations and meanings between the different components of the historical city" [17], going beyond the punctual role of ruins as monuments, including those areas inside the infrastructure of public and open spaces and inside the opportunities that can transform the city.

It means to deal primarily with the hardness and resilience of edges as typo–morphological theme. This liminality is representative of a lack of integration, it is a consequence of the immobility and delay, but it can also be considered as physical reference of an opportunity, a call for action and a possible methodological approach.

The general answer cannot then be functional or quantitative. It has to refer to an open strategy in which the planning process looks to meanings and relations before than to the possible solutions to functional issues that have instead to be considered as elements to decline in this wider integrated and multi-scale view: the issue of "connecting city to archaeology is indeed an issue that cannot be addressed by self-referential elements" [18] but it has to rely on a methodology able to consider the heritage as infrastructure and essential layer inside the historic landscape view confirmed and included in the Rome's "Piano Regolatore Generale" [19].

2.2. The ancient harbor city of Ostia

The ancient city of Ostia was an important settlement active from the Bronze Age and flourishing until the 3rd century AD. Its abandonment ensured its immobility until the 6th century when Gothic and Saracen invasions initiated a long and constant process of despoliation that continued until the first half of the 19th century. Subsequently, significant campaigns of demolition and reuse of valuable materials were carried out under the pontificate of Pius II.

From the 16th century, renewed interest in the ancient sparked new despoliations of decorative elements for villas, gardens, and private collections, including the papal one in the Vatican Museums. In the 18th century, following a renewed attention to classical architecture, archaeological campaigns were launched that reconstructed some monuments, thanks to which Ostia became part of the Grand Tour circuit.

During the twentieth century, a new interest in Roman archaeology led to interventions aimed at enhancing the remains parallel to the establishment of a system of major road axes that continued the Imperial Way (1937). The monuments were often isolated and exhibited "using [...] their vegetal outline as a landscape setting at the edges of the new roads" [20], introducing the instrumental use of nature for the staging of archaeology.

In 1938, the works for the 1942 Universal Exhibition connected Ostia with the EUR district. From the following year, the "Commission for the Organization of the Italian Garden Exhibition" [21] began to take care of the tree and plant arrangements in the area with the main objective of arranging the ruins so that they could also be appreciated from the newly constructed main road. In 1941, Michele Busiri-Vici joined as a designer. The intervention was articulated in four scopes. One related to the filtering zone with the road axis through the planting of isolated groups of domestic pines, cypresses, and holm oaks. The second surrounded the walls of the ancient city, compensating for any shortcomings with a geometric myrtle hedge and introducing regular plantings of fruit trees, oleanders, plane trees, and eucalyptus.

Within the park, the third scope defined the streets through rows of domestic pines, cypresses, and elms. Ornamental trees emphasized the most significant places of the layout. Modern consolidation interventions of the walls were covered with ivy to hide the discontinuity with the original bricks. The fourth scope reconstructed specific original gardens in correspondence with some prestigious monumental areas through flowered borders and shrubs as vegetal backdrops. The instrumental role of vegetation therefore aimed to restore the plausible image of a possible "habitat" for the ruins without resorting to philological reconstruction, but keeping alive the romantic spirit of classical ruins [22].

Today, the archaeological park, established in 2016, shows tourist potential such as territorial dimension and the possibility of recovering the consolidated connection between ruins and landscape. However, the absence of hospitality services risks turning the park into a marginal place compared to the more well-known attractions in the center of Rome. The massive presence of infrastructure represents both the main fragility of the park and an opportunity for connection. The coastal road, the international airport of Rome Fiumicino, and the "Lido" railway line constitute limits and sources of noise and environmental pollution in the area.

The absence of urbanization could ultimately generate a "theme park" effect but at the same time allows the use of the monuments for independent cultural events such as concerts, exhibitions, and theatrical performances.

3. Conclusion and linked perspectives

The case studies define a space that, way before than physical, brings us to a strategic opportunity in which the project in its wider definition could behave as threshold to manage and coordinate the different specific knowledge inside an interdisciplinary, sustainable framework. Together with this explicit methodological consideration, the approach opens explicitly to a more integrated idea intervening in first instance on the relations of sense and form between the contemporary territory and the heritage [23]. Thereby it opens to a possible operative dimension that needs to be a process, open and traceable, instead of a closed, predetermined, solution [24]. The perspective foreseen is an operative inter-scalar and multidisciplinary dimension able to link this new urban question to the territory as "expression of cultural identity subject in all its parts to an organic strategy of intervention" [5] with specific local targets connected with this general view. It then defines an explicit field of interest able to combine recovery, transformation and planning within a sustainable framework able to translate the historic delay [25] connected with these conditions into an opportunity for a more sustainable and adaptive landscape.

Fig. 1: Ercolano. La città vista dall'area archeologica

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Preservation of the identity of an exiled population and architecture: the "Borghi Giuliani" built for the Italian exiles from Istria, Fiume and Dalmatia after the Second World War

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Abstract

After IIWW, many settlements (Borghi - i.e. Villages - Giuliani) were designed and built in Italy for the Italian exiles from Istria, Fiume, and Dalmatia. For their construction, standard projects and procedures were followed. Many characteristics of the cities and villages of origin of these displaced communities were replicated to promote the preservation of memories, religion, and family and social life. This paper aims to present the results of research that led to the documentation of over a hundred interventions.

Keywords: Borghi Giuliani, Exiles, Reconstruction, IIWW

1. The numbers of the exodus

The exodus of the Italian population from Istria, Dalmatia, and Fiume during and after the Second World War occurred in three phases between 1943 and the early 1960s of the short twentieth century: immediately after the armistice of September 8, 1943, and the first violent Yugoslav partisan occupation; in the period immediately following the end of the war, the second Yugoslav partisan occupation, and the Paris Peace Treaty (1947), which decreed the formation of the two zones of the Free Territory of Trieste (FTT) and the definitive cession of Dalmatia, Fiume, and most of Istria to Yugoslavia; after the London Memorandum (1954), which definitively assigned Zone B of the FTT (north-western Istria) to Yugoslavia, while Zone A, with Trieste, returned to Italy.

Historians agree that the exodus involved more than 300,000 people, who were forced to leave their homes, often by makeshift means and abandoning all their belongings, despite the guarantees provided - on paper - by the peace treaties. From the city of Pula alone, the Istrian capital, more than 28,000 Italians emigrated in the first months of 1947 out of a population of just over thirty thousand people.

Tens of thousands reached North and South America and Australia, while others found accommodation on their own, and for tens of thousands, the so-called "refugee cycle" began: first hospitality at state Refugee Collection Centres (C.R.P.) or at Accommodation Centres managed by municipalities and other welfare entities, then job placement, and finally definitive assignment of housing.

2. The construction of houses for the exiles

Initially it was planned to concentrate the exiles in one locality, but the Italian government preferred to distribute them in small settlements ("*borghi giuliani*"), to be built in almost all Italian regions.

The first ad hoc laws were also defined, reserving for the exiles a share of the new economic-popular housing of the houses built for state employees.

Given the growing size of the exodus, it was necessary to prepare extraordinary housing programs and establish dedicated institutions.

Based on the experience of the Italian UNRRA mission, which operated from 1945 to 1947 in the field of assistance to displaced people, the (UNRRA)-Casas (Administrative Committee for Relief to the Homeless) was founded in 1947.

Fig. 1: Panel of the exhibition held by the OAPGD at Trieste City Hall, March 27, 1960 – Borgo San Pellegrino, Opicina, Trieste. Archive of ATER Trieste (Trieste Territorial Housing Authority), OAPGD, *Fotografie*.

This Committee, divided into two councils and organized into ten district offices, built 125 houses, totalling 500 housing units, for the Giuliano-Dalmatian exiles, thanks to funding for two two-year programs (1948-49 and 1951-52), in the provinces of Gorizia (68 housing units in four villages, in Gorizia, Gradisca, Grado and Monfalcone), Udine (23), Venice (15), Brescia (10) and La Spezia (9), near the most crowded refugee camps.[1]. At the same time in Zone A (Trieste) of the FTT, the Allied Military Government (U.S. and GB) strictly managed the wave of people fleeing Yugoslavia by preventing them from staying permanently in the Zone. As of July 1, 1949, however, the responsibilities for assisting Italian refugees were transferred from the AMG to the Italian government. The refugees in Zone A of the FTT were allowed to enjoy the benefits provided by Italian law, and the Italian government was authorized to intervene in the construction of houses for the Giuliano-Dalmatian exiles.

After the construction of about 150 dwellings in the Trieste neighborhood of Gretta (temporary housing), three other interventions were carried out: in Trieste (140 housing units in the Chiarbola district), in the neighboring municipality of Duino-Aurisina near the source of the

Timavo River (40 housing units), and in the Trieste hamlet of Santa Croce (initially only 24 housing units). In the rest of Italy, associations and committees of exiles, supported and financed by the state, were beginning to operate. The most important was undoubtedly the Opera per l'assistenza ai profughi giuliano dalmati (OAPGD - Organization for the assistance to Giuliano-Dalmatian refugees), founded in 1947 as the Comitato Nazionale per i Rifugiati Italiani (National Committee for Italian Refugees), thanks to the engineer Oscar Sinigaglia, the father of Italian steelmaking, and his wife Marcella Mayer (daughter of the founder of the city's main daily newspaper, Il Piccolo). It remained operational until 1977 [2].

Fig. 2: Villaggio giuliano, Gorizia, 1948-49 (UNRRA-Casas Prima Giunta. *Realizzazioni edilizie per gli esuli adriatici*. Roma: UNRRA-Casas Prima Giunta, 1957, p. 18-19).

Initially, the Opera also financially supported groups of exiles who gathered in building cooperatives to benefit from the funding provided by Law 162/1949 (Tupini Law)..

In 1952, with the aim of emptying the Refugee Camps, the Italian government, through Law 137, allocated nine billion liras for the construction of thousands of low-cost housing units in forty provinces by the Istituti autonomi case popolari (IACP - Autonomous Institutes of Public Housing). The largest Giuliani suburbs were built in Alessandria, Bari (Villaggio Trieste), Bologna (Villaggio Giuliano - demolished), Brescia, Civitavecchia, Cremona, Florence, Grosseto, Latina (Villaggio Trieste - demolished), Livorno, Lucca, Mantua, Massa, Milan, Novara (Villaggio Dalmazia), Ravenna, Turin-Lucento (Villaggio del profugo), Tortona, Venice-Marghera (demolished) and Vicenza-Campedello (Villaggio Giuliano).

In 1955, on the other hand, five billion liras were allocated for the reclamation for productive purposes of land to be assigned to exiled peasants, with related colonial buildings. The Ente Nazionale per le Tre Venezie (ENTV – National Institution for Tre Venezie) was in charge of the interventions, which obtained 142 farms in Fossalon di Grado (GO), 53 in San Michele al Tagliamento (VE), 63 in Maniago (PN), 25 in Roveredo in Piano (PN) and 59 in San Quirino (PN). ENTV was also commissioned to build two Istrian Fisherman's Villages in Muggia (TS), for a total of 80 housing units, and a third in Duino-Aurisina (TS), for 140 housing units

[3].These were not the only interventions: many exiles were placed in Alghero, Sardinia, where they were assigned the city of Fertilia, whose construction had been started by Mussolini but left unfinished.

Fig. 3: Villaggio Istriano, Chiarbola, Trieste, 1952-53. View (above - UNRRA-Casas Prima Giunta. *Realizzazioni edilizie per gli esuli adriatici*. Roma: UNRRA-Casas Prima Giunta, 1957, p. 49). Ceremony for the delivery of the houses house, May 9, 1954. Archive of ATER Trieste (Trieste Territorial Housing Authority), OAPGD, *Fotografie,*26

Fig. 4: Giornalfoto, Borgo San Mauro, Sistiana, Duino-Aurisina (TS) 1948-49. Archive of ATER Trieste (Trieste Territorial Housing Authority), *Fotografie*.
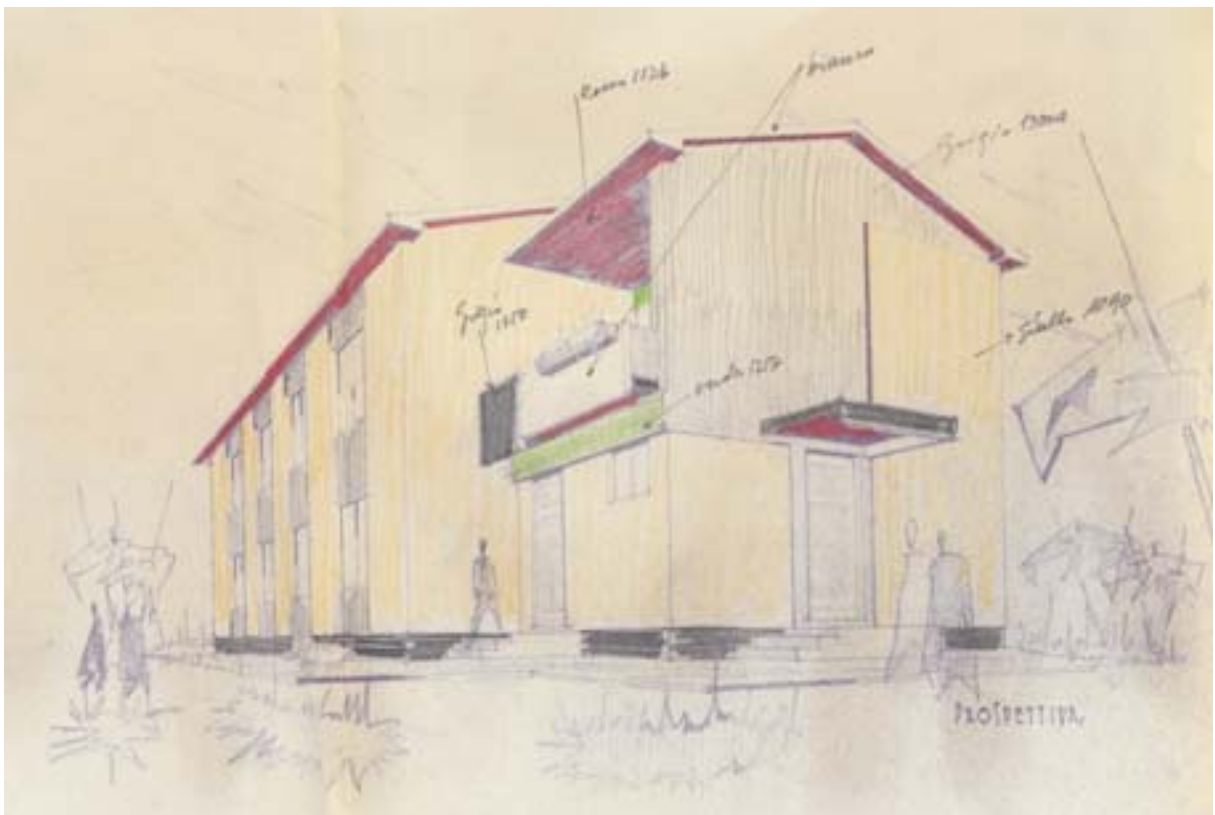
Fig. 5: UNRRA-Casas, building project for Borgo San Mauro, Sistiana, Duino Aurisina, 1955. Archive of ATER Trieste (Trieste Territorial Housing Authority), OAPGD, 144.

In Rome, twelve exiled families occupied in 1947 the abandoned village of the workers who had worked on the construction sites of the E42; thanks to the construction of new buildings, it became today's Quartiere Giuliano-Dalmata, which now houses several thousand descendants of exiles. Finally, in Fossoli, near Carpi (MO), many exiles found permanent accommodation from 1954 to 1970 in the facilities of the infamous prison, concentration, and transit camp, which they renamed Villaggio San Marco. [4].

Dozens of other interventions, mostly single multi-story buildings, were autonomously built by groups of exiles thanks to other government incentives. Altogether, settlements built exclusively or largely for the Julian-Dalmatian exiles in Italy amount to more than two hundred.

3.   The design matrices and guidelines

Due to the significant scale and prolonged duration of the migratory phenomenon, the design of settlements for the Julian-Dalmatian exiles only at the beginning followed specific guidelines. Especially in the early phase, in fact, there was an attempt to build villages that somehow reproduced the characteristics of the abandoned towns. Groups of single or double-family buildings, one or two stories high, with a garden, were designed around a small central square. In the villages built by UNRRA-Casas, no buildings were constructed for services or worship, but there was always a shrine with the terracotta bas-relief of the Madonna della Rinascita by Domenico Mastroianni. The streets were named after the cities and saints of Istria. The housing typologies, which were intended to be extremely affordable, did not deviate from the patterns used at that time, as outlined in the UNRRA, IACP, or INA Casa manual. [5], reworked by the Centro Studi per l'Abitazione (CSA - Center for Housing Studies), active at the CNR from 1949 to 1957, which produced about a hundred standard projects for the reconstruction of the building stock destroyed during the war. They were primarily used by the Opera, following a standard procedure that involved identifying the site for the construction of a settlement, compiling a standard form specifying the conditions of the site, preferred building typologies, and the number of housing units to be built. The form was then sent to the Casas and the CSA in Rome, which drafted the project, and the nearest district office of Casas supervised the works.

Furthermore, the Refugee Works wanted to emphasize the identity matrices of the inhabitants, dividing and directing them to the various settlements built according to the city of origin and giving the settlements the names of the patron saints. They also involved local artists to create religious sculptures related to the patron saints rather than the sufferings of the exodus or small memorials. [6].

The design of interventions under Law 137/1952, carried out by the IACPs, did not follow specific guidelines but was conducted according to the capabilities and language used in their respective technical offices. Generally, there was less emphasis on seeking a unified identity. Nonetheless, efforts were always made to create gardens and outdoor spaces for socializing, as well as small gathering places.

Only in sporadic cases were specific architectural solutions sought, mostly limited to reproducing the most common patterns in the design of low-cost housing. There are some exceptions in Trieste, where, for example, a greater chromatic articulation of the facades was sought, and the (unrealized) project by Luigi Figini and Gino Pollini for Borgo Porto Conte (1951-53), adjacent to Fertilia, presented at the IX CIAM in Aix-en-Provence. [7].

Fig. 6: UNRRA-Casas, building project for Borgo Sant'Eufemia, Trieste, 1953. Archive of ATER Trieste (Trieste Territorial Housing Authority), OAPGD, 83.

Fig. 7: View of Borgo San Cristoforo, Muggia (TS), in ENTV, *Villaggio del Pescatore di Muggia*, October 25, 1960, Archive of the Municipality of Muggia (TS).

Fig. 8: View of Borgo San Cristoforo, Muggia (TS), in ENTV, *Villaggio del Pescatore di Muggia*, October 25, 1960, Archive of the Municipality of Muggia (TS).
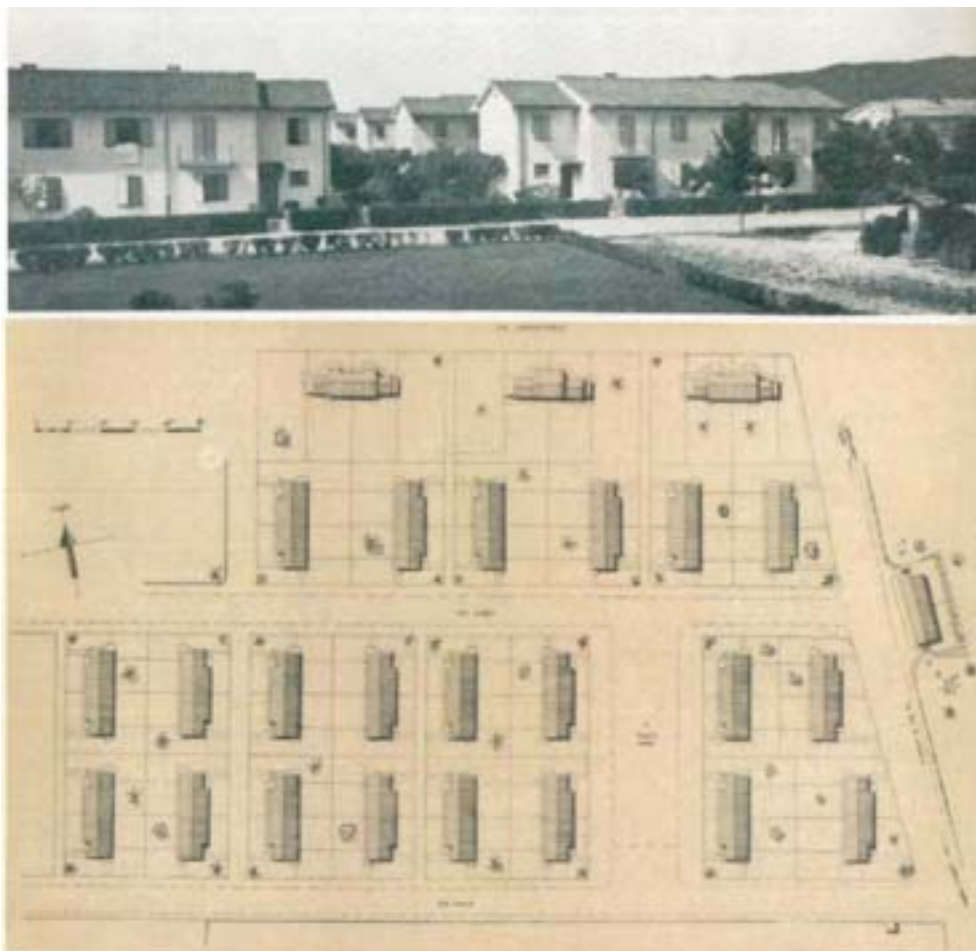
Fig. 9: Villaggio Pola, Taranto, 1954-56. UNRRA-Casas Prima Giunta. *Realizzazioni edilizie per gli esuli adriatici.* Roma: UNRRA-Casas Prima Giunta, 1957, p. 35.

Fig. 10: Villaggio profughi, Alessandria, 1953-59 (2023).

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Le Vie dei Mercanti

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Farmsteads, suburban manor houses and country houses, itineraries of conservation of a damaged heritage of the Adriatic coast.

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Abstract

The paper aims to draw attention to some categories of constructions, such as farms, farmsteads, country houses or 'retreat villas' that outline the profiles of a cultural heritage with a identity bond with the territories of origin: the building techniques, architectural typologies and the location of the constructions acknowledge their connection and reciprocal influence with the local resources and landscape.

These buildings developed according to a unitary project or as a result to the architectural stratification of older structures, are often altered by far too many changes due to state of neglect, rampant overdevelopment and by inappropriate interventions of demolishment and change.

The edifices, built outside the historic centers, in the open countryside or along the coast, represent a turning point in the social and economic dynamic settlements of the past also connected to the transformation of the productive activities between the nineteenth and twentieth century.

The path of mindfulness of the tangible and intangible values verifiable in the studies of the buildings in their environment identifies a starting point of the consideration on the uses consistent with the proper conservation of these particular realities of settlements; knowledge this architectural heritage appears today important for the expansion of the reference points for the safeguard and the enhancement within sustainable development.

Keywords: cultural heritage, rural buildings, landscape, maintenance, restoration

Introduction

The contribution summarizes the first results of a census of artefacts still in progress relating to some architectural categories of rural buildings - large farms, farmsteads, farmhouses - and villas - manor houses or pleasure lodges - scattered across the territory of the Adriatic coast. These are testimonies of a cultural heritage still little studied and recognized by the community as such which has undergone, starting from the second half of the last century, a progressive impoverishment due to urban development and building speculation or to the typological transformation and abandonment of countrysides.

The research is aimed at promoting important initiatives of the MIC - Ministry of Culture, aimed at outlining a cognitive framework of the historical rural heritage built throughout the national territory; in particular the study on the buildings of the Abruzzo area, carried out by the writer in collaboration with the researcher arch. Claudio Mazzanti and the supervision of prof. Claudio Varagnoli of the University "G. d'Annunzio" of Chieti-Pescara, aims to provide scientific support to the cataloging campaign "Protection and valorization of architecture and rural landscape" promoted by the General Secretariat of the MiC.

Recurring typologies and construction techniques

These activities and the sharing of the research carried out are now indispensable for fueling the debate and strengthening the tools for safeguarding and valorising the settlement network which for several centuries has shaped the landscapes and local identities and which now risks not finding the right place in the future developments of the territory.

Rural settlements and vernacular architecture, the result of long-lasting construction phenomena closely connected with local resources and landscapes, have paid and continue to pay a very high price in terms of abandonment, degradation or typological and structural alteration of pre-existing structures. The census therefore focuses on the valley territories and the hinterland for a radius of approximately 50-60 km from the coast and in particular along the course of the main rivers of the region, areas which more than others have welcomed in the recent past the phenomena of industrial and infrastructural expansion.

Fig. 1: Penne (PE), Favaro district, 'farmstead' with a loggia and the external staircase (S.C. 2024).

The census of rural buildings and suburban villas follows a territory already investigated by previous studies for the purpose of identifying the consistency and recurring typologies [1] and aims to update and increase the cataloging of pre-existing buildings, paying particular attention to their state of conservation and to the dynamics of formal and structural transformation and alteration that have occurred on them over the last seventy years.

In relation to the rural house, the recurring typology is the one organized into two levels – 'valley floor house'; the volume develops starting from a rectangular plan with the external connecting staircase frequently concluded at the top by a loggia.

In the case of houses located on slopes - 'slope house' - the accesses are arranged from the respective walking surfaces also on the transversal walls.

In addition to the loggia, among the distinctive elements that most characterize these architectures and strongly connote the landscape are the 'dovecote towers' which particularly

characterize the gentle hilly slopes of maritime Abruzzo; however, there is no shortage of significant examples in the more internal territories - such as those in the Penne district - and they are also widespread in other extra-regional contexts [2] [3].

The main variations of the 'valley floor house' typology are represented by single-storey 'houses in line', on a single floor, in which the living and service rooms follow one another and have independent access from a common external courtyard and by houses on two levels with internal staircase or those on multiple levels with a quadrangular development with a pavilion roof and external staircase perpendicular to the main facade.

This last typology finds similarities with another type of buildings, built in particular starting from the 19th century in response to vocations other than the agricultural one: the 'hunting lodges' and the 'delight lodges'.

In these houses some typical elements of the rural house take on new shapes: the external staircase becomes a double flight and develops 'elbow' or 'pincer' shaped and the loggia is configured in several arches and takes on greater importance in the design of the facades.

Between the middle and the end of the nineteenth century the typological evolution also pass through the change in scale: from the rural house or 'masseria' and the 'lodges' [4] the settlements outside the urban walls took on the characteristics of 'noble villas' and 'manor house' [5].

In coastal Abruzzo the distinction in functional and formal terms often remains blurred and there are mainly 'rustic villas' - the operational and management center of agricultural estates - and 'suburban villas' with a greater residential and representative vocation.

In both cases the layout is often resolved into a main volume of two or more levels flanked by two symmetrical secondary buildings, arranged in lateral wings and lowered compared to the central one.

The distinctive and characterizing elements from a formal point of view are concentrated on the latter: double-flight staircases with different shapes, porticoes, balconies, loggias and roof terraces [6].

Fig. 2: Francavilla (CH), Castelvecchio district, 'valley floor house' with the 'dovecote tower' (S.C. 2024).

Fig. 3: Penne (PE), Crocifisso district, 'valley floor house' with the 'dovecote tower' (S.C. 2024).

Fig. 4: Loreto Aprutino (PE), Cordano district, 'houses in line' with annexes (S.C. 2024).

Fig. 5: Alento river valley (CH), house with a pavilion roof and external staircase (S.C. 2024).

However, the construction techniques remain substantially unchanged [7] [8]; inherited from tradition and always closely connected to local resources, they are based on double-faced walls with a compact core (pieces of stone and brick), wooden floors, structural clay brick vaults on the ground floor (usually with a 'cross' development) and 'false vaults' made with bricks sheets with ribs on the upper levels ('mirrored vaults ' or 'lowered pavilion vaults ').

The changed dimensions of the rooms are compensated for by inserting wooden chains on the extrados of the vaults and metal tie rods for greater stability of the floors and wall attachments.

The study of the wall structure shows a prevalence of brick facings or mixed stone and brick structures in the area walls in which the presence of transverse 'diatoni' is rarely detected; these typologies are recorded in particular in the territories of the central belt (between the Sangro and the Vomano) while the presence of walls in regular stone blocks characterizes some areas of the Frentano sub-Apennines (between the Sangro and the Trigno) and the more internal territories between the Tronto and the Vomano [9] [10].

Fig. 6: Bellante (TE), villa with a main volume flanked by two symmetrical buildings (S.C. 2024).

Transformation and abandonment

The partial and complete alterations of the agricultural and productive complexes and of the "retreat villas" are particularly incisive along the coastal strip. Villa Pretaroli in Silvi Marina is an emblematic case of how building speculation after the Second World War definitively compromised the urban layout of what could have been one of the most valuable tourist settlements on the Adriatic coast. The complex already registered in the Bourbon land register of 1807, conceived as a neoclassical evolution of local rural buildings, appears in some vintage postcards; the villa is immersed in a large park and directly connected to the sea by a long tree-lined avenue which underlined the axial layout of the entire complex.

The original layout has now been altered by numerous expropriations due to the strengthening of accessibility and road conditions implemented starting from 1824 with the adaptation of the Adriatic Road and the subsequent passage of the railway axis after national unification. The occupation of the coastal lands necessary for the passage of the railway affects the green areas in front of the villa, definitively interrupts the direct connection with the sea and starts the process of subdividing the Pretaroli park. The recent building development, convulsive and heterogeneous, fills the urban voids between the Adriatic national road, the railway and the sea with a building fabric, dense and of low architectural profile, which definitively compromises the correct perception of the villa.

Fig. 7: Silvi Marina (TE), Villa Pretaroli, the residence without the park facing the sea (S.C. 2024).

Less incisive, but still significant, alterations are instead the consequence of the functional reconversion of some villas, usually for hospitality purposes, as in the case of Villa Rossi in Silvi or the villas Durini and De Lellis at San Silvestro (PE).

The hilly urban area now included in the territory of Pescara once belonged to the municipality of Chieti and was connected to the city by a ridge road, the current state road 152, along which there are some of the most interesting examples of manor villas nineteenth-century.

The area was characterized by large agricultural estates - today largely divided - organized in a "rustic villa" - often equipped with an oil mill on the ground floor, granary, oven and cistern -

and various agricultural appurtenances and outbuildings scattered throughout the property, in addition to the farmhouses managed by sharecroppers.

In the locality of Crocefisso, near the churches of Santa Maria de Criptis and Madonna del Carmine, there are two buildings with different destinies: Villa Obletter which, despite the war damage, retains its original appearance, the surrounding park and part of the seven hectares cultivated with olive trees, vines and fruit trees and Villa Pini that disappeared, however, following a conversion into a private clinic whose structures have profoundly transformed the 30 hectares of relevance and the surrounding landscape.

Continuing eastwards in the Schiavoni-Fontechiaro area, you come across two buildings that represent variations compared to the typical typologies of the "rustic" residence: Villa Blaga, a massive construction without an external staircase, but equipped with a large terrace open towards the valley and Villa Testa which has an unusual courtyard layout preceded by two farmhouses arranged symmetrically with respect to the access avenue.

On the opposite side of the Alento river valley, beyond the ridge on which Ripa Teatina develops, it is possible to witness one of the few episodes of recovery and reconversion of use of a pre-existing structure implemented with a certain attention to the context and in harmony with the landscape.

This is the intervention proposed for Villa Mezzanotte as part of the strengthening of the relevant winery now belonging to the Di Sipio brand.

Fig. 8: Ripa Teatina (CH), Villa Mezzanotte, the manor house and the new cellar (S.C. 2022).

The project born from the need to adapt existing spaces and structures to new production needs (a new cellar with a useful surface area of over 4,000 m2) resolves the relationship with the pre-existing structures and the surrounding landscape through a semi-underground volume that does not enter into contrast with the adjacent manor house and communicates with the surrounding environment through the roofing plane - used as a viewing terrace - and

the spaces intended for the cellar, tasting room, barrel cellar, circumscribed in a system of round arches adhering in shape and materials to the construction language of local tradition. However, another property of the Mezzanotte family located in the Santa Filomena area along Via Tiburtina Valeria on the right bank of the Pescara riverbed is still waiting to be saved from abandonment and decay. The construction is affected not only by the subdivision of the property and the consequent lack of maintenance, but also by the complete alteration of the context. The building densification of Chieti Scalo, beyond its commercial and industrial vocation, has in fact completely distorted the surrounding landscape; the improvement of the infrastructure has also affected the property with the construction of a motorway junction, compromising the direct relationship between the villa and the church of Santa Filomena in front and compressing the park into a green area enclosed between the industrial warehouses and the shopping center Megalò.

Built in 1885 on a pre-existing eighteenth-century villa as a representative villa, the building brings together in a rather small volume all the recurring elements of the suburban villas in the area: double-flight external staircase, roof terrace open onto the landscape through large pointed arches and low volumes side service.

The overall picture of the instability and degradation is complex: the partial collapse of the roofs and the prolonged exposure to atmospheric agents and infiltrations have caused the collapse of the brick vaults on the first level and the structures of the central volume also show detachments and alterations, in addition to the loss of efficiency of the wooden and metal ligaments of the floors.

Fig. 9: Chieti Scalo, Santa Filomena (CH), Villa Mezzanotte abandoned to decay (S.C. 2024).

Conclusions

Abandonment remains one of the most impactful factors with respect to the loss of these important testimonies, as well as the typological alteration of the pre-existing structures which particularly affects the 'lodges', the rural houses and the buildings attached to the villas.

In smaller towns the transformation takes the form of the loss of the context and the relevant agricultural lands; land subdivision and infrastructure involve a substantial alteration of the landscape but it is in the big cities on the coast like Pescara [11] that uncontrolled development

and urban densification lead to the total cancellation of pre-existing structures, progressively modified and then completely sacrificed to building speculation.

The measures implemented in emergency situations are now revealed to be inadequate to contain phenomena that compromise the conservation of this particular area of cultural heritage on multiple fronts.

Even the phenomena of urban decay and the failure of development policies which have favored the growth of suburbs deprived of identity and services to the detriment of historic centers and agricultural landscapes confirm that any set of rules and norms that are not the direct expression of a local culture and of a specific settlement and territorial reality is destined to fail [12].

The Cultural Heritage Code of 2004, as a result of the long and complex path [13] [14] which in the last century has led to awareness of the role that minor buildings - urban and rural - and the anthropized landscape - in its integrity - play in purposes of sustainable development, provides for the protection and conservation of this heritage to be ensured "through coherent, coordinated and planned study, prevention, maintenance and restoration activities" (Legislative Decree 42/2004, art. 10, c. 4 , letter 1). From this perspective, the census of rural buildings and suburban villas presents itself as an indispensable and preparatory step in any safeguarding process.

Furthermore, in the broader panorama of the protection of tangible and intangible cultural heritage from whose synergy and interaction anthropized landscapes derive, also in reference to the recent establishment of the *National Observatory of Rural Landscape, agricultural practices and traditional knowledge* and the *National Register of Historic Rural Landscapes* (2010-2012) [15], the cataloging of rural heritage can take on a key role in participatory planning, becoming a useful instrument for community mapping activities and a practical means for describing places, identifying identity elements that compose them, of their potential and vulnerability, to be systematized with further data of a social and economic nature with a view to correct management, protection and development of the territory.

Fig. 10: Pescara Pn. (PE), Pescara, rural house transformed and close to demolition (S.C. 2015).

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Rosettes on the Tombstones in Muradiye Complex

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Abstract

Muradiye Complex, located in Bursa province, was built by Sultan Murat II in the 15th century. Muradiye Complex is a widescale structure consisting of a mosque, bath, madrasah, imaret and tombs belonging to the dynasty and was included in the Unesco World Heritage list in 2014. Within the complex there are two open areas where the tombs of the courtiers who are not members of the dynasty are located. When the tombstones here are examined, the diversity in the rosette motifs on the stones draws attention. With their circular form, rosettes are ornamental elements that have been frequently used in architecture since pre-Islamic times. In addition to their formal diversity, these motifs are also iconogrophically important in terms of representing concepts such as time, life cycle, etc. Within the scope of the study, the rosette forms on the tombstones of Muradiye Complex were analyzed, their typologies were determined and an inventory was created.

Keywords: Muradiye Complex, rosette, tombstones, cultural heritage, gülbezek

1.   Introduction

Ornamental motifs in circular form are called rosette. Rosettes are generally derived from floral motifs, spirals or repeating geometric forms. The rosette motif has been used since prehistoric times. It is an artistic tradition that appears in almost every culture that has its own art [1]. Van Hoek, in his study of rosette motifs (a circle of bowl marks around a central bowl) in British prehistoric rock art, found that rosettes have specific local concentrations, as if they were symbols of social identity [2]. Van Buren states that although it is possible to think of rosettes as purely decorative motifs, when the environment in which they were found is analyzed, these motifs were used with an intention beyond ornamentation [1]. From this point of view, it is understood that the meaning of the motifs varies according to the culture in which they are shaped.

Throughout history, the circle form has been attributed various meanings in cosmological, philosophical, mythological, symbolic and architectural terms [3]. According to Schuon, the circle, which expands infinitely from the center to the periphery, is the expression of spatial and temporal infinity [4]. Jung, on the other hand, points out that the circle symbol is an indicator of the integrity at the basis of life [5]. According to Ögel, the circle symbol is associated with concepts such as the unity of the universe and infinity [6]. The principle of dispersion from a single center in the form of a circle refers to the sacred and creation in Islamic philosophy [3].

In the relevant literature, the circle and circular movement are associated with cosmic elements. The circular motif is accepted as the symbol of the sun, the source of celestial movement, etc. in traditions and beliefs such as ancient Egypt, Hinduism and Buddhism [7]. The sun and its representation, the circle, were identified with God and considered sacred in

prehistoric and ancient times. At this point, a similarity can be drawn with the mandala symbols that have an important place in Hinduism and Buddhism. According to Jung, the mandala is the representative of the connection between sacred forces and the universe [5]. Mandala or concentric circles are seen as an expression of cosmic energy, a microcosm and also a symbol of God [8].

This universal meaning attributed to the circle form explains the presence of rosette and similar motifs in different geographies and beliefs. For example, Van Buren, who examines rosettes in Mesopotamian art, writes that these motifs symbolize goddesses. She points out that the rosettes on the tombstones of the period may have been made to indicate that the deceased was a devotee or initiate of the goddess [1].

Rosettes, which were widely used in the Anatolian Seljuk period and became one of the main architectural ornamentation elements, were also frequently used in the Great Seljuk and Ottoman periods. The shaping of the motif was interpreted with the unique style of each period. In these cultures, the motif refers to concepts such as the eternal life cycle, God, universe and cosmos. According to Esin, "time was measured by the phases of celestial bodies rotating in space and the phases of change of living beings in life and beyond death" and Turks considered the human soul as a rotating being [9]. Therefore, the circle symbol is associated with concepts such as the power of spirits, being in motion, and temporality. In Islamic culture, it is seen to represent concepts such as infinity and the infinity of God.

Williams mentions that the rosette form was frequently used during the Renaissance. The rosette motif is found in the floor coverings of architectural works such as the Church of San Spirito, the Laurentian Library and Campidoglio Square. In Renaissance architecture, a special importance was given to the central plan and the central point of the building was identified with the creator of the cosmos. According to Williams, this emphasis on the center is one of the reasons why the rosette form is preferred in design. Derived from a strong center, rosette motifs are an effective means of conveying the importance of the center to the moving observer [10].

In line with this information, it is possible to say that rosette motifs are design elements that are important not only with the unlimited variety in their designs but also semantically. For this reason, within the scope of the research, it was aimed to create a typology of the rosettes in Muradiye Complex.

2. Methodology

The geometric rosette has often been used in art and architecture to decorate surfaces. The rosette can be surrounded by various types of outer cells that maintain its concentric form. The center of symmetry is the center of the concentric circles that surround the central star, the middle cells and the different outer cells respectively. The arrangement of the rosette is linked to the number of central cells [11]. In the literature, there are studies that propose various drawing methods by analyzing the types of rosettes [12]. Although these methods were taken as a reference while creating the typology of the rosette varieties in the Muradiye Complex, it was understood that the proposed methods were not suitable for all designs. The geometries of the rosettes were tried to be analyzed for each design and transferred to the drawing using tools such as autocad and adobe illustrator.

3. Rosettes on the Tombstones

Muradiye Complex was built by Sultan Murat II in 1425 in Bursa, the first capital of the Ottoman Empire. Muradiye is the last complex built by the Ottoman sultans in Bursa. The complex consists of a mosque, a bathhouse, a madrasah, an imaret, a fountain and 13 mausoleums of the sultans. With the restoration carried out in 2012, Ottoman Period tombstones, building and fountain inscriptions, architectural elements such as cists, etc. dated to different times between the mid-15th and 20th centuries were collected in the complex and an open-air museum was created here. The complex was inscribed on the UNESCO World Heritage List in 2014 as a part of "Bursa and Cumalikizik: The Birth of the Ottoman Empire" World Heritage Site.

Fig. 1: Tombstones located in Muradiye Complex

The Muradiye Complex has a rich diversity both in terms of its architectural quality and the use of arts specific to Turkish culture such as tile and calligraphy. The study focuses on the tombstones section of the complex, which can also be described as an open-air museum. In this section, there are a large number of tombstones made of marble and stone materials, dating to different times between the 15th and 16th centuries, with titles or inscriptions. Tombstones can be considered as important means of communication between past and future generations. Tombstones, which embody many cultural qualities, also appear as an art form. Coming from a nomadic culture, the Turks' living in different geographies and changes in their religious beliefs play an important role in the evolution of tombstone design. Tombstones appear as design elements composed with literary texts, various symbols, titles and ornaments. The rosette motif has also been frequently used on gravestones. When the tombstones in Muradiye were examined, many types of rosettes in different designs were found. Although some motifs are repeated on different stones, a total of 43 different types of rosettes were identified (Table 1). Those whose geometry was analyzed were transferred to the drawing (nos. 1-37). One of the motifs could not be read due to abrasion on the stone (nos. 43).

| 1 | 2 | 3 |
| 4 | 5 | 6 |

7	**8**	**9**
10	**11**	**12**
13	**14**	**15**
16	**17**	**18**

19	20	21
22	23	24
25	26	27
28	29	30

31	**32**	**33**
34	**35**	**36**
37	**38**	**39**
40	**41**	**42**
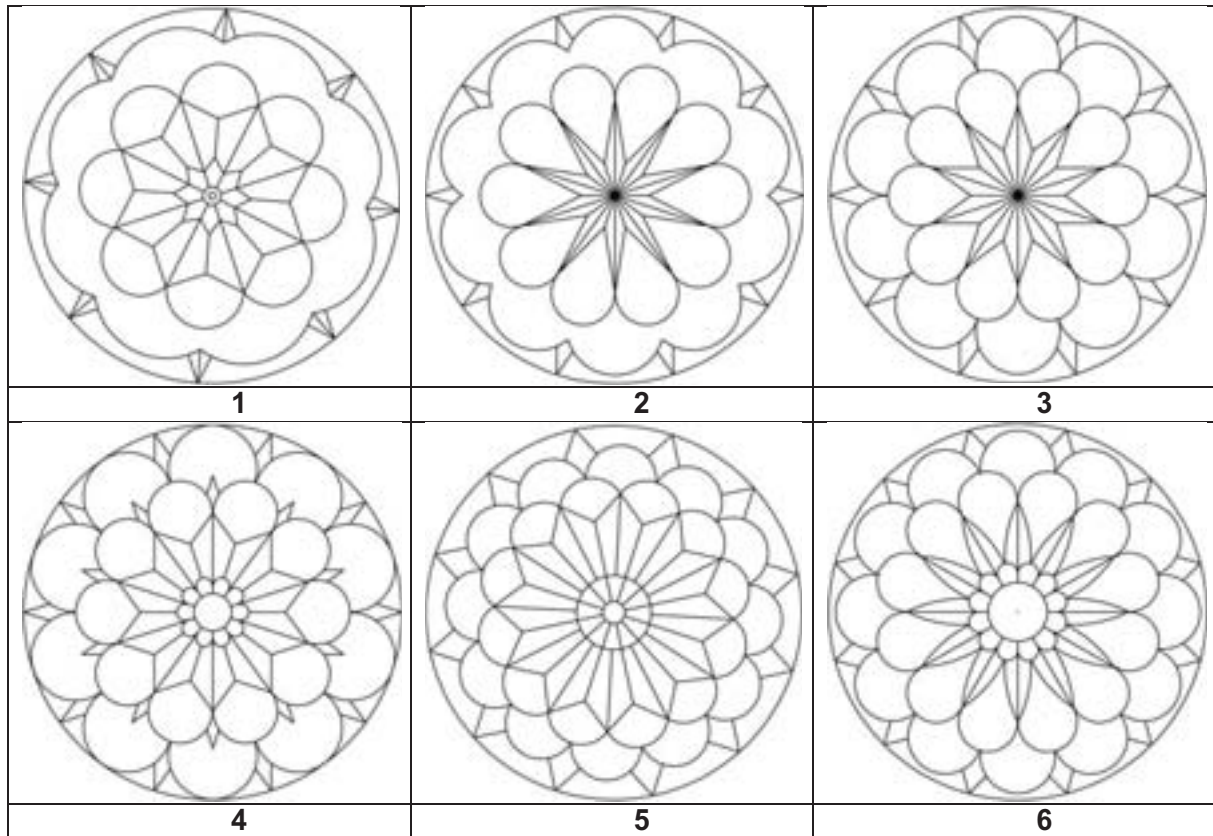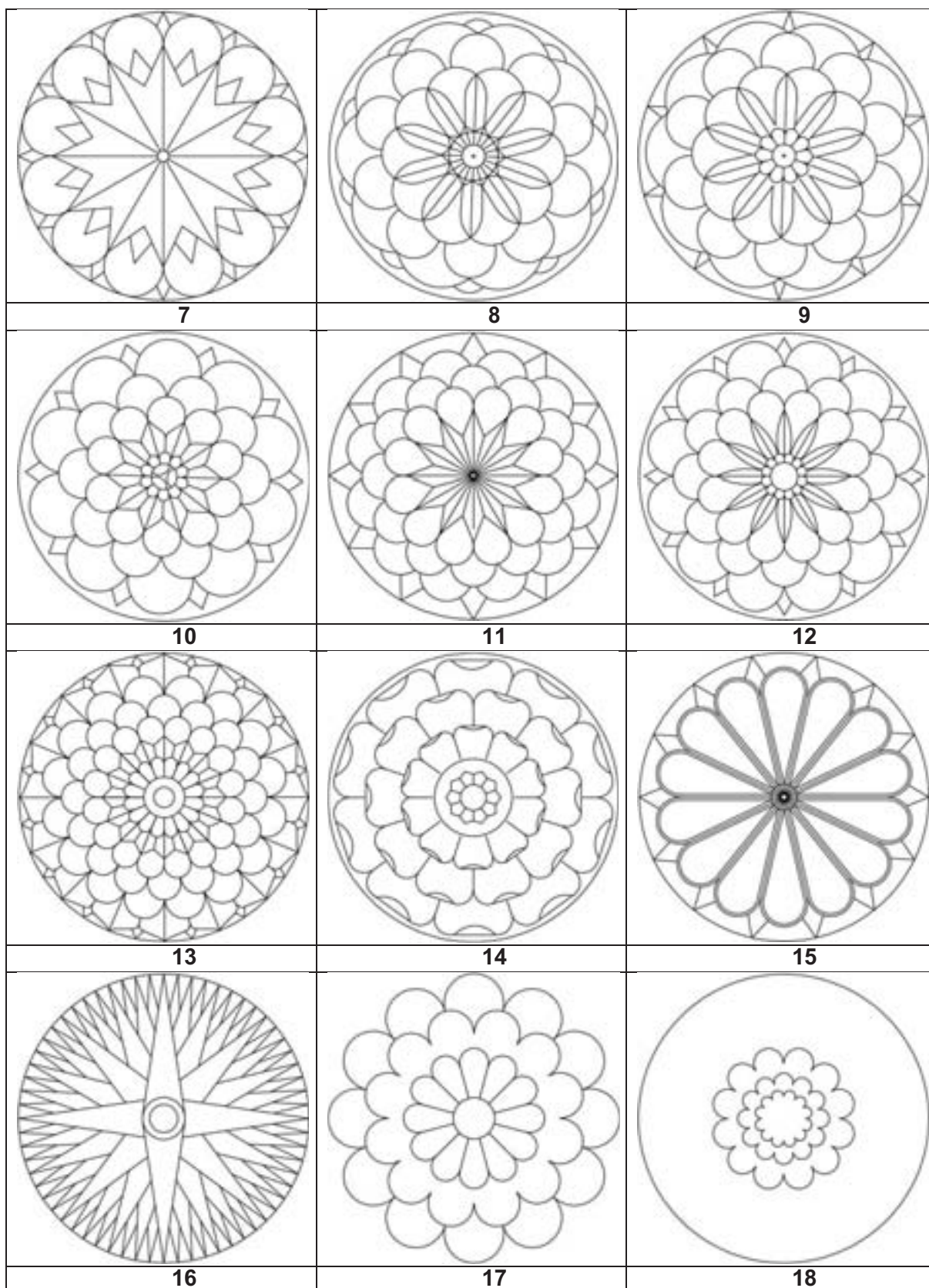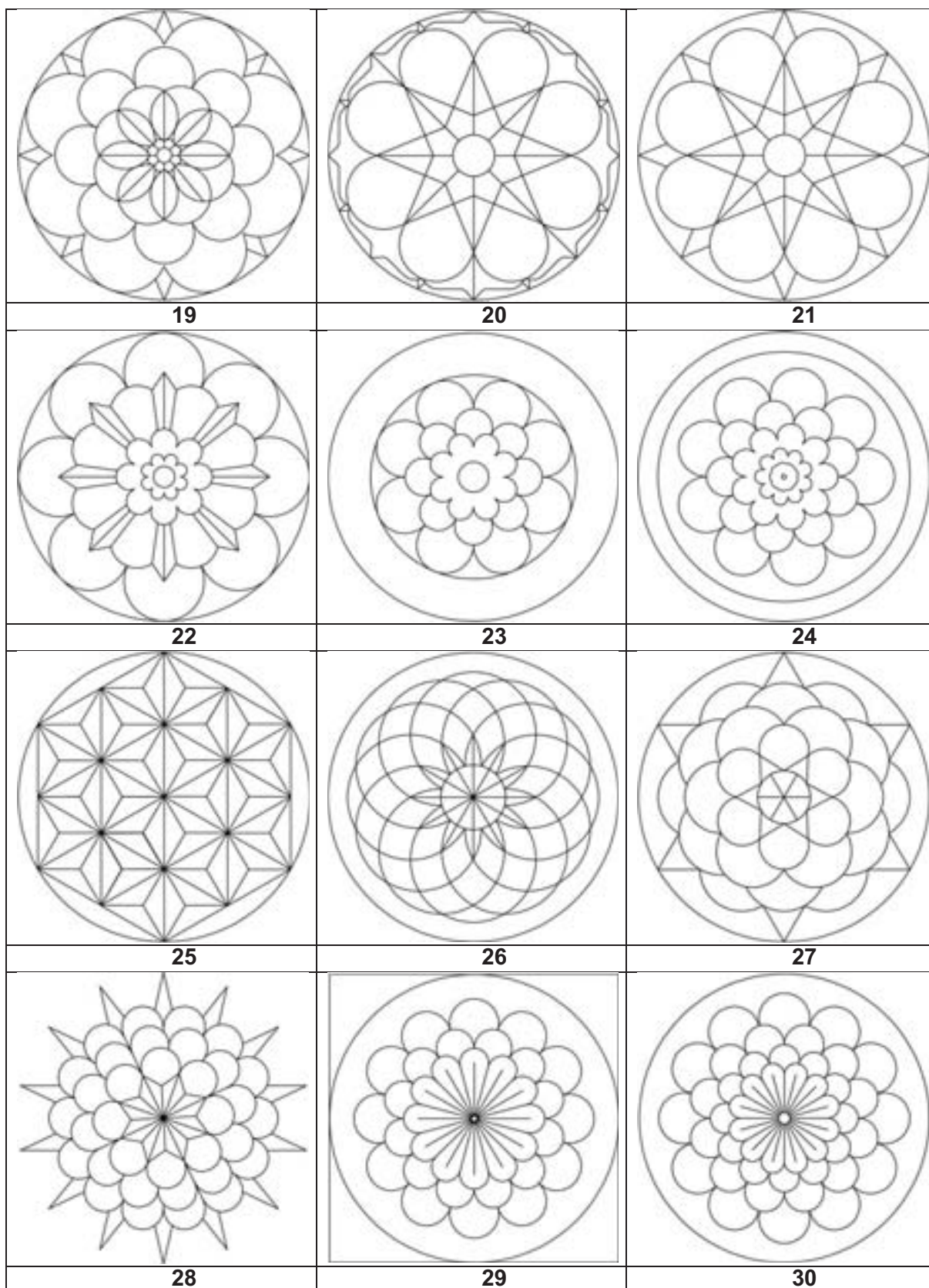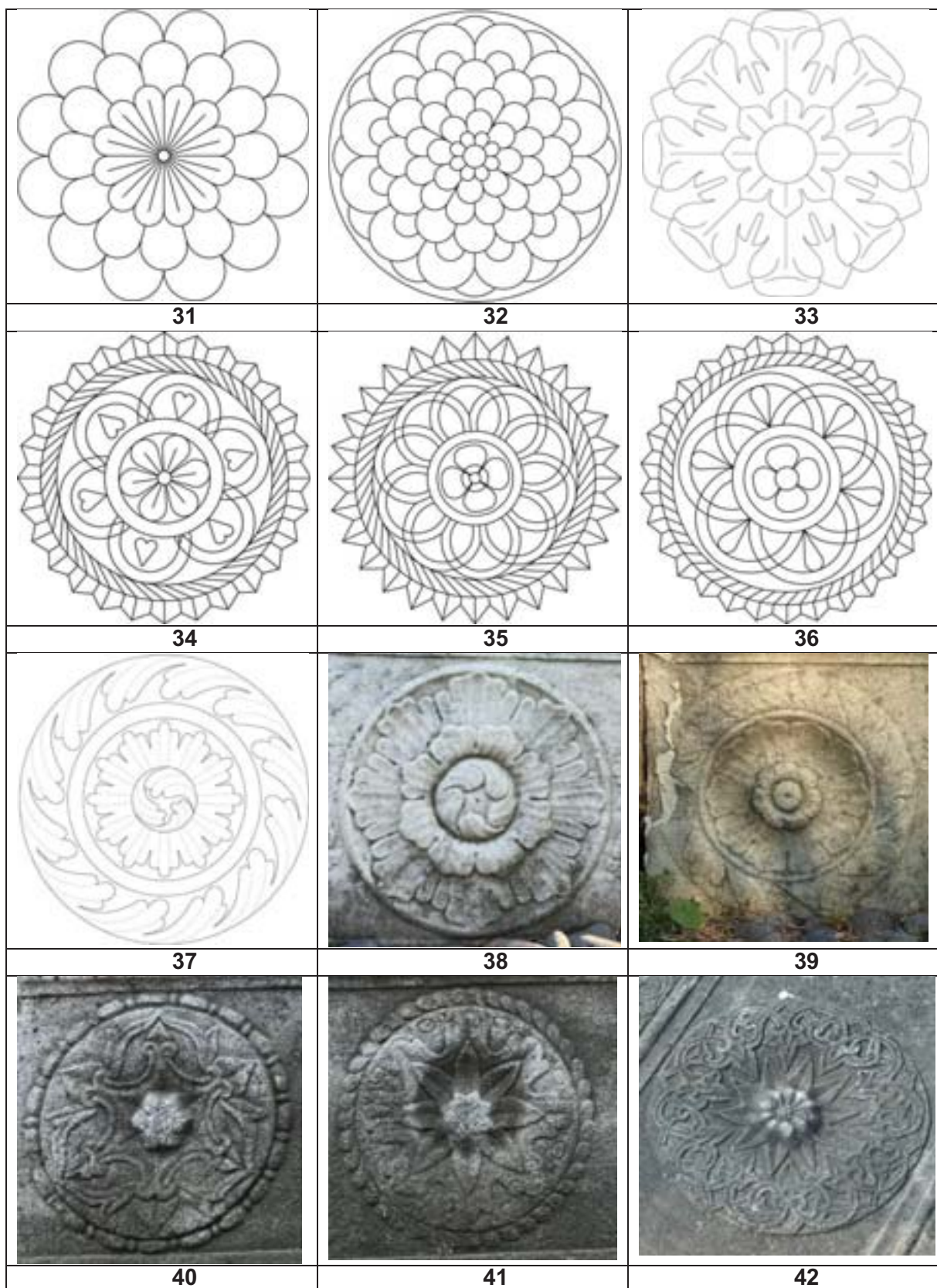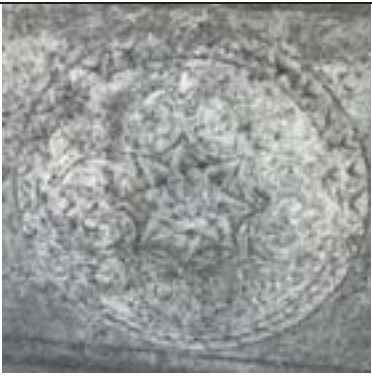
43		

Fig.2: Table 1. Typologies of rosettes

4.   Conclusion

As mentioned in the introduction, rosettes are in circular form, symmetrically arranged and emphasize a single center. When the designs are examined, it is seen that geometric floral motifs are predominant. Beliefs such as Buddha being born from the heart of a lotus flower in Buddhism and the rose flower symbolizing the prophet in Islam explain the use of floral motifs. Although some motifs look similar at first glance, they differ from each other due to differences in the number of rows from the center to the outer periphery, the number of middle cells, and the design of the central star/section. The design of the motifs as reliefs on the material strengthens the perception of depth.

It is possible to come across rosette motifs in most architectural and artistic works in Anatolia. However, the number of studies aiming to create a typology of these motifs is very limited. For this reason, the research aims to draw attention to the subject and to create a typology of the rosettes in Muradiye Complex. With their semantic value and unlimited variety in design, these motifs constitute a part of our cultural heritage. Unfortunately, the fact that Turkey is an earthquake country is a negative factor in the sustainability of our cultural and architectural heritage. Therefore, it is important that the elements that make up our heritage are documented and passed on to future generations.

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Rebuilding settlement culture: playground as a tool to reactivate the social cohesion in fragile communities

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Abstract
Besides destroying cultural heritage, armed conflicts tend to undermine social cohesion. Children are the most affected victims and their needs must be looked after first and foremost by recovering to themthe value of play in the reconstruction of cities.
After the Second World War, playgrounds played a strategic role not only in the progressive recovery of open spaces but also in the reconstruction of communities, where children were certainly the most fragile stakeholders. The post-war playgrounds had great interest for having rehabilitated the right to play denied by armed conflicts, designing types of games to arouse their creativity, and for the low-cost construction, due to the economic crisis of these spaces. Starting from the desk research on the performances of playgrounds built in Europe after the world conflict, the methodology confronted them with the contemporary needs of many refugee children and the new requirements introduced by UNI standards. The research returns guidelines for design that recover themes of interest already in historical parks, such as creativity, low cost, and reuse of materials, to decline them in a contemporary key, with the paradigms of the circular economy.

Keywords: Playground, Second World War, Refugees, Fragile communities, Maintenance.

1.   Introduction
Within the framework of the built environment recovery processes [1,2,3,4,5,6], the research identifies the system of open spaces for public use as a key element in the transmission of the territories' identity and the cultural diversity of communities. The open spaces of cities, the connective tissue between the built environment and inhabitants, constitute one of the cornerstones of European identity, as places with the ability to sustain the social, cultural, environmental, and economic changes of communities overtime [7].
The research investigates the strategic role of playgrounds in the reuse and redevelopment of public open spaces in fragile contexts. Starting with armed conflicts, which in addition to destroying cultural heritage tend to undermine social cohesion, post-World War II playgrounds represent an example of the reuse of abandoned open spaces in bombed-out European cities. In this context, children represent privileged stakeholders in the recovery process as

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victims most affected by the consequences of conflict. The value of play in the reconstruction of post-World War II cities made the playground a tool for physical, social, cultural, and psychological redevelopment [8].

Currently, the European Union tends to play a welcoming role towards refugees, especially women and children, who migrate from wars, poverty, famine, and adverse weather events in search of better living conditions [9].

Unicef, in 2023, recorded the arrival in Europe of about 270,100 migrants, including 64,500 minors, in often dire conditions, fleeing from the Middle East and North Africa, Sub-Saharan Africa, and Central and South Asia. This number registered a sharp increase compared to 2022, when arrivals totaled 160,000 people, including some 32,200 children were under the age of 18.

Considering the Mediterranean also the Western Balkan routes, in 2023 a total of 361,839 refugees and migrants arrived in Italy, Greece, Bosnia-Herzegovina, Bulgaria, and Serbia, including 53,738 minors, more than 30,000 of whom were unaccompanied.

Italy is the first country to the arrival of refugees and migrants in Europe: over 157,600 arrivals in 2023 from the Mediterranean, against 105,100 in 2022 and 67,400 in 2021. Of the 157,651 arrivals in 2023, more than 26,800 were minors, including over 17,800 unaccompanied. In addition to arrivals by sea,

there are over 173,900 Ukrainian refugees fleeing war, more than 49,400 of whom are under the age of 18 [10].

2.   The world is our playground: learning from the past

Play is how children learn to be in the world and build narratives, knowledge, and social skills. Play is an essential activity for children. It is an effective way for parents and kids to connect and express love. The International Convention on the Rights of the Child [11], in Article 31, recognizes play as an 'inalienable right', not only for the physical growth but also for the social, emotional, and intellectual development of the child. It also becomes a tool to support development: indeed, numerous studies have shown that children, who are denied the right to play, manifest socially aggressive and emotionally repressed atypical behavior [12,13,14,15,16]. Numerous global and European action programs and documents promote and protect children's rights: ensuring their safety; building a world tailored to children where sustainable human development takes their best interests into account; listening to children, and ensuring their participation [17,18,19].

In the years after the Second World War, residual spaces in several European cities began to be reused as places for children to play and recreate. Playgrounds arose, therefore, in difficult contexts as an attempt to reply to social problems worsened by conflict and enemy occupation [20]. Carl Theodor Sorensen, Lady Allen of Hurtwood, Aldo Van Eyck, Alfred Trachsel, and Alfred Ledermann, turning their attention to the everyday life of young users, in cities just emerging from the war, interpreted playgrounds as a component of a more general physical and social reconstruction of the city, thus making children, who until then had not been included as bearers of needs in city planning practices, visible on the public scene [21].

These years saw the birth first of Junk Playgrounds and then Adventure Playgrounds, which unlike traditional playgrounds did not consist of play equipment that guided the child to perform repetitive activities but instead involved the child in experimenting, making, and destroying. They were places where children were free to do many things: build houses, dens, and climbing structures out of discarded materials, make bonfires, cook outdoors, dig holes, garden, or simply play with sand, water, and clay [22]. Particularly interesting was the work carried out in Amsterdam between 1947 and 1948 by Aldo van Eyck, who in his playgrounds not only included a few simple devices to leave the children's imagination free to choose the play activities to be carried out there but also endeavored to merge them with the city, favoring interaction and inclusion [23].

3.   Methods and Materials

The methodology consists of three main phases: knowledge, processing, and validation, developed in an iterative process.

The knowledge phase involved the identification of contemporary needs, the requirements of current regulations, and the performance of past best practices. Different methods of analysis were used for each of these aspects, referring to multi-criteria approaches [6]:

•   The identification of contemporary needs took place through Strategic Options Development and Analysis [24], based on the construction of community engagement and decision-maker involvement tools. In the former case, the use of large-scale questionnaires

aimed at prioritizing the needs; in the latter case, survey interviews made it possible to verify their implementation action in the co-design and co-implementation phases of the recovery process.

•   The identification of requirements was carried out by an analysis of technical standards, in which the priority sector addresses the UNI EN 1176-1:2018 and UNI EN 1177:2019 standards selected [25] [26].

•   The identification of best practice performance was carried out through desk research on a European scale, choosing 11 Adventure playgrounds built after World War II. These cases were identified as best practices based on the ability to recover and enhance the built environment through the reuse of local materials by post-war communities. The systemic analysis of Adventure Playgrounds according to environmental and technological units, lead to the identification of common criteria for selecting the performance of strategic playgrounds in participatory regeneration for post-conflict reconstruction [27].

The processing phase involved the identification of guidelines for the design of inclusive and educational playgrounds, through the construction of a matrix comparing needs, requirements and performance.

The outcomes of this matrix return guidelines that highlights the importance of transversal themes of interest that can be declined in a circular and sustainable perspective for the participatory transformation of the built environment.

The validation phase concerned the compliance of the guidelines through the ongoing experimentation of the project '2022-PEM-00215 GIRASOLI', led by L'Orsa Maggiore social cooperative E.T.S. and whose partners are local associations and the Department of Architecture of the University of Naples Federico II (Figure 1).
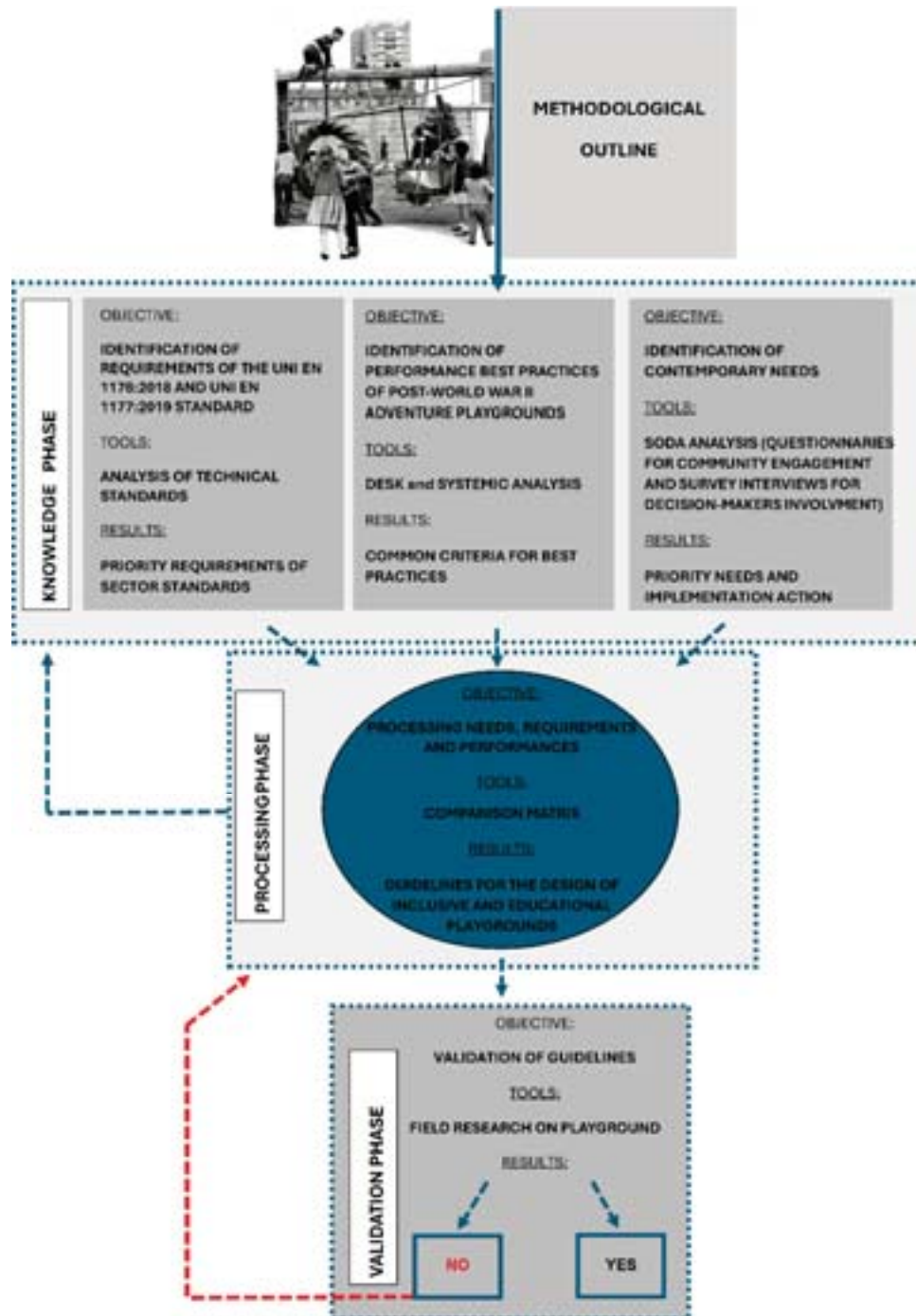
Fig. 1: Methodological outline

The iterativeness of the methodological path follow the trial-and-error process, whereby the failure to validate one of the guidelines provides for its reworking by retracing the previous methodological phase.

4.   Result and Discussion
The analysis of the adventure playgrounds created after World War II (Figure 2) reveals the preponderant use of waste and low-cost materials, which stimulated creativity, and psychological- affective and sensorial development.

Fig. 2: Example of best practice Bertelsmann Plein, Amsterdam, 1947, Aldo Van Eyck

In the analyzed best practices, accessibility, inclusion, and quality of the socio-educational services place the practices as social and cultural points of the fragile contexts in which they were implemented(Figure 3).

Fig. 3: The selected Eleven Adventure Playgrounds created after World War II

The best practices common criteria identified the performances for the design of playgrounds (Figure 4).

Fig. 4: The common criteria of Eleven Adventure Playgrounds

The guidelines are developed by systematizing, through a matrix: the performance of historical playgrounds, the requirements from technical standards, and the contemporary needs surveyed through participatory approaches (Figure 5).

Fig. 5: Guidelines for the design of inclusive and educational playgrounds

The guidelines represent tools to guide the choices in the process of reuse of open spaces for collective use as urban infrastructure for informal learning, aimed at building community ties and new cultural models. The validation of these guidelines in contemporary playground design has been confronted in the ongoing experimentation of the *Girasoli* project. Working in this context of high fragility and educational poverty, the use of the guidelines is aimed at increasing the well-being of 125 children, enrolled in Hakuna Matata and Froebel primary schools, in order to improve the quality of life in the Quarto neighborhood of Naples. The *Girasoli* project aims at enanche creativity and cohesion too, which are fundamental to the empowerment of the entire local community. The guidelines respond, on the one hand, to the new requirements introduced by the UNI standards, centered above all on strategic themes such as sustainability, circularity, and recovery. On the other hand, they address transformative actions of the built environment aimed at evoking the virtuous performances already present in the historical parks declined in a contemporary key according to the paradigms of the circular economy.

5. Conclusion

The definition of guidelines represents a tool for the design of inclusive and educational playgrounds. They focus on the selection of playground devices concerning the community that is to receive them, to trigger processes of socialization, care, and sharing. The guidelines are useful tools for an appropriate transformation of the built environment, replicable in different fragile contexts for improving the quality of life of communities and the built environment, starting with the children's generation. They mark new perspectives for the transformation of cities towards more inclusive, sustainable, and attractive settlement systems, steering away the loss of quality of open spaces and generating cohesion and participation in increasingly heterogeneous and multi-ethnic communities.

The vision of a city as a community-built custom playground revolutionises the idea that spaces for children are to be designed as bounded playgrounds, separated from other parts of the public space. In the research perspective, playgrounds become an open and continuous system, places of ecological and identity quality, a garrison of settlement culture and an extraordinary source of change in management processes, starting with the involvement of children, the generation to whom we will transmit our world. In the scenario of the transition to sustainable human development, the playground can contribute to children's growth through the creation of bonds of affection and responsibility towards the place where they grow up, and in particular towards public space, which they must learn to conceive as a common good.

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Urbanisation in Protected Areas and Beyond Their Boundaries. An Analysis of National Parks in Italy for an Integrated Planning

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Abstract
The spread of unsustainable development models, driven by global trends and dynamics of urbanisation, has led to ecosystem degradation and biodiversity loss. Protected Areas play a crucial role not only in nature conservation but also in enhancing territorial resilience. However, urbanisation trends and policies pose challenges to PAs, especially in Italy, where the interaction between PAs and urban areas is significant. This study analyses Italian National Parks and urbanisation patterns within and outside their boundaries. Results indicate low urbanisation within PAs but significant urban expansion in surrounding areas. This underscores the need for integrated territorial governance to ensure the effectiveness of conservation efforts and to address threats to ecological connectivity.

Keywords: Protected Areas, Urbanisation, GIS analysis, Integrated planning.

1.   Protected Areas and contemporary territories. New challenges to address

Global trends and dynamics such as population growth, urbanisation [1], and territorial metropolisation [2, 3] have led to the proliferation of unsustainable development patterns characterised by land consumption, ecosystem fragmentation, degradation, biodiversity loss, depletion of environmental resources, and pollution. These patterns result in increasing vulnerabilities of territories [4, 5] as well as significant impacts on ecosystems and human health.

Protected Areas (PAs) are fully involved in the contemporary disciplinary debate concerning the scenarios and socio-territorial effects of metropolisation. They are recognised not only for their role in conserving and enhancing natural heritage [6] but also as "tools"[1] for the resilience of territories. They must be able to respond to the challenges posed by ongoing

anthropogenic pressures and innovate towards social, economic, and environmental sustainability [8, 9]. In particular, they play a decisive role in climate change mitigation and adaptation strategies, natural risk reduction, sustainable territorial development, and improving the quality of life for settled communities and species [8].

PAs, defined by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) as "conservation biodiversity cornerstones" [10], are consistently recognised as the most effective instruments for protecting biodiversity and ecosystem services in situ. According to the International Union for Conservation of Nature (IUCN) definition, they are described as "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means (...)" [11]. Through protective regulations, they effectively reduce processes of radical soil anthropisation and ecosystem fragmentation.

Furthermore, there is an emerging trend of increasing interaction between PAs and urbanised contexts. This is evident from: i) the positive trend in terms of the surface area of PAs in accordance with international and national policies and strategies (Kunming-Montreal Global Biodiversity Framework, 2022; European Biodiversity Strategy for 2030, 2020; National Biodiversity Strategy for 2030, 2023); ii) the localization of PAs in urbanised contexts; iii) the processes of urbanisation characterising territories adjacent to Protected Areas [11, 12].

The interaction between Protected Areas and urbanised contexts draws attention to the traditional approach of the "dual protection model" [14], which aims to protect areas of recognized naturalistic value, the PAs, while allowing indiscriminate urbanisation outside their boundaries and resulting in increased insularisation of PAs [15]. This approach highlights the need for a renewal of strategies and tools for territorial governance that embrace the territory's complex unity, transcending the administrative boundaries of Protected Areas and acting on its physical dimension. The objective, in line with the current challenges of contemporary territories, is to adopt a model that embodies the "new paradigms of conservation" [16] for open and integrated PAs within the context, capable of reflecting the benefits of their actions onto the surrounding environment.

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[1]"Protected areas are a valuable and effective tool for helping to address many of the conditions that cause natural hazards" [7].

2.   Italian National Parks: An Overview

Within this framework, the study aims to analyse the relationship between Italian National Parks (NPs) and urbanised areas, both within and outside protected boundaries, as well as to conduct a reconnaissance of the planning tools specific to Protected Areas (Park Plans).

The twenty-five established National Parks[2] cover a total area of 15336,05 km², representing 5% of the total national surface area. They reflect, in a highly varied manner the different territorial, landscape, and environmental contexts of the peninsula. The great heterogeneity that characterises them also concerns the territorial surfaces of the individual NPs which, as shown in Table 1, range from 1822,2 km² of the Pollino NP, the largest, to 38,6 km² of the Cinque Terre NP, the smallest. They have been established since 1922 with the first NP, the Gran Paradiso, up to the latest on the Island of Pantelleria in 2016. In addition, the 2018 Budget Law[3] approved two amendments for the future establishment of two more NPs, Portofino and Matese.

From a regulatory perspective, the fundamental reference is the "Framework Law on Protected Areas" (L. 394/1991) [6], which identifies National Parks as "…areas of land, rivers, lakes, or seas containing one or more ecosystems, intact or partially altered by human interventions...of international or national importance for naturalistic, scientific, aesthetic, cultural, educational, and recreational values" (art. 2, co. 1). The following are emphasised: on the one hand, the relationship between the Protected Area and anthropic intervention understood as a threat, of which urbanisation represents the most invasive component; on the other hand, the recognition of not only naturalistic values to be safeguarded and promoted, but the set of "aesthetic, cultural, educational and recreational" [6] characteristics resulting from the reciprocal relationships established between anthropic actions and the natural environment, as well as "conservation for present and future generations" [6]as the objective and horizon of State intervention in the establishment of PAs.

The Framework Law, in Article 12, introduces and defines the NP planning instrument in the Park Plan, which pursues the "protection of natural and environmental values" entrusted to the Park Authority. It "has the effect of a declaration of general public interest and of urgency and indispensability for the interventions provided for therein, and furthermore replaces landscape plans, territorial or urban planning plans, and any other planning tool at every level" (Art. 12, co. 7), making evident the importance attributed to it by the law. Moreover, despite the regulation stipulating that it must be approved within a maximum period of 24 months from the establishment of the Park Authority (Art. 12, co. 4), out of the 24 NPs (whose Park Authority is established), only 13 have a plan definitively approved (Tab. 2). The same Law introduces, in Article 32, the "Contiguous Areas". The Park Authority has the autonomy to establish rules limited to "prohibitions regarding the methods and times of hunting" if necessary, while it is the Region "in agreement with the Park Authority and the local authorities concerned that can establish plans and programs and any disciplinary measures (...) where necessary to ensure the conservation of the values of the protected areas themselves". Hence, the stratification of competencies involved in territorial planning within the contexts of Protected Areas is evident, often resulting in coordination issues among all policies, traditionally characterised by a sectoral dimension [12].

In conclusion, Law 394/91 has certainly represented an innovative impulse achieving important objectives, including safeguarding 10% of the national territory. At the same time, it has returned a dual vision of the territory, between what is encompassed within the boundaries of Protected Areas and must be safeguarded and what is outside. In this framework, the contribution intends to analyse the relationship between the Protected Area and the urbanised area, within its boundaries and outside, recalling the need to adopt a unitary conceptual dimension of territorial government.

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[2] Although the Golfo di Orosei e Gennargentu National Park was established by Presidential Decree of 30 March 1998, it has never been operational and the management bodies have never been established.

[3] 2018 Budget Law. Profili di interesse della VIII Commissione Ambiente A.C. 4768. Dossier XVII Legislatura.

3.   Interaction between Protected Areas and urbanised areas

The contribution proposes two types of analysis, the first of an analytical-conceptual nature, the second of an analytical-assessment nature.

The analytical and knowledge phase initially investigated the consistency of the National Parks, starting with: identification, in chronological order, of the year of establishment of the Park and the Park Authority; geographical location (Figure 1); possible presence of other types of international designations (UNESCO Man and Biosphere Reserve, IUCN Green List and UNESCO Global Geopark).

In a second stage, the analysis concerned the identification of: territorial extension; number of municipalities falling, partially or entirely, within the NPs; geographical classification according to the territorial contexts of reference (mountain, hill, coast, island); and finally, the state of Park planning. The data necessary for the elaboration of these analyses were retrieved from: institutional websites of the individual National Parks; EUAP (Official List of Protected Areas); "State of progress of planning in the National Parks: synoptic picture of the chronology of the Plan approval and updating process" prepared by ISPRA [17]. The summary results are listed in Tables 1 and 2.

In conclusion, a quantitative analysis was carried out, using the QGis software, limited to the calculation in percentage terms of urbanisation within the twenty-five National Parks and outside them, within two buffer zones identified at 500 m and 1500 m from the protected areas boundaries[4]. Data from the Corine Land Cover (CLC) 2018 dataset were utilised for land use and land cover [18]. Specifically, codes related to Level 1 Artificial Surfaces, as labelled in the CLC Database, were selected. An intersection was then performed with the NPs and buffer zones layers defined at 500 m and 1500 m from the NPs boundaries, followed by calculating the average percentage of urbanised area with reference to the three investigation levels (1. National Parks; 2. 500 m buffer zone; 3. 1500 m buffer zone). Data were obtained from: Corine Land Cover 2018 Database [19] and the National Geoportal for the NPs layer [20].

The results of the analysis conducted on urbanisation within and outside NPs, as reported briefly in Table 3 (see also Figure 2), demonstrate that, on average, the percentage of urbanised areas within NPs is very low, at 0.7%. Conversely, outside the NPs, the same percentage increases significantly: in the 500 m buffer zone with a percentage of 1.7% (more than doubled) and in the 1500 m buffer zone with a percentage of 3% (more than tripled).

4.   Conclusions

These results describe the extent of the relationship between National Parks, external contexts, and urbanised areas, which pose potential threats to ecological connectivity and ecosystem functioning. Starting from these results, we intend to recall the need to adopt a new conception, one that assumes a unitary dimension of the territory, in the conviction that the objectives of protecting and enhancing the Protected Areas cannot be pursued except within a comprehensive notion of territorial government. It is necessary to renew strategies and tools that regulate the use and transformation of territories, the planning, location and implementation of interventions in favour of an integrated management that overcomes the 'dual protection model' and the insularisation of protected areas. The development of the territory functionally connected to the defence of the soil, the protection of the landscape, the Natural Capital and the care of collective interests must embrace the 'new paradigms of conservation' for Protected Areas that are open and integrated in the context, capable of reverberating on it the benefits of their actions.

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[4] The definition of buffer zones at 500 m and 1500 m was taken from an earlier study: Ministry of the Environment, the Nature Conservation Service, CED-PPN. AP. The National System of Protected Areas in the European Context: Classification, Planning and Management. 2003

Fig. 1: Map of Italian National Parks (listed from 1 to 25, according to chronological order of Parks' institution as following in Table 2 and Table 3).The black dots stand for Regional Capital e for the two Autonomous Provinces.

N.	National Park	Year of Institution	Year of Park Autority Institution	Region	Further International Protection Designations
0	1	2	3	4	6
1	Gran Paradiso	1922	1947	Aosta Valley Piedmont	IUCN Green list
2	Abruzzo, Lazio e Molise	1923	1950	Abruzzo Lazio Molise	-
3	Circeo	1934	2005	Lazio	UNESCO Man and Biosphere Reserve
4	Stelvio	1935	1993	Autonomous Province of Trento Autonomous Province of Bolzano Lombardy	-
5	Monti Sibillini	1988	1993	Marche Umbria	-
6	Pollino	1988	1993	Calabria Basilicata	UNESCO Global Geopark
7	Arcipelago Toscano	1989	1996	Tuscany	IUCN Green list UNESCO Man and Biosphere Reserve
8	Dolomiti Bellunesi	1990	1993	Veneto	-
9	Gran Sasso e Monti della Laga	1991	1995	Abruzzo Lazio Marche	-
10	Majella	1991	1995	Abruzzo	UNESCO Global Geopark
11	Vesuvio	1991	1995	Campania	UNESCO Man and Biosphere Reserve
12	Gargano	1991	1995	Puglia	-
13	Cilento, Vallo di Diano e Alburni	1991	1991	Campania	UNESCO Man and Biosphere Reserve UNESCO Global Geopark
14	Val Grande	1991	1993	Piedmont	-
15	Foreste Casentinesi, Monte Falterona e Campigna	1993	1993	Tuscany Emilia-Romagna	Green list IUCN
16	Aspromonte	1994	1994	Calabria	Global Geopark UNESCO
17	La Maddalena	1994	1996	Sardegna	-
18	Golfo di Orosei e Gennargentu	1998	-	Sardegna	-
19	Cinque Terre	1999	1999	Liguria	-
20	Appennino Tosco-Emiliano	2001	2001	Tuscany Emilia-Romagna	UNESCO Man and Biosphere Reserve
21	Asinara	2002	2002	Sardegna	-
22	Sila	2002	2002	Calabria	UNESCO Man and Biosphere Reserve
23	Alta Murgia	2004	2004	Puglia	-
24	Appennino lucano, Val d'Agri Lagonegrese	2007	2007	Basilicata	-
25	Isola di Pantelleria	2016	2016	Sicily	-

Tab. 1: List of the Italian National Parks (listed according to a chronological order of Parks' institution). The preview informations reported are (columns 1-5): 1) name of the National Park; 2) year of Park institution; 3) year of Park Authority institution; 4) administrative Region(s) or Autonomous Province(s); 5) Further International Protection Designations.

N.	National Park (NP)	Territorial extension (km²)	Number of municipalities included, totally or partially, in the NP	Geographical features (inland, coastal, island)	Park Plan status (year)**
0	1	2	3	4	5
1	Gran Paradiso	711,1	13	uplan	Approved (2019)
2	Abruzzo, Lazio e Molise	507,1	25	upland	Approved (2023)
3	Circeo	89,2	4	coastal	Adopted (2021)
4	Stelvio	1307,9	22	upland	Adopted (2023)
5	Monti Sibillini	697,4	16	upland	Adopted (2021)
6	Pollino	1822,2	54	upland	Approved (2023)
7	Arcipelago Toscano	176,9	11	island	Approved (2010)*
8	Dolomiti Bellunesi	309,9	15	upland	Approved (2000)*
9	Gran Sasso e Monti della Laga	1433,7	44	upland	Approved (2020)
10	Majella	741,29	39	upland	Approved (2009)*
11	Vesuvio	82,7	13	upland / coastal	Approved (2010)
12	Gargano	1204,9	18	hilly / coastal	Adopted (2010)
13	Cilento, Vallo di Diano e Alburni	1781,3	80	hilly / coastal	Approved (2010)*
14	Val Grande	147,3	16	upland	In process
15	Foreste Casentinesi, Monte Falterona e Campigna	369,2	11	upland	Approved (2010)
16	Aspromonte	645,9	37	upland / coastal	Approved (2009)*
17	La Maddalena	51,3	1	island	In process
18	Golfo di Orosei e Gennargentu	739,4	25	hilly / coastal	Unestablished Park Authority
19	Cinque Terre	38,6	5	coastal	Revoked (2010)
20	Appennino Tosco-Emiliano	228,1	13	upland	In process
21	Asinara	51,7	1	island	Approved (2010)*
22	Sila	772,1	21	upland	Adopted (2023)
23	Alta Murgia	680,7	14	hilly	Approved (2016)
24	Appennino lucano, Val d'Agri Lagonegrese	680,4	29	upland	Adopted (2021)
25	Isola di Pantelleria	65,6	1	island	In process

Tab. 2: List of the Italian National Parks (listed according to a chronological order of Parks' institution). The previews informations reported are (columns 1-5): 1) name of the National Park; 2) territorial extension; 3) number of municipalities included, totally or partially, in the National Park; 4) geographical features (upland, coastal, island, or a mix of them); 6) Park Plan status and year.
(*) Review process is in progress.
(**) Elaborated on the basis of: ISPRA "Stato di avanzamento della pianificazione nei Parchi Nazionali: quadro sinottico della cronologia dell'iter di approvazione e di aggiornamento del Piano (aggiornamento al 31/08/2023)" [17].
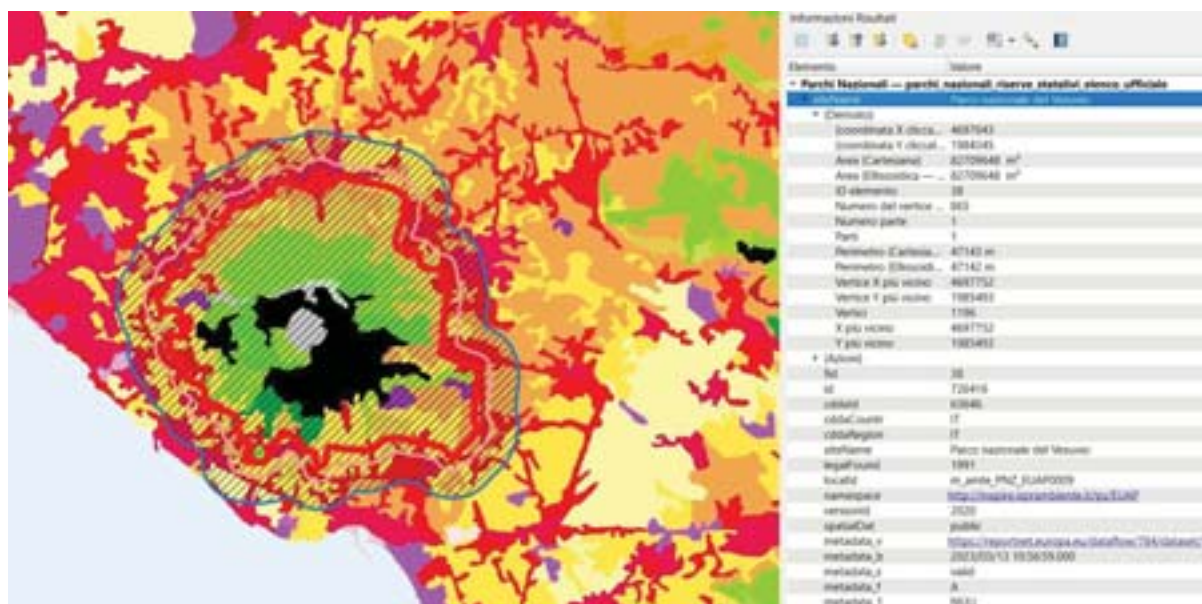
Fig. 2: QGis software interface during the analysis performed. Zoom on the Vesuvius NP. The base layer is the Corine Land Cover 2018, the red border defines the boundary of the NP, in pink and blue the limits of the buffer zones.

National Parks (NP) total area [km²]	Corine Land Cover (CLC) 1 [km²]	% CLC 1 / NP area [%]
1	2	3
15336,05	16502,71521	CLC 1 - National Parks **0,7 %**
		CLC 1 - Buffer zone 500 m **1,7 %**
		CLC 1 - Buffer zone 1500 m **3 %**

Tab. 3: Results of QGis analysis. The preview informations reported are (columns 1-3): 1) National Parks total area; 2) Corine Land Cover 1 area. In particular, the areas falling within CLC Level 1 – Artificial surfaces – are: 1.1 Urbanised residential areas; 1.2. Industrial, commercial and infrastructure zones; 1.3. Quarrying areas, building sites, dumps and artificial and abandoned land; 1.4. Artificial non-agricultural green areas; 3) Percentage of urbanised area on the three levels (National Parks, Buffer zone 500 m, Buffer zone 1500 m.

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Protection of Cultural Heritage from War Damage in Aleppo During the Time of War.

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Abstract
Generally, in Europe, when "war damage" suffered by the built cultural heritage is mentioned, it refers to the experience coming from the damage caused by WWI and WWII. Nowadays, the consequences of the war in Ukraine prompt reflection due to its geographic proximity and sudden change after 70 years of peaceful living in Europe. Studies on the Middle East's context often focus on political issues and cultural comparisons and rarely delve into the existing relation between the local communities and the built heritage. This paper examines the ongoing war in Syria that began in 2011, specifically focusing on the case of Aleppo, where the violence raged from 2012 to 2016, thereby destroying the city's urban fabric and its built heritage, with a huge impact on the social fabric.
The paper presents various preservation interventions realised by the local community of Aleppo between 2013 and 2014 to protect the city's built cultural heritage during the war. The analysis of specific examples of heritage which the local community chose to protect shows a mixture of cultural values within the protection initiatives. The strategies developed by the Aleppines to safeguard their cultural identity prove their crucial role in preserving the urban-built heritage and revealing strong cultural resilience. Therefore, the article highlights the complex relation between the Aleppo local community and the city-built heritage, revealing the identity value that was conferred on it during the war. As a result, the paper offers a new perspective on the complex social processes that link together the cultural values and the identity of the locals.

1.   Introduction

The presence of war always provokes huge consequences for the cultural heritage of cities involved in conflict areas. When an armed conflict affects an urban territory, it increases the level of risk and often causes extended destruction of the built environment. The consequences provoked to the built architectural heritage represent a specific typology of damage characterised by huge violence, particularly high in terms of its extension and irreversibility. One of the main characteristics of this kind of damage is the trauma that it causes to the population due to the high rapidity of its appearance (the damage is no longer the effect of the progressive decay that increases slowly over time, but it arrives suddenly as an unexpected event) and to the pervasive extension of the affected area, which normally depends on the expansion of the scene of the fighting. Due to the characteristics mentioned above, the devastation engendered by war to cultural heritage, particularly traditional architecture, constitutes a specific category of damage, different from all the other typologies that are usually subjected to restoration. War damage to historical buildings often necessitates reconstruction rather than restoration, which aims to avoid the complete disappearance of the material element. The presence of a destroyed historical-artistic-built heritage requires careful consideration for not only the absence of the material consistency of the items but also the possible loss of their value of identity and their other cultural implications (these values present various interpretations at the local and sovra-local scales, as well as at national/international level). The knowledge of these aspects and the awareness of their implications represent an unavoidable requirement to correctly interpret and define the most appropriate modalities of intervention for the damaged built heritage, adopting planning solutions that will be able to observe the cultural values of which the historical buildings were a direct expression.

Undoubtedly, an essential example of war destruction has been represented by the consequences of World War II. This example should not be ignored, and it should be considered not only concerning European reality. The destructions that were provoked to the European cities by the bombing of the Allied Army constitute a primary example of the main effects provoked by an armed conflict on urban-built heritage [1][2]. The knowledge of these events should be considered carefully due to their historical importance and specific contribution to the following years' theoretical debate concerning solutions to repair, restore, and rebuild the damaged and/or destroyed monuments. As it is well known, many studies have focused on this topic in the past years [3][4], including the ones that specifically deal with the role played by the public agencies, which were deputies to the conservation of the national heritage [5][6]. The reconstruction process was particularly long and complex due to the difficulties encountered by the discipline of restoration. These difficulties were correlated from one side to the impossibility of identifying a unique intervention methodology and, from the other, to the reasons previously mentioned (i.e., the trauma of the destruction, the loss of the material parts of the traditional buildings, the emotional engagement of the population, etc.).

The topic of the war damages that may be generated to the built architectural heritage concerns a central issue nowadays due to the not uncommon presence of conflicts and war scenarios all over the world, including nations with cities rich in historical and artistic built witnesses, as was the case in the Syrian city of Aleppo. According to this consideration, the Syrian war constitutes an emblematic case due to the damage that occurred to the city's cultural heritage and the fact that it shows the presence of specific forms of resilience that the local population has overtaken. Indeed, starting from the first years after the beginning of the fighting, the inhabitants of Aleppo had been directly involved in actions aimed at contrasting the war's negative consequences to minimise the damage to the urban architectural heritage.

2.   The Syrian War

The Syrian war is a complex and ongoing war that started in 2011, with protests escalating into armed conflict by 2012. Over time, the conflict emerged with international involvement, and rebel groups became armed opposition, ranging from secular factions to Islamist and Jihadist organisations. Both sides have caused damage to archaeological sites, monuments, and cities.

Despite the growing war, Aleppo remained relatively normal for a year and a half [7]. The first serious fight in the city was on July 19, 2012 [8]; the armed fight started dividing the city between the western half under government control and the eastern one under the rebels (Fig. 1); for four years, until the summer of 2016, the borderline between west and east barely moved, solidifying Aleppo as a *"divided city"* [9] [10]. By late 2012 and early 2013, the fighting had reached the Old City [11]. Most of the fighting was concentrated near the old Souq *al-Madina*, along with the Citadel and *al-Jdīdeh neighbourhood.* The Citadel, known as the natural defence and highest point, faced constant attempts. During the fight, it remained under government control, and ironically, this monument regained its defensive role and transformed into a military base and army barracks, restoring its historical significance. This marks the use of cultural heritage as a tool during the war. By the end of September 2012, *Souq al-Madina* had been swapped into the fire [12], marking how the cultural heritage in Aleppo was used as a warfare tool [7]. Moreover, in April 2013, the minaret of the Umayyad Mosque was reduced to rubble [13]. The danger of the effects of the war had been felt since the beginning, and prevention works started to appear by various groups of the local community, conducting physical protection attempts as well as archival and mapping the destruction of cultural heritage. In 2013, the World Heritage Committee included "Ancient City of Aleppo" on the List of World Heritage in Danger [14].
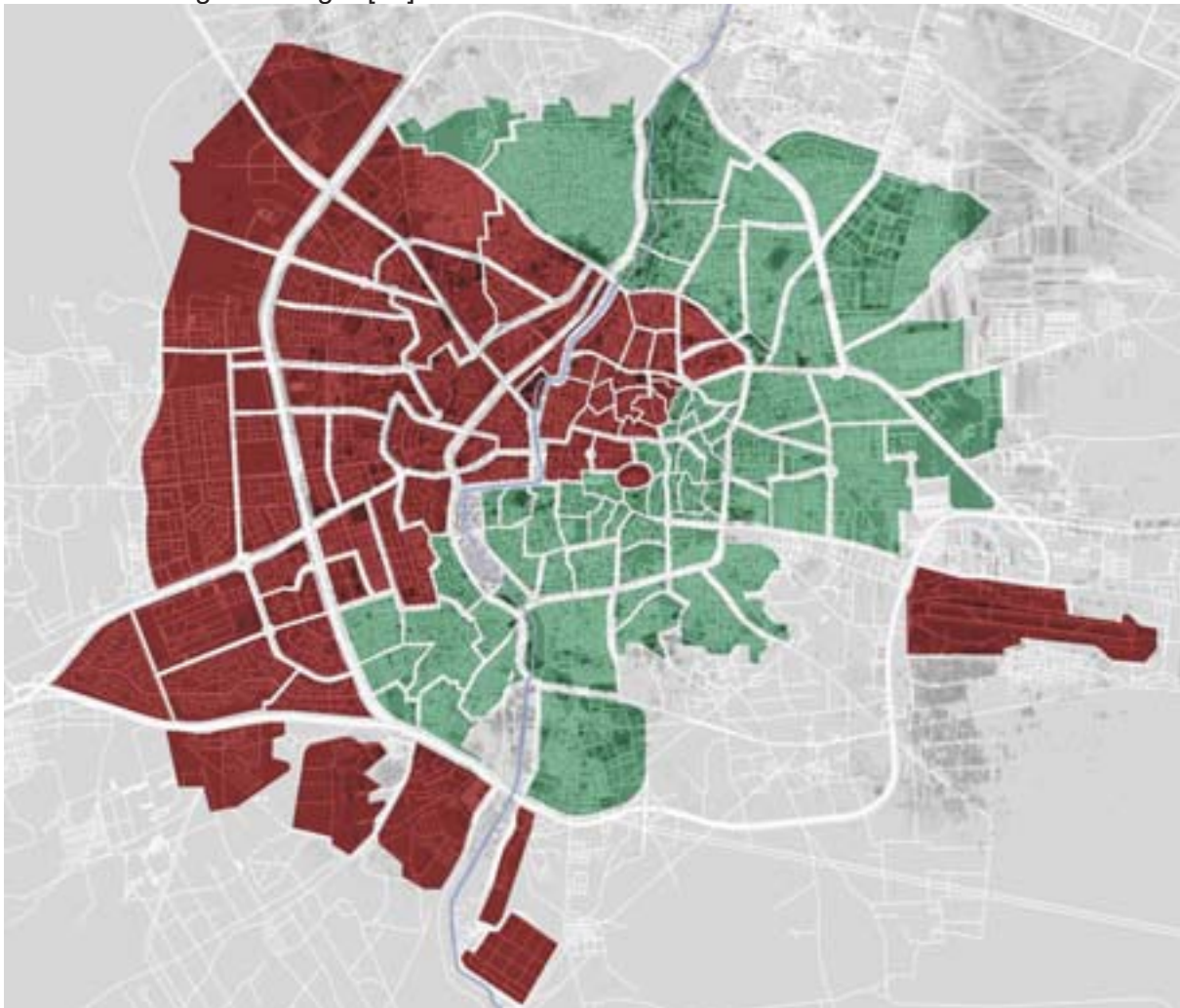
Fig. 1 Aleppo's Division between Government on the West (Red) and Opposition on the East (Green). Credits: (Aragelian 2019, p.47).

3.   Preservation interventions during war

During the war in Syria, the local community became active on social media. This act first started as an initiative to announce the dangerous areas; slowly, many web pages became a platform documenting the war. After the extent of the damage to the cultural heritage became

evident, these pages became a local platform where people posted photos of the building's damage. This act has slowly created a vast source of information. Although spontaneous, it soon became an interactive source, narrating the act of war and the many pieces of historical information or stories known among the community as pieces of common knowledge. Thus, locals became activists, documenting their cities through an unintentional photographic movement born from an emotional agenda, resulting in a dozen pages (Fig. 2). After the war ended in Aleppo, these pages remained an active source of raising the local voice about the post-war reconstruction phase. Experts working in the reconstruction of the city used their personal profiles to share their work and its process, giving a non-conventional but rich archive of precious documents and resources, which represents an opportunity to preserve an authentic testimony of the events experienced in the communities involved, allowing for a deeper and more compassionate understanding of the challenges faced. However, the level of detail remains shallow, as the concept of documentation in Syria is mainly directed towards a photographic one, and each individual who conducts the work will have his own archive.

Fig. 2 Representation of Facebook pages created by the Aleppo local community to document Aleppo. L. Abdulmawla.

3.1 Heritage Preservation Through Archiving During Times of War

On the other hand, archive projects involving data collection aimed at building a database have begun. In Syria, *Dār al-Waṯhā'iq al-Raqmīya al-Tārīḫīya* (Historical Digital Documents House), founded in 2013 by the Aleppine lawyer *Alaa al-Sayed* aimed to digitise historical records with the help of local volunteers [15], while other projects were based outside of Syria. These latter began without collaboration with local experts on the ground, relying on social networking sites and high-resolution satellite images, aiming at recording the damage to cultural heritage sites, as did by the 'Association for the Protection of Syrian Archaeology' (APSA), the 'American Society of Overseas Research' (ASOR) [16], the 'Aleppo Project' [17] in 2015, and the 'Conflict Urbanism: Aleppo Initiative' [18] in 2016. Additionally, the Syrian-German efforts (Fig. 3) [19][20][21][22][23] derived from the Urban Historical Archive and Documentation Center for Aleppo (UHADCA), which operated in the old city from 2008 to 2011 [24]. This work is crucial as it plays a fundamental role in preserving an episode of the life of this heritage, organising and providing access to documents about the recent history of the country and the transformation in Syrian society.
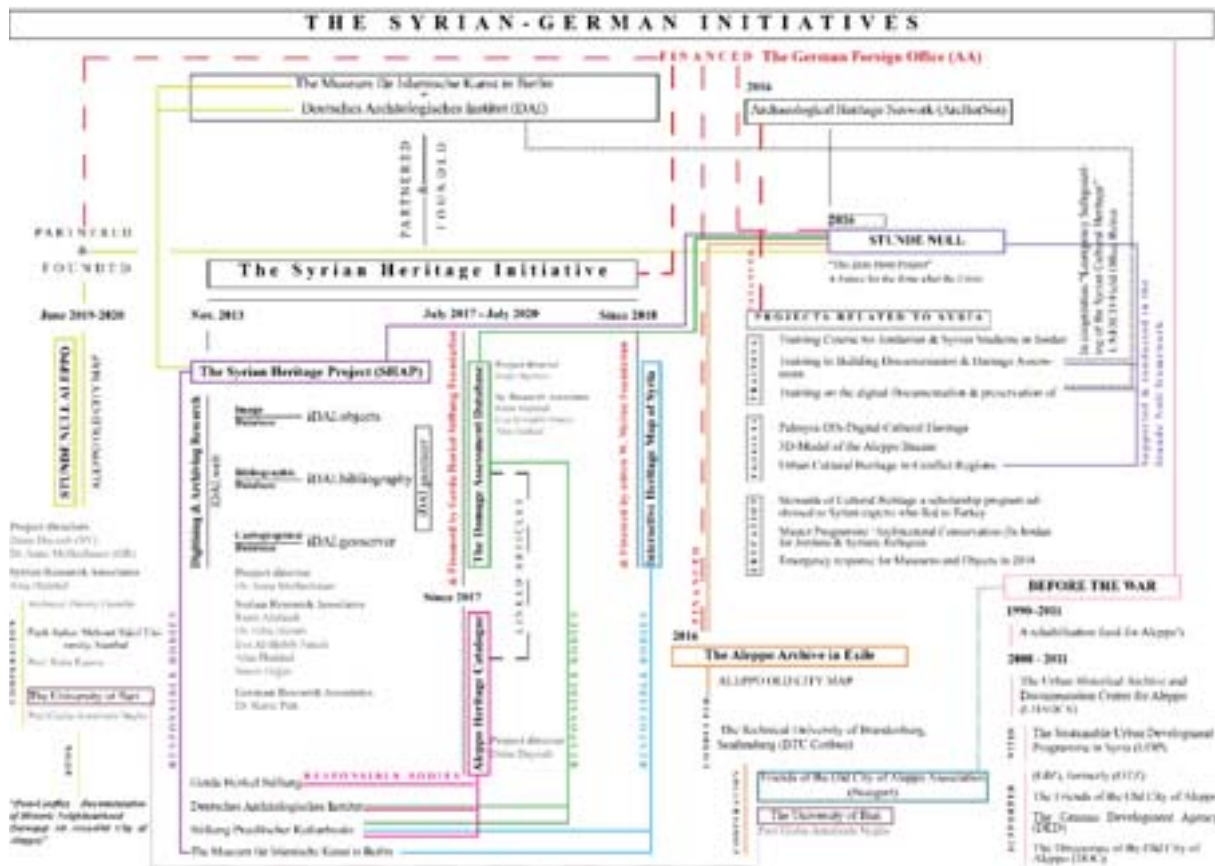
Fig. 3 Diagram: The Syrian-German initiatives. L.Abdulmawla.

3.2 Case Studies of National and Local Community Preservation Efforts During War

The preservation interventions during the war show how local groups organised themselves to restore their heritage, proving the importance of the local community and local experts. It was observed that different groups carried out several incidents of cultural heritage protection during the war in Aleppo. In fact, *Maamoun Abdulkarim*, former director of DGAM (Directorate-General of Antiquities and Museums), expressed gratitude to the local community for their solidarity in defending the antiquities [25]. *Kanjou Youssef*, a Syrian cultural anthropologist and a former member of DGAM, has identified three main active groups. Two were based in Syria: one was active in government-controlled areas, the other in anti-government areas, and the third outside of Syria [26]. In areas controlled by anti-government forces in Aleppo, the local community has conducted various initiatives, mostly represented by NGO groups like the *'Syrian Association for the Preservation of Archaeology and Heritage' (SAPAH)*. According to the NGO's official social media page, these interventions of the protection of the Aleppine cultural heritage started in the second half of 2013 and ended at the end of the year in collaboration with *'The Division of Monuments of Free Aleppo Council* [27]. The interventions were primarily led by internal Syrian archaeologists who collaborated with Syrian archaeologists from outside the country [28]. One of the first initiatives was the protection of the *Mīḥrāb* (prayer niche) of the *Madrasa al-Ḥalāwī*ya (Fig. 4). The *Mīḥrāb*, dating back to 1245, is seen as a masterpiece of Islamic art. It is a unique piece of woodwork and Arabic calligraphy featuring a rectangular form with a curving central niche carved with ebony, ivory, and mother-of-pearl carvings [29].

Fig. 4 Madrasa al-Ḥalāwīyya, mīḥrāb de Ṣalāh al-dīn Yūsuf II. PL. LXXXIII. Materiaux pour un coprs inscriptionum arabicarum. Herzfeld, Ernst (1954, Vol 2, p. 96).

Fig. 5 Left: The method adopted for the *Mīḥrāb's* protection. Right: The resistance of the built shield. Credits: Dakhel Louay (03 January 2017).

The SAPAH reported that the first inspection of the *Mīḥrāb* was conducted on May 20th, 2013, by a committee from the collaborative associations [27]. The *Mīḥrāb* has already suffered significant damage, and the committee documented 39 wooden shrapnels that were relocated and stored at the "free Aleppo government council (FAGC)," thus suggesting a potential sudden fall of the element due to separation from the wall. The method adopted for the *Mīḥrāb's* protection was in line with the current conditions at that time (Fig. 5, left). It was made using a sponge cover used as an insulation layer covered by a plastic mat, aiming at creating an additional warping element. A final protection layer made by a 40 cm separation wall was built within a 20-30 cm distance from the plastic mat, with a total height of 1.50 m (Fig.), aiming at covering important architectural elements. The process took 9 days, beginning on May 29th, 2013 [27]. While the surroundings suffered a lot of damage, the protective shield served its purpose, as seen in Fig. , right [30]. The same technique was used to protect other architectural and religious elements in the Great Umayyad Mosque's *Qublīya* [31]. The SAPAH faced challenges in securing materials and workers and transporting them into the mosque. The work lasted nine days, from August 31 to September 8, 2013; it included the construction of two walls in front of *Maqām Saīduna Zakarīya*, the main *Mīḥrāb* and in front of *Bāb al-Wālī* [31]. The walls appear to have resisted war damage, as reported by the end of 2016 [32].
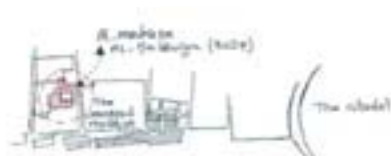
Fig. 6 Diagram: *Mīḥrāb* 'the payer niche' of *al-Madrasa al-Ḥalāwī*ya Protection Method. L. Abdulmawla.

Sandbags were used to protect architectural elements in the Umayyad Mosque in Aleppo, which were already subject to cracks and damages, as seen in Fig. , military corridors (*al-Ṭalāqīyat*) were filled with sandbags [33]. The presence of such military corridors in the old buildings in Aleppo is a form of forced destruction in urban warfare. They are openings in the walls made by fighters to monitor and snipe soldiers and provide safe passages from enemy bullets. They are usually created by manually digging a hole in the wall, while when violent clashes erupt, the fighter will boobytrap the walls and explode them to open these passages. Sandbag protection is highly effective in preventing bomb reverberation and preventing contact between built blocks and protected elements; e.g., they were used to prevent contact around the solar clock of the Umayyad Mosque and the 20-cm cement firewall [34] (Fig.).

Fig. 7 *Ṭalāqīyat*,'; filled with sandbags, location: *Madrasa al-Ḥalāwī*ya. Credits: FAGC (03 November 2013).

Fig. 8 The protection of the solar clock located in the Umayyad Mosque's courtyard. FAGC (13 September 2013).

Despite efforts to protect architectural elements, sometimes good intentions can be harmful. For instance, concerning the removal of art elements, which should be the last resource as it increases the risk of damage, loss, or looting, as it happened to the *Mīnbar (pulpit)* of the

Umayyad Mosque, an element with great historical value and a religious one for the Muslim community (Fig. , left). Designed by an Aleppine craftsman in the 15th century, it is the second oldest *Mīnbar* after the one of *al-ʿAqsa* Mosque in occupied Jerusalem. It is made of wood inlaid with ivory and mother-of-pearl. Its cultural value is derived from the belief in the relationship between the two *Mīnbar* in Jerusalem and Aleppo, defined locally as identical twins, which is well-known in the popular consciousness. The SAPAH dismantled the historic *Mīnbar* in May 2013 (Fig. , mid)*,* warping it and aiming at transferring it to a 'safe' place [35] (Fig. , right). Unfortunately, the *Mīnbar* was lost, speculating its relocation to Turkey, as it happened to manuscripts and books from both the *ʾAwqāf* library and the library of *al-Madrasa al-Šhuʿaībānīya*, and the 39 wooden shrapnels of *Mīḥrāb al-Ḥalāwī*ya [36]. These examples show one of the main factors of heritage loss, which is the lack of documentation about the undertaken wartime conservation measures, particularly regarding the relocation of movable heritage.

Fig. 9 Left image: the Umayyad Mosque Mīnbar source unknown. Mid Image: The dismantled of the Umayyad Mosque Mīnba on (13 May 2013) By SAPAH. Right Image: The transfer of the Umayyad Mosque Mīnbar on (16 July 2013) By SAPAH. Online.

At the government level, most of the effort conducted by the DGAM focused on the protection of museums and their collections, conducting digital archiving, raising people's awareness of the importance of this heritage and their role in protecting it, as well as fighting against trafficking in cultural properties and illegal excavations in archaeological sites [25]. By the fourth quarter of 2012, when bombings had become common, the Aleppo Museum used 50×50 cm sandbags to cover non-movable sculptures. However, the DGAM realised that the sandbags were a poor solution for the immovable sculptures in the garden due to the resulting solar damage and weather conditions; thus, they decided to cover the exterior components with 'glass sulphonated' insulation and enclose them with a wooden box filled with sand [37]. Two rows of sandbags were used for the museum façades [38] and floor mosaics as a precaution (Fig.) [39]. This left the upper level of the façade unprotected due to their height, so it was covered with 5cm wooden beams to protect the statues (Fig.) [37]. The mosaic walls were isolated by anti-wet and fireproof fibreglass and covered with wooden panels supported by wooden poles. Moreover, the wooden Ottoman ceiling of the Islamic Coins Hall was protected with a wooden platform isolated by a fireproof "fibreglass" layer, supported by a metal structure rising from the hall floor up to 10 cm under the ceiling. This solution avoided the direct connection between the wooden platform and the wooden ceiling to protect its colours and decorations from damage and scratching [37].

Fig. 10 The implementation of the protection plan of the Aleppo Museum entrance. Credits: Fakhro, Mohamad. (2013), (Fakhro 2020, p.339).

4.   Conclusions

The extensive use of social media platforms during the Syrian war provided a unique opportunity to learn about the actions taken towards the city's cultural heritage. Although these materials may be limited and not scientifically organised, their "real-time" nature makes them valuable sources of information and serves as primary data. They enable the analysis of case studies and a more comprehensive understanding of the challenges faced by cultural heritage during and after the war. It was observed that preventive measures were only conducted between 2013 and 2014, although the war in Aleppo lasted until the end of 2016, which could be explained due to the gravity of the latter situation.

The local community's protection initiatives reflected a mixture of cultural values, with communities focusing on historical and religious elements reflecting their cultural identity. The DGAM also worked on protecting museums and preserving objects that have shaped the nation's narrative. The war in Syria has strained the society, hitting its ethnic and sectarian diversity, cultural heritage, and shared history. Locals' actions and risks to protect architectural heritage on the frontline demonstrate the importance of local involvement and their will to preserve the built heritage for future generations. Local community initiatives provide a comprehensive perspective on their critical role in addressing challenges faced by individuals and communities since the war started; they provide pathways for resilience, identity, and healing. The narrative underscores the importance of hope in the post-war phase. Furthermore, the case of Aleppo remains significant as it represents society's resilience during the war and post-war period, but it also demands additional resilience due to the earthquake of February 6, 2023, adding further difficulty and destruction.

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Strategies for reusing Albanian bunkers

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Abstract
The rehabilitation and adaptive reuse of buildings designed for military purposes is a controversial issue at the international debate. Changes in national and international policies, as well as the influence of technological advances in conflict, have led to the abandonment of buildings and sites that were once strategic for military purposes.
The research addresses the potential for enhancing the network of military bunkers dotting the Albanian territory. The militaristic Albanian government of the second half of the Twentieth Century had invested in the construction of hundreds of thousands of bunkers for defense use, not only along the borders and coastlines but also within urban areas. Indeed, more than 150,000 of these bunkers of various types and sizes were built: ranging from large anti-nuclear bunkers designed to house vehicles and people, to small bunkers intended to defend the territory. These buildings have never been used for military operations: in the beginning, spontaneous reuse was undertaken; nowadays, the population is gradually, albeit with difficulties, beginning to recognize their value as cultural heritage. A systematic survey of this endangered heritage is still lacking; studies on the conservation status and potential for reuse are still limited. Based on the analysis of some significant case studies and the identification of recurring characteristics in the Albanian bunkers, the paper aims to define a methodology for classifying and analyzing this heritage, to identify a comprehensive intervention strategy, and criteria for evaluating compatible reuse hypotheses.

Keywords: Bunker, Military Architecture, Totalitarism, Adaptive Reuse
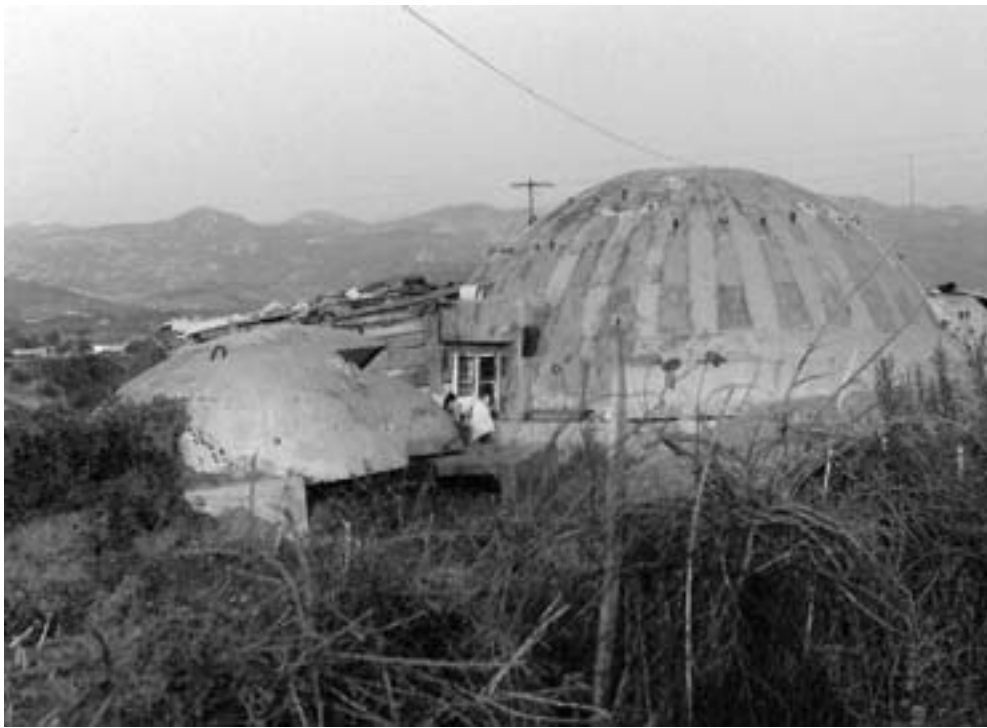
Cover: Bunker in Albania used as a dwelling (Author: Albinfo, 1994. License: Creative Commons Attribution 3.0 Unported).

1. Introduction

War fortifications have evolved and adapted as a response to new building technologies and as a consequence of changing military strategies and tactics [1]. In the Twentieth Century, for example, the use of combat aircraft greatly influenced defensive war architecture. There emerged the need to build solid structures that could shelter, not only the soldiers but also the civilians and that were resistant to aerial bombardment [2]. The new art of warfare, during World War II and the Cold War, thus led to the construction of a real "new geography of bunkers" within the European landscape, mostly consisting of underground concrete monoliths [3]. Current European populations' perception of these reinforced concrete constructions tends toward a kind of code of silence, like a *damnatio memoriae*. According to Martìnez-Medina et al., bunkers "*are the first concrete ruins of our contemporary age and, despite this, no one pays attention to them today, as if they were remains of a shipwreck that people would like to forget*" [4] (Fig.1).

Fig. 1: A "triple series" of linked Qendra Zjarri bunkers on an Albanian beach. Source: Concrete Mushrooms Project, Elian Stefa, Gyler Mydyti, 2009.

The bunkers built in Albania in the 1970s are a tangible testimony of Enver Hoxha's dictatorial rule that also brings intangible values, which have strongly affected the Albanian people [5]. The country, after years of extreme deprivation, with the collapse of the Albanian Labor Party in the mid-1990s and the rise of the democratic government, began a period of renovation, driven by growing tourism. The urban planning vision adopted since the early 2000s is oriented toward the negation of the past in favor of a new modernity [6]. This trend has driven the demolition of many bunkers, often to obtain space to build, and other times to reuse the iron in new construction.

This research on the reuse of bunkers in Albania is currently in its early stages, the topic is still understudied, and scientific documentation is scarce. In recent years, however, Albania has become more conscious of the historical value of its past, appreciating wartime constructions also through art as a "tool of political strategy" [7] (Fig. 2).

Fig. 2: ACAP Project (Community Action for the Conservation of Protected Areas of Albania) by Mrfijodor, Checko's Art, Davide DPA. Valona, 2018. Source: www.vagabundler.com

Especially in Tirana, the capital, it is possible to appreciate the first signs of change. One example is the so-called "color plan" promulgated by Mayor Edi Rama, now Prime Minister of Albania. The plan includes the application of art for the redevelopment of communist-era buildings [8]. Also, from the perspective of adaptive reuse, the project carried out by MVRDV for the famous Pyramid in Tirana, built in 1988 as Hoxha's mausoleum, has been much discussed (Fig.3).

Fig. 3: Up: The abandoned Hoxha pyramid, before MVRDV's project. Source: Diego Delso, CC-BY-SA 3.0. Down: The adaptive reuse of the Hoxha pyramid: from mausoleum to startup headquarters. Source: Paola Doci, 2024.

2. Background on the Bunkerization of Albania

To discuss the bunkers built in Albania in the mid-20th century, it is essential to mention the political history of the "Land of Eagles." In 1944, after being abandoned by German troops, the country could finally enjoy the independence it had gained in 1912. From the beginning, the Party Of Labor, led by Enver Hoxha, a politician with an openly Marxist-Leninist stamp, became predominant. Hoxha gradually took power, transforming the government into a full-fledged totalitarian communist dictatorship [9]. Albania went through several phases of alliances and consequent ruptures: first with Tito's Yugoslavia, then with Stalin's USSR, and finally with Mao's People's Republic of China. Albania's tendency toward isolationism, pressed between the NATO countries (Italy and Greece), the "revisionists" of the USSR and Yugoslavia, and the U.S. imperialists, led Hoxha to develop the paranoid belief of imminent invasion [10]. In fact, in one of his speeches commemorating the 30th anniversary of the founding of the Party of Labor of Albania (1971), Hoxha said, "*We, Albanian communists, [...] consider the future of the world with optimism [...]. However, our revolutionary optimism does not prevent us from seeing at the same time also the threats and dangers facing our country and all peoples, threats, and dangers coming from American imperialism and its aggressive policy, as well as from the new Soviet imperialism, which together aim at hegemony, at world domination.*"[11] Hoxha, between the period of the zionist alliance (from 1961 to 1978) - thanks to China's economic and technological aid - until his death (1985), carried out his ambitious project: the material and immaterial bunkerization of an entire country, setting it up for a war that will never come [10]. Through the global expropriation of land, linked to the deepest concepts of communist ideology [12], it was possible to carry out planning on a national scale [13]. At the moment, the exact number of bunkers built on the entire Albanian territory is not known: it seems that the initial project was oriented towards 750,000 bunkers (with a ratio of 1 bunker for every 4 Albanian inhabitants). The military personnel and officials involved in the construction claim that the number is between 167,000 and 175,000 [14]. In any case, the cost of constructing the bunkers is equivalent to 2 % of the national GDP: in terms of resources and labor, the construction of twenty bunkers is equivalent to the construction of one kilometer of road. As Montobbio argues, if there were an alternative use of these resources, Albania perhaps would have achieved a far different economic development [15].

For the strategic placement and design of the bunkers, Albanian engineers from the "*Istituti I Studimit dhe Projektimit te Veprave te Mbrojtjes*" (ISPVM, the Institute for the Study and Design of Defense Works), initially assisted by the Chinese, studied 20th-century fortifications, such as Maginot Line, built in France during WWI (Fig. 4), the Ziegfried Line (Germany), the Stalin Line (USSR) and the prefabrication used by the US for the Vietnam War [16]. The ISPVM for the construction of bunkers first experimented with the use of "stalobeton" (stalo means steel, supplied mainly from China, while beton is the concrete), a high-performance concrete (400 kg/m^3) [17].
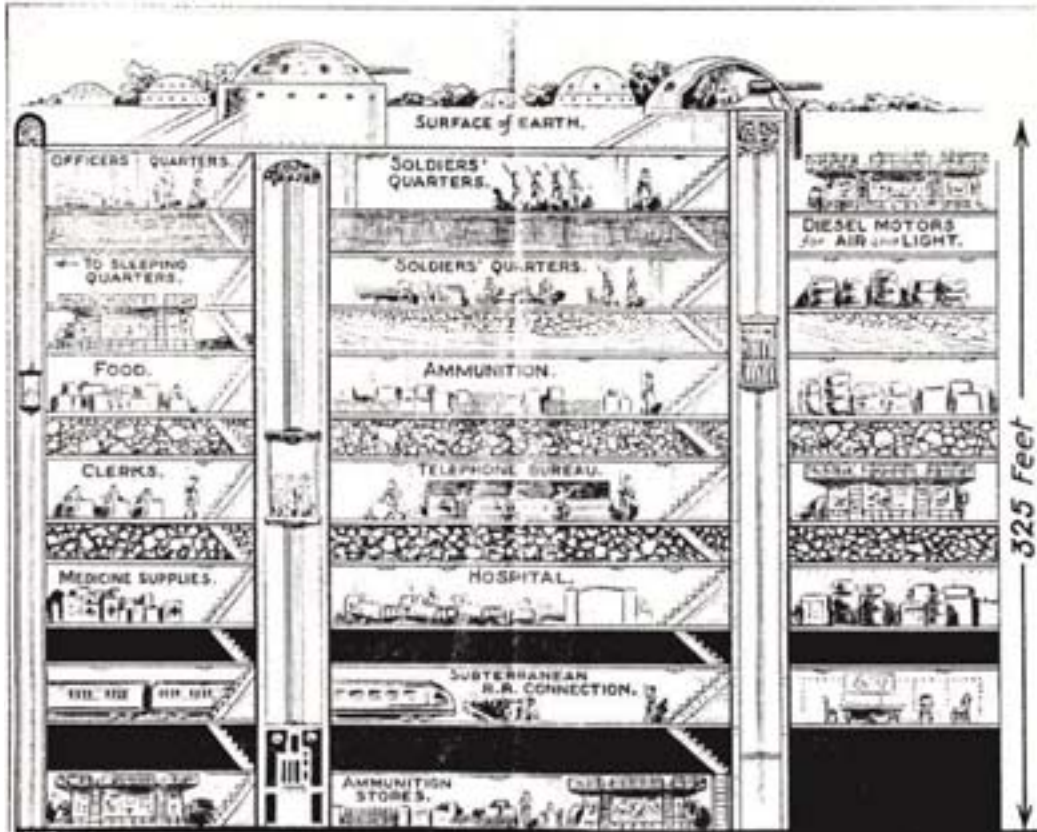
Fig. 4: "Diagrammatic section through a Maginot Line fort as it was popularly imagined in 1936. Source: Daily Express-Photonews. London, 1936

Bunkers were built both along the territorial borders, so along the northern Albanian Alps and the Tomorit Mountains in the south, and along The waterfront border, literally built on beaches - but without using camouflage techniques. In addition, bunkers can be found in large urban areas as well as near small rural centers (Fig. 5) [18].

Fig. 5: Abandoned bunker in the countryside of Velipojë, North Albania. Source: Paola Doci, 2024

Bunkers can be classified by size: small, to shelter one soldier; medium-sized, to house families; and large, also called special structures (Fig. 6). Along the coasts and in rural areas, bunkers tended to be small to medium in size and they were made offsite in two/three parts, and were easily transported and assembled, i.e., they were simply placed on a prepared seat on the ground. The characteristic "mushroom" cupola is composed of reinforced frames, as in the event of bombardment it is the most vulnerable element. In the mountains, along the borders, the size of the bunkers was larger and the type of cupola was called "portokalli", or orange: the wedges were transported by animal-drawn wagons and were assembled on-site [17,18].

Fig. 6: Typologies of bunkers. Source: STEFA, Elian. MYDYTI, Gyler. Concrete Mushrooms. Reusing Albania's 750'000 abandoned bunkers. Barcelona: Dpr Barcelona, 2012. Licensed under a Creative Common Attribution-Non Commercial-No Derivs 3.0. Unported License.

3. Good practice

Albania, also known as the "Gate to the Orient", is a very complex territory marked by consolidated traditions [19], but above all characterized by material traces, and evidence of the different peoples who have inhabited it. It has a strong tourism potential, discovered only in recent years [20]. The proposed adaptive reuse of bunkers aims to enhance the tourist vocation, which is positive for the country's economy but must be contained to avoid the deletion of the signs of history. The proposed method starts from the analysis of some best practices to define guidelines and directions for adaptive reuse.

The ownership of bunkers is not always certain: it is not clear yet whether they are publicly owned or privately owned, allocated to citizens along with the land expropriated after the fall of the Hoxha regime. Very often bunkers are reused spontaneously by the population. This

kind of reuse is positive and should not be hindered because it generates a sense of attachment in the community and determines their care and preservation (Fig.7).

Fig. 7: Spontaneous reuse of a small bunker as a place of Orthodox Christian cult. Ohrid Lake, Albania - North Macedonian border, 2023.

In second place, however, it can be referred specifically to the field of tourism. A good practice is the "Bed&Bunker" project arising from an international collaboration between the University of Applied Sciences in Mainz, Germany, and POLIS University (International School of Architecture and Urban Development Policies) in Tirana, Albania. The 2012 project involved the adaptive reuse of several abandoned bunkers in the village of Tale, near Lezha, in the north of the country. The aim of the project was the reuse of the bunkers as bed & breakfast hostel for backpacker tourists. The source of inspiration for the project is the "tiny house" concept, and it is largely possible to say that for the most part the building transformation constraints, perceptual-cultural constraints, morphological-dimensional constraints, and material-constructive constraints are largely fulfilled [21].

Fig. 8: Bed&Bunker, a reuse of a bunker in Tale in northern Albania. Left: interior of the bunker. Right- up: Construction in progress. Source: Universiteti Polis - Bed & Bunker, 2012. Right-down: planimetry of the project. Source: Gilberto Mastomatteo.

A third good practice analyzed was adopted, instead, by the Albanian government for the large bunkers, also called "special structures." In the capital city the two main underground bunkers, used as a strategic base by the communist government, have been museumized, not without protests from the local community. In particular, Bunk'Art 2, opened in 2016, has been reused to be a museum of itself, with the structuring of a tour of the three main layers of which it is composed: the period 1912-1939, used by the Xhandararmëria nga Pavarësia (Gendarmerie of Independence), the period 1939-1944, used by the Nazi-fascist occupation armed forces, and the period 1944-1991, used by the Policia dhe Sigurimi (the Communist government's Secret Police). The latter section includes an art installation dedicated to the memory of those persecuted by the totalitarian government. The museum also includes spaces dedicated to temporary art and museum installations.

Fig. 9: View from below the portokalli-style dome lined with photos of those persecuted by the Hoxha regime at the Bunk'Art 2 museum, Tirana. Source: Paola Doci, 2024

4. Methodology

To define a strategy for the valorization of this diffuse heritage, it is above all necessary to build its mapping on the territory, collecting information on geolocation, type, use, and state of preservation. Due to the high numerical consistency of the bunkers and their spread throughout Albania's territories, the methodology adopts ICT technologies for data collection by involving the main stakeholders (tourists, communities, and local authorities). The goal is to develop a mobile application for the identification of bunkers in the Albanian territorial context. This process, possibly incentivized through gamification, on one hand, would allow obtaining information, including unedited information, about the bunkers, and on the other hand, could raise user awareness towards the preservation of this heritage spread throughout the country.

In addition to classifying bunkers according to their size, geographical context, and state of preservation or use (Fig. 10), tools such as questionnaires can also be used to define appropriate reuse strategies. In this way, data can be collected to define the needs of local communities and tourists, especially in rural areas where public and private services are lacking. In this manner, the reuse project can pick up the concept of "architecture as the representation of those who use it" [22]. Also essential is the evaluation phase, which, at the level of the reuse project, can be conducted effectively through the method of transformation constraints, mentioned above [21].
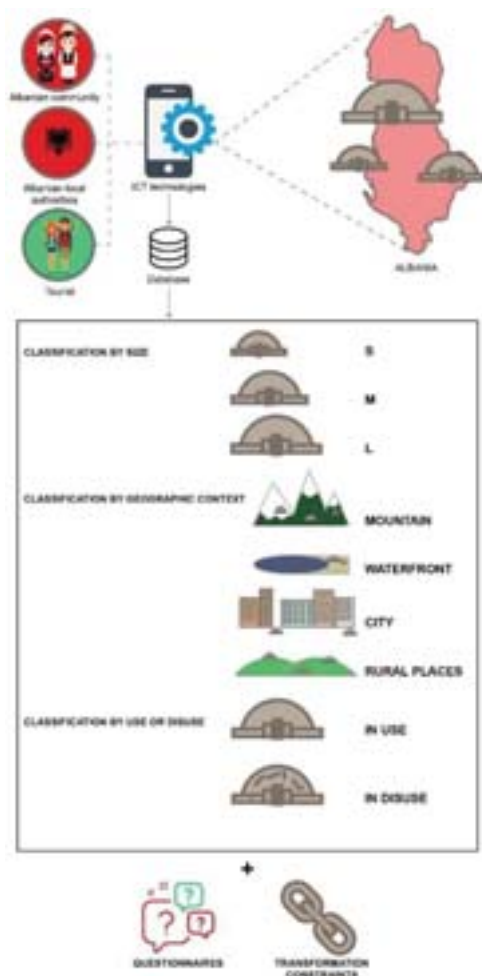
Fig. 10: Methodology proposed for reusing Albanian bunker

5. Conclusion

A valuable opportunity for new approaches to socio-economic development is the widespread distribution of cultural heritage across Albanian territory, which is tangible evidence of a significant period in the nation's history. The aim is to plan interventions for each asset in a harmonized perspective by defining a strategic enhancement framework with a territorial scope. Defining investment priorities based on accurate territory knowledge is a new approach to regenerating local identity. In addition, a more effective enhancement process requires to focus on resources, public-private partnership opportunities, participation of privates, and potential user profiles.

The research results open the way to a new interpretation of the enhancement issue, based on the need to integrate cultural activities with other productive activities which characterize local environments. Development objectives accompany the protection and enjoyment of cultural heritage. To increase the attractiveness of areas not included in traditional tourist itineraries and not industrialized, it is necessary to identify unified land management models that introduce measures to support economic activities and employment compatible with culture.

A thorough knowledge of Albania's bunkers is an essential prerequisite for defining a comprehensive strategy and identifying specific reuse solutions. Strengthening the bond between the local community and this widespread built heritage is an essential step in a reuse process that requires synergies between citizens and public administration, both in the regulation of reuse and in the promotion of diffuse maintenance tailored to non-traditional building systems.

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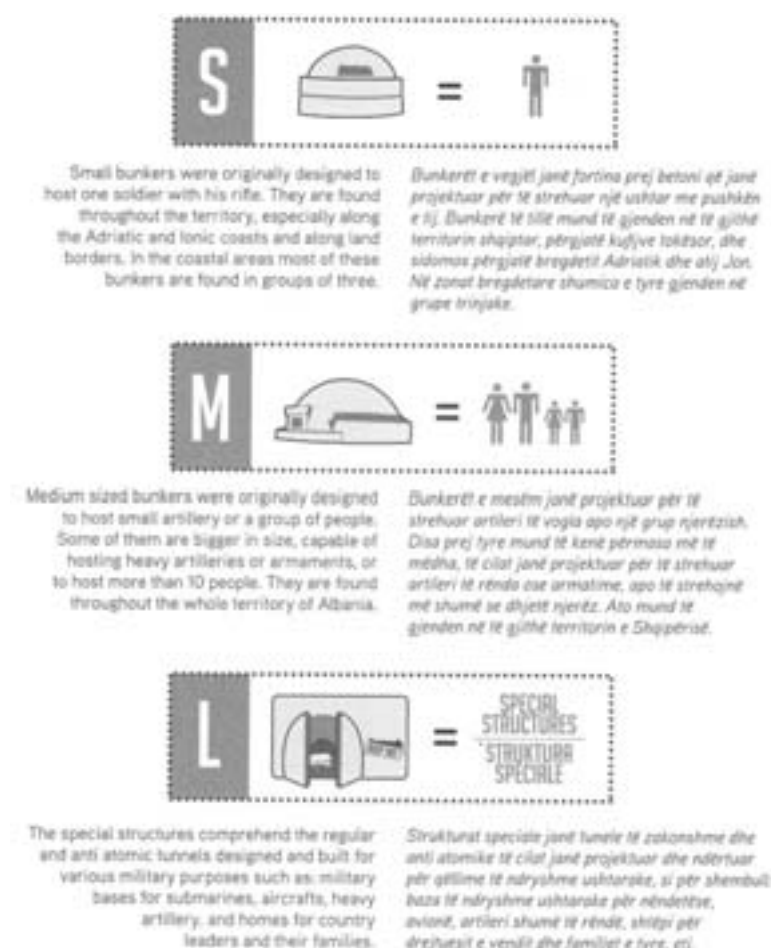
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Re-build identity.
Ukraine War and digital preservation

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Abstract
The objective of this research consists of a series of actions to support and implement the digital reconstruction of places destroyed in the Ukraine war led by the *NGO Pixelated Realities*. Starting from the concepts of "collective memory" and "national identity," this will subsequently provide the possibility to identify new strategies of memory to preserve symbolic places of Ukrainian culture from which to rebuild the destroyed identity of the people. Ultimate goal will be to enhance the work of the OMG in order to rethink the preservation of tangible heritage - physical places - and intangible - symbolic places
- at the times of conflict with new digital tools. This work, moreover, may allow, subsequently, to be able to implement the digital models with different materials, such as archival material or video, in order to be able to preserve a wider Cultural heritage.

Keywords: Digital heritage, Digital reconstruction, Pixelated Realities, Ukrainian cultural heritage, 4CH project

1.   Introduction

"The tyrannies of the twentieth century, having realised that the conquest of nations and peoples lay in the control of information and communication, institutionalised their domination of memory and sought to control it down to its most hidden recesses" [1].
In the early days of March 2022, just a few days after the commencement of the Russian assault on Ukraine, news outlets reported a missile attack near the Babyn Yar memorial site in Kyiv, commemorating one of the largest Nazi massacres of the local population, including many Jews [2]. In response, Ukrainian President Volodymyr Zelensky issued a global appeal via Twitter, questioning the value of proclaiming "Never Again" for 80 years when the world remained silent as a bomb had struck the very site of Babyn Yar, killing at least five people – "History repeating" [3]. But

while each historical event is unique and unrepeatable, situated in a definitive moment of the past, the way history is told is repeatable, through its selection, processing, creation or erasure. Indeed, memory corresponds to the production of representations constructed through selective work, including or excluding other representations [4].

When memory becomes a "social selection of remembrance" shared by a group of individuals, it gives rise to a "collective memory" [5] that is essential for maintaining the temporal identity of group through the creation of bonds of belonging. Thus, the control of a people's memory is a "political activity" aimed at controlling the ideals of the population [6] [7] [8]. Especially in totalitarian regimes, it is the state that creates and controls collective memory [9].

This is probably why more than 835 cultural sites that hold the memory of the nation were damaged during the conflict in Ukraine [10]. Thus, it is not only human lives that are being destroyed, but also their cultural heritage in order to erase their identity and thus their existence.

This war tactics of the Russian army is associated with culturocide in the rear along with urbicide, deliberate destruction of the cities, on the frontline and in the gray zone on the territory of Ukraine. The important insights to dealing with the effects of such extensive destruction can be found in the pilot study of Bosnia and Herzegovina heritage preservation experience by Map of Renovation NGO. It elaborates the striking fact, that even those who survived ethnic cleansing and genocide, upon their return focus foremost on the restoration of the destroyed symbols of Bosnian Muslims' cultural and religious identity, rather than any other objects. Therefore, the preservation and restoration of symbolic heritage should be also considered in connection to re-emigration of displaced people inside and outside of Ukraine.

However, the political use of memory is a common and recognised practice in both dictatorial and democratic governments. Even the Babyn Yar monument, erected in 1976 in the style of socialist realism, is the result of the Soviet regime's desire to remember the crimes of the Holocaust while omitting Jewish ethnic symbols, making this monument appear more "anti-Jewish" [11] and placing it in the place different from the actual massacre location [12]. In this way, the past becomes a "social construction" aimed at nullifying or emphasising an event [13].

Nevertheless, contemporary conflicts, such as those in Ukraine, prompt a profound interrogation of the dynamics of memory when the past to be memorialised is simultaneously unfolding in the present and the systematic dismantling of a population's identity is still active. Maurice Halbwachs offers a cautionary perspective, noting that an event is only assimilated into the chronicle of historical narratives after an extended temporality following its initial occurrence [14].

This paper therefore seeks to outline a prospective framework for the "preservation of memory" and the "making memory" in the context of warfare, through the strategic application of emergent technologies.

2.   Digital preservation of Ukrainian Cultural Heritage

In Ukraine, where an estimated 10,582 Ukrainian civilians have already been killed during the Russian invasion [15], more than 6 million have so far sought refuge in other countries [16], and those who remain are struggling with the effects of rocket attacks, depleted territorial and human resources, while media focus has now shifted to the Israeli-Palestinian conflict. In such a state of emergency, discussing the preservation of cultural heritage in standard terms would be complex, if not impossible, without the use of new technologies. Obviously, a society's strategies of remembering are also conditioned by the means of remembrance at its disposal, which produce a representation of the past that is consistent with the present [17].

In order to preserve Ukraine's historical heritage through technology, the European *4CH project* has created the first *European Competence Centre for the Conservation of Cultural Heritage*. Shortly after the Russian invasion of Ukraine, 4CH launched the *Save the Ukraine Monuments* (SUM) initiative to preserve the digital documentation of Ukraine's cultural heritage, fearing that it would be destroyed, which is unfortunately what is happening. Descriptions, photographs and 3D models will facilitate the restoration or reconstruction of war-damaged buildings and monuments. As digital documentation, along with the monuments themselves, could be compromised or lost, copies of this digital data have been stored on secure servers within the European Union. This will allow Ukrainians to transfer documents over the Internet, which will be returned to them once peace is restored [18]. Among the Ukrainian colleagues working with 4CH to collect and secure digital data is Pixelated Realities NPO, an Odesa- based organisation dedicated to improving methods of cultural heritage preservation through digital production, which has already been able to back up around 30 terabytes of its projects to the EU cloud [19]. On 24 February 2022, Pixelated Realities inaugurated another significant initiative, a war documentation project, *The Museum of UA Victory*, aimed at emergency preservation of the cultural and historical heritage of Ukraine in three-dimensional form, thereby documenting the damage caused by the Russian onslaught against Ukraine. This three-dimensional reconstruction is achieved through the creation of a point cloud made possible by photogrammetric surveying techniques, which involve the capture and processing of photographic images. The images are typically collected by the staff of the organisation with on site photography with digital camera, drones, and for high objects accompanied by a bucket truck or ladders. For locations with limited access due to martial law, conflict reporters and military press officers, military drone pilots and pilot trainers are involved, trained, provided with specific tasks for the surveys. The survey utilising drones, thereby exposes the pilots to significant risk as they may be seen as a threat to security and a military target for both sides of the conflict. The combination of these methods facilitates the process of surveying areas that are otherwise inaccessible or difficult toreach.

Fig. 1: Odesa National Fine Arts Museum (ONFAM). Photos taken with a drone. 2023.

The collected models will then be uploaded to a specially designed digital platform such as Sketchfab, Polycam and AR OPEN [20] for open access. The models can also be viewed in augmented reality, thanks to a QR code or link that allow the user to open the model directly on a mobile or tablet device [21]. The ambition of the project is to preserve in 3D the evidence of Russian invasion and represent objects of historical importance which suffered or changed their function drastically in Ukraine. It is a time-sensitive collection, as most of the destroyed or ruined objects are typically removed and repaired as soon as possible in the municipalities hit by russian shelling, and the ones close to the frontline are destroyed to the ashes during the conflict. The project theorizes that the exhibits will become a part of the future metaphorical or real Museum of Ukrainian Victory. In this soon-to-be metaverse, each relic imbued with the wartime narrative will be translated into a three-dimensional reconstruction, ranging from a historical building to the carcass of a destroyed military truck.

Fig. 2: 3D model of Destroyed military truck in Kharkiv in Museum of UA Victory website.

Among the 3D model currently available on this platform is the statue of the Duke de Richelieu in Odesa The images were captured by a cameraman on a bucket truck, even during the air siren. This statue was notable for being the first to be covered in sacks in order to protect it against bombing. It is now being transformed into a "monument within a monument." This is a powerful symbol of the Ukrainian people's determination to preserve their cultural heritage in the midst of war. In essence, this act of protection could be seen as an expressive performance of Ukrainian resistance, an almost impulsive act between pain, bereavement, struggle and memory. It bears a conceptual resemblance to the early installations and performances characteristic of the artists of the 1980s, with one of the earliest examples of such "*counter-monument*" being Hans Haacke's 1988 installation *Und ihr habt doch gesiegt* in Graz,Austria [22].

This act of preservation evokes the initial "spontaneous memorials" that emerged in the period immediately following the end of the Second World War. "Sacrario dei partigiani" (Partisan memorial) inPiazza Nettuno, Bologna (Italy), is a case in point [23].

The three-dimensional reconstruction of this "emergent monument" in Odesa, critical for its symbolic resonance, also permits an estimation of the requisite number of protective sacks necessary for the conservation of additional monuments. The sacks protecting the statues are renewed periodically, so the form of the monument transforms each time. The change therefore is traceable through the time inmedia and people's photos.

This act of preservation, which serves also a memorial function, exemplifies the determination of the Ukrainian to embark upon the restoration of their national identity, despite the ongoing conflict. It reflects a political and cultural process that emerges from society and ascends towards the echelons of power, representing a paradigmatic "*bottom-up*" approach

[24].

Fig. 3: 3D model of Statue of Duke de Richelieu in Sand Bags, Odesa, in Museum of UA Victory website.

3.   Conclusions. How to rebuild Ukrainian identity

Every conflict inevitably results in destruction, with the subsequent accumulation of rubble and the dissemination of lifeless bodies. However, war can also result in the destruction of a people's cultural heritage and the values that accompany it. Therefore, it can be argued that the safeguarding of a people's survival extends beyond merely providing humanitarian aid for them; it also encompasses the preservation of both tangible and intangible cultural heritage, which is crucial to maintaining identity and preventing the people themselves from being erased. This highlights the necessity for the Ukrainian people to allocate their resources towards the protection of their historical legacy, even in the face of the urgent need to channel resources to save as many human lives as possible.

In acknowledgment of this imperative, Pixelated Realities has initiated a study on the cultural needs of Odessa's residents and their perceptions of the urban mythos of the city, types thereof, associated cultural products, and media, through the sponsorship of the European Union as part of the *EU4Culture project* [25]. The mission of the project is to create a foundation for a strategic and fact-based cultural, heritage preservation and touristic activity in Odesa.

Analysing the foundational myths of a city undergoing rapid transformation due to the war may assist in reconstructing an image of the city that risks being lost or drastically altered by the foundational myths of the invaders. The findings from this study will constitute the groundwork for the Cultural Development Strategy of Odesa. It encompasses research, publishing of Road map of Cultural Development, White book of Cultural Heritage, Urban Design Guide for Signs and non-formal education about the urban mythology for citizens.

Among the tasks of the project is to showcase digital preservation and catalogues of historical burials situated in the city, digitization of Cossack crosses (early Ukrainian-identifing people dating back to XVII century), and a collection of porcelain from the local museum. Along with protection from the possible destruction by rocket hits, it represents an important step to decolonial understanding of the city identity. Namely, the oldest Cossack cross on the local necropolis is 3 years older than the so-called foundation myth of Odesa by Russian propaganda, linking the city to the legacy of Russian empress Katherine II. Now more research is being done in the Khan Ukraine during Osman Empire, Crimean Khanat etc, showing mentions of the people living in a city in the location of Odesa as early as 600 years ago.

This pursuit of social inquiry, replicable in other Ukrainian cities, coupled with the safeguarding of historical and cultural heritage through digital tools, may prove to be a potent strategy for

safeguarding the identity, and thus the memory, of the Ukrainian people. Moreover, the determination by Ukrainians themselves to preserve certain memorials, shielding them from Russian assaults, might provide a salient indicator of the places and symbols tightly interwoven with the collective memory of the Ukrainians, hence aspects of their identity that warrant immediate protection.

Nevertheless, deliberating on the reconstitution of identity while still in the throes of war, and without fully apprehending its consequences, could be deemed premature. However, awaiting the cessation of hostilities, which is hoped to arrive as expeditiously as possible, without undertaking any protective measures might lead to the total loss of Ukraine's physically and symbolically significant sites. "The Museum of Victory," a virtual space for physical locales, could thereby, in the post-war interval, evolve into a "*lieux de mémoire*" conceptualized in accordance with Pierre Nora's exposition – a locus imbued with specific significance in relation to the collective memory of the community that foster [26].

In conclusion, the digital constructions proposed in this article offer the possibility of tangible and intangible heritage preservation and memory even in a context of conflict. Within this "metamemory," in which destruction, preservation and remembrance occur simultaneously, memory itself is in the process of becoming, whereby old myths are shed and a new postcolonial identity is formed. This, in turn, feeds a new collective memory that is reflected in original spontaneous memorials.

In this context, the preservation of a physical artefact through emerging technologies may therefore assume a pivotal importance that transcends mere augmentation of the object's knowledge base. This is predicated on the principle that a people devoid of memory essentially constitute a people without identity.

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The culture of protection between Architecture and Archaeology: the case of the "Parco Archeologico di Metaponto", Matera.

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Abstract
In a time considered to be a time of crisis, tangible and intangible cultural heritages are exposed to phenomena that accelerate their degradation and very often cause their disappearance. Natural disasters and their causes undermine the choices made in sites, such as archaeological sites, where the preservation and protection of finds is considered a priority; it would be desirable to consider at the same time the relationship between the building and the context, between unexpected events and environmental fragility, in order to guarantee a margin of time useful for developing a "culture of protection". This is the case of archaeological sites, which are the custodians of fragments of our history that are constantly being revealed, thanks to the daily work of archaeologists, architects, historians and restorers. The survey site of the "Parco Archeologico di Metaponto", in the province of Matera, characterized by ancient ruins and urban layouts, strongly compromised over the centuries, risks disappearing under the effect of increasingly frequent flooding phenomena, as a direct consequence of climate change. The paper investigates the relationship between Architecture and Archaeology, which has reached increasing points of interest, in the practices of an integrated approach of knowledge and design; from the protection of historic sites through sustainable construction and reconstructive practices, to digital practices for the preservation of memory.

Keywords: Archaeological Heritage, Natural Risks, Documentation, Augmented Reality

1.   Fragility and forms of cultural heritage protection at archaeological sites

Very often the cognitive spheres and disciplines related to the conservation and enhancement of cultural heritage, between archaeology and architecture, are respectively considered, conservation practice (archaeology) on the one hand and transformation process (architecture) on the other; on the contrary, only the synergy between documentation, reconstruction and project is able to return good practices of reconstruction and safeguard of

a historical memory today strongly at risk. Forms of preservation of architectural artefacts or parts of cities now deprived of their original function, placed in highly disadvantaged contexts, require a theoretical and methodological effort projected towards forms of accessibility, also of a digital kind, that can measure up to the ancient and to today's climatic challenges. Archaeological sites, such as that of the Metapontum Archaeological Park, exposed to continuous natural disasters, such as frequent flooding phenomena, risk permanently compromising relics and masonry structures, causing the loss of an enormous historical and cultural heritage. The remains of Metapontum are about to disappear, in the murky waters of yet another natural disaster. Floods have in fact inundated the archaeological park of what was once a flourishing city of Magna Graecia, a crossroads of history for many centuries, before being obliterated also due to the frequent floods that prompted the slow and progressive abandonment of the city. The scientific research and experiments currently underway [1], focus on the definition of specific lines of intervention, aimed in the first instance at the communication and representation of a heritage that is today illegible, through the use of digital technologies (such as AR), as an exploratory strategy applied to the design of Architecture in

archaeological sites. The interaction between architecture and archaeology through AR makes it possible to preserve and document evidence of the past in an innovative way, enriching the methodological processes related to accessibility, including virtual accessibility, in poorly preserved and highly vulnerable contexts. Today's reconstruction of the urban layout of Metapontum (Fig.1) is the result of several studies based essentially on aerial photographs, surface observations and a few archaeological findings. The most accredited and accepted form corresponds to the situation determined in the second half of the 4th century B.C., with the greatest demographic development and the most intense occupation of the urban space (approximately 150 hectares and a perimeter of 7 km) [2]. For Metapontum, the city represented the beating heart of civil and religious life for centuries and, to this day, vast, albeit barely visible, areas of the chora are still present: the urban sanctuary, part of the agora, the artisan district for the production of ceramics (Kerameikos) and the great north-south road axis (Plateia III) on which the entire urban layout was based; on the edge of the current route leading to the archaeological park, the area of the castrum extends. As early as the mid-5th century B.C., imposing reclamation works affected the city's major arteries; it is assumed that the entire area, when the Achaean colonists arrived, did not present a flat and regular conformation and that this was only achieved following repeated alluvial deposits [3].
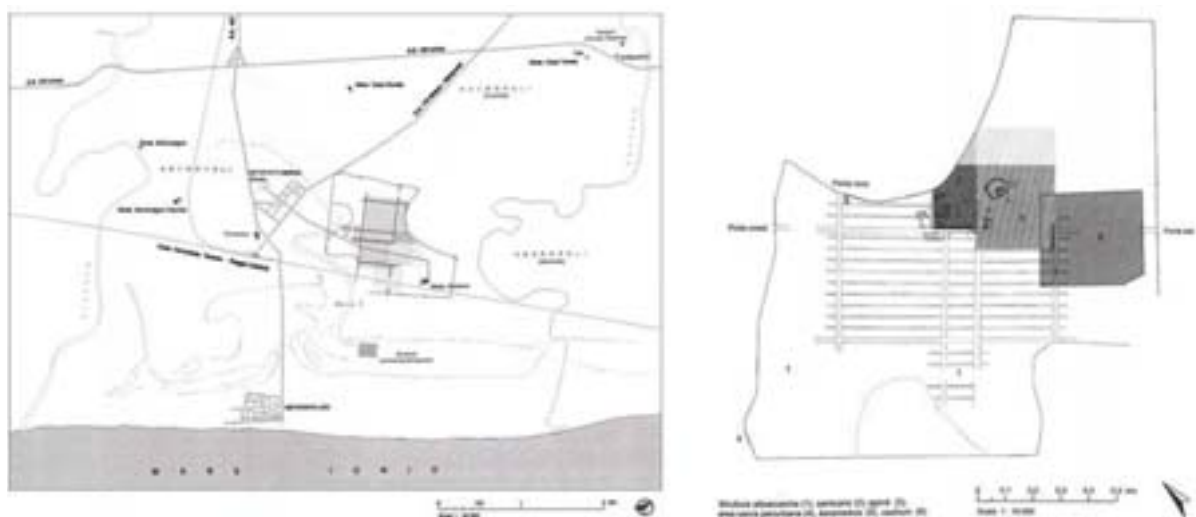
Fig. 1: Right: The Metapontum district with the area of the Greek colony and the modern road system; left: urban area of Metapontum (Source: Bertelli, 2002).

2.   Geoarchaeology of a place. History development and decline.

The Achaean colony of Metapontum indeed arose in a fertile alluvial plain between the mouths of the Basento and Bradano rivers on the Ionian coast of Basilicata. It should be noted that in antiquity, the Basento river certainly flowed along the southern edge of the settlement, exerting a decisive influence on its urban development and spatial configuration. The wide curvilinear profile that can be appreciated in the centre of the southern course is, in fact, attributable to

one of the periodic digressions of the river's course (Fig.2), determined by alluvial floods or possible obstructions formed near the mouth [4].

Fig. 2: Orthophoto map of the Ionian strip with schematic indication of the variations in the coastline and course of the Basento river (Source: Bertelli, 2002).

Starting with the frequency of significant rainfall in the area between the two rivers, it is possible to deconstruct some of the causes that generated the Site's current configuration. The seasonal excavation campaigns aimed at studying the *chora* very often turn out to be emergency excavations necessary to free the flow paths of the waters that collect just like in an expansion vessel. From a geomorphological point of view, the area is confined between the eastern front of the southern Apennine chain and the western edge of the Apulian Promontory (Fig.3) and represents the youngest foredeep of the Bradano [5][6]; it is characterized by a succession of marine terraces corresponding to discrete coastal depositional wedges belonging to alluvial environments [7].
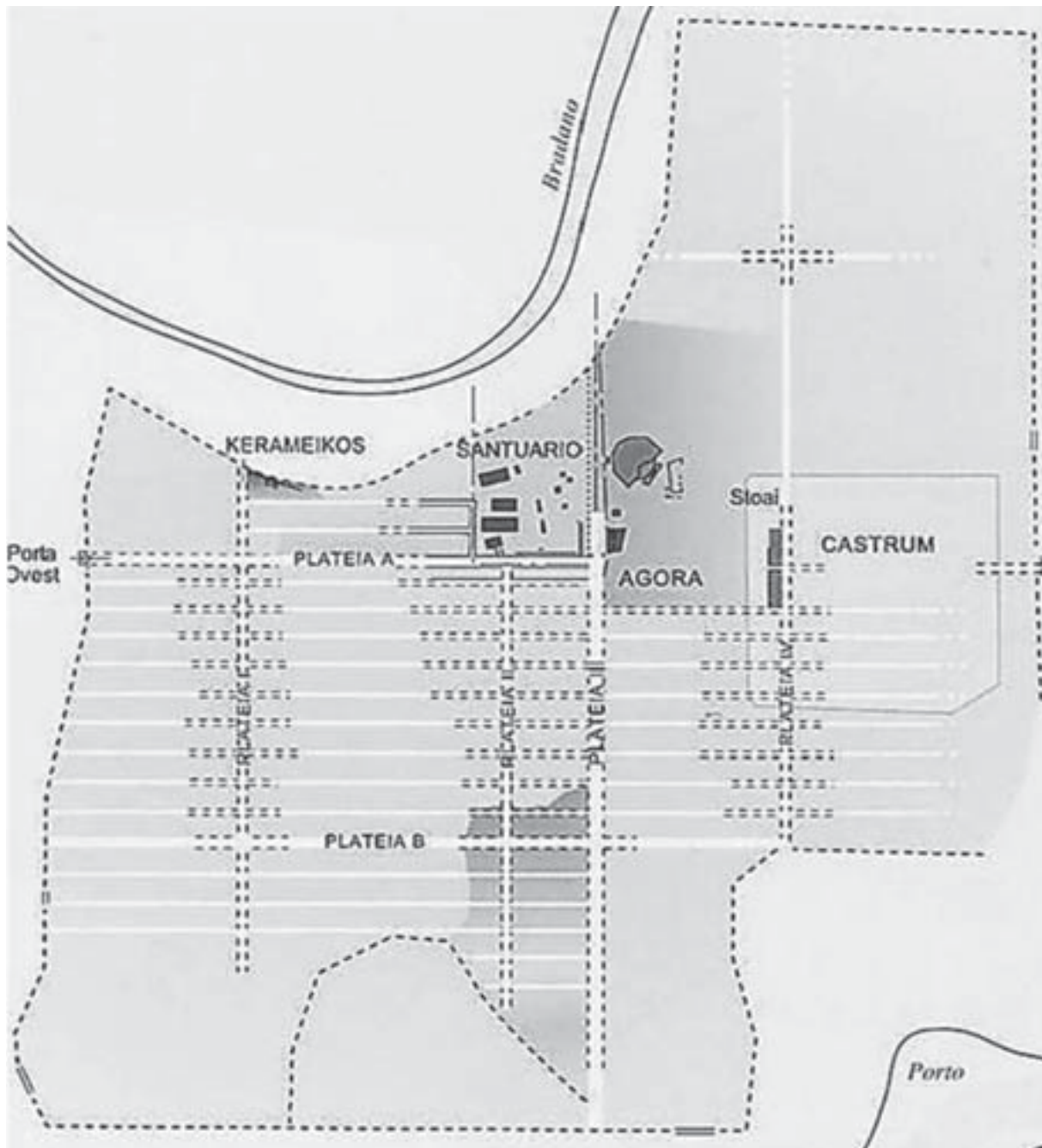
Fig. 3: Metapontum. Schematic plan of the urban layout (J.Mertens 2006)

Since the 1980s, by studying the interaction between man and the environment in different historical periods, it has emerged that the intrinsic characteristics of the landscape, compounded by atmospheric phenomena, have significantly affected human activities [8]. According to various studies, the last phase of the city's history coincides with a gradual depopulation, unlike the castrum area, the only inhabited one. The increase in alluvial deposits in the area's main rivers during the Greco-Roman period suggests a possible increase in erosion processes within the tributary basins due to changes in land use and extensive agricultural practices [5][6]. For the reconstruction of the events, reference is made to paper and digital bibliographic sources, but the most significant collection is represented by a digital archive for the cataloging of the calamitous events that have affected the Metapontino area since 1959 [9]. The geomorphological features and the rainfall study tell what the inhabitants of the *chora* of Metapontum probably knew from the time of the first settlement; the rising water table led the inhabitants to equip the city with an important drainage and channeling system that is still visible and functioning (Fig.4).
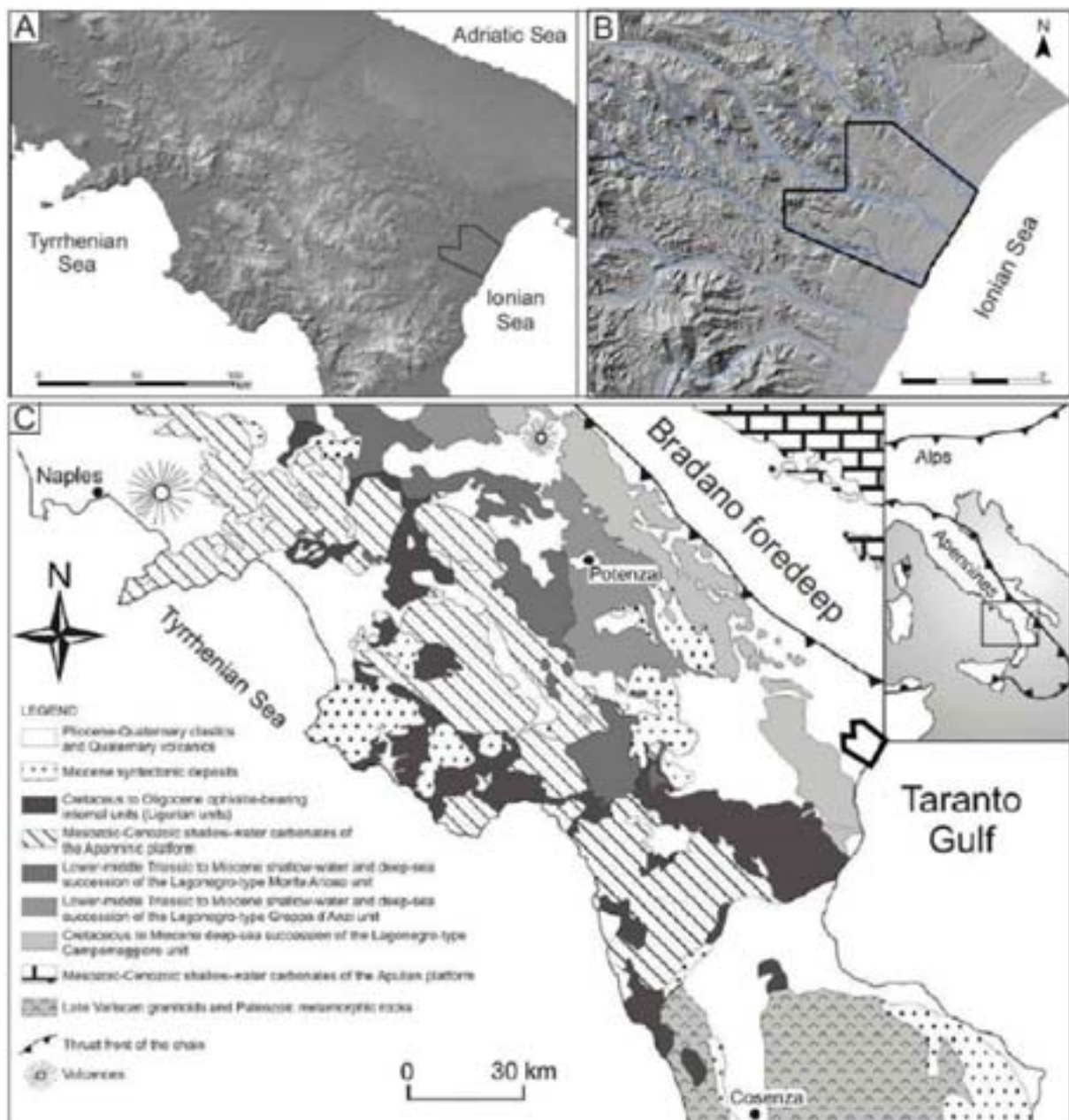
Fig. 4: Geological Map of Southern Italy (as amended by Martino & alii, 2009). In the box: regional framework (A) and ideogrammatic representation of the Ionian Coastal Zone)

The Metapontine supply and drainage systems represent one of the most faithful applications of the Hellenic hydraulic tradition in Magna Graecia; the first elements of the water supply system were the domestic wells and half of the domestic drains were the cloacae of the public drainage system (Fig.5). They ran along the edge of each road axis, main or secondary, and always along the east side of the north-south *plateiai* (Fig.6), so as to ensure a capillary service; they were connected to each other following a hierarchical order similar to that of the road axes, and the main drains led the water outside the walls, through openings along the curtain walls and in the fortified structures of the gates (Fig.4). In the same period, the first phase of the great canal was built (defining a preferential water drainage route) and after its activation, the public distribution system was constructed. In the second phase, the stone shoulders of the *cloacae* invade the edge of the *plateiai* roadway, demonstrating a renewed rise in the water table, dated to the end of the 5th century B.C. [3]. It is highly probable that, in order to speed up the removal of sewage water easily stagnating in the *cloacae*, the system was connected to canals dug in the territory [10], whose water therefore flowed through the town and into the moat and, from there, into the sea, through the great harbour canal, which connected the town to the coast, allowing Metapontum (as in Poseidonia) to directly benefit from the management of territorial waters.

Fig. 5: PHOTO LEFT METAPONTO, area of the Sanctuary of Apollo Licio, large drainage channel, bipartite drainage passage through the northern wall. PHOTO RIGHT METAPONTO, area of the Sanctuary of Apollo Licio, plateia A-A1: cloaca estovest/south edge: section before the junction with the first north-south plateia)

Fig. 6: PHOTO LEFT METAPONTO, settlement to the west of the Sanctuary of Apollo Lycios, insulae I and stenopos between insulae I and II, drainage channel. PHOTO RIGHT METAPONTO, area of the Sanctuary of Apollo Lycius, stoa along temenos south: public well and drainage channel)

3. Future Research Developments: Between Documentation and Augmented Reality

The difficult environmental situation of the Metapontine plain, imposes diversified solutions; from hydraulic interventions to avert possible flooding, such as defense works to protect the archaeological excavations and remains, to the possible safe use of the site and the interpretation of an often illegible heritage. In this first approach to knowledge, the research being experimented investigates the possibility of using digital technologies in the documentation, survey and redesigning phase of the cultural heritage; seeking to protect and hand down the memory of the form, combining a new mode of use for the Site, Mixed Reality, based on the interaction between place and user. Architectural research acquires greater strength thanks to the systematic use of certain procedures pertaining to Augmented Reality technology; through the superimposition of some original architectural elements, virtually reconstructed and placed in the real settings, a product is returned that is capable of being transversal - not exclusively in the scientific field - increasing the perceptive possibilities of the users. '[...] is the overcoming of an elitist model that has found application and life in various "phygital" experiences, in which the mediation between physical and digital space enriches the sense of experience of fruition using AR and VR' [11]. The research makes use of hologram technology, allowing the visitor to interact with the ancient architecture of the past, without affecting the form and reading of the landscape. Holograms, three-dimensional images created through the recording of interfering light patterns, allow virtual objects to be perceived as really present in physical space. To implement the use of the technology on site, it used a complete ergonomic holographic device without cables and independent Hololens (Microsoft), which

allows digital content to be projected into real space, surrounding the wearer. These are equipped devices that, by means of sensors and cameras, allow virtual volumes - previously modelled - to be projected directly into the Archaeological Park of Metapontum. Interesting for the research is to preserve the communication of the heritage; depth, position, orientation of the original architectural artefacts, in their composition, safeguarding the relationship and perfect spatial and perspective coherence with the visitor (Fig.7).
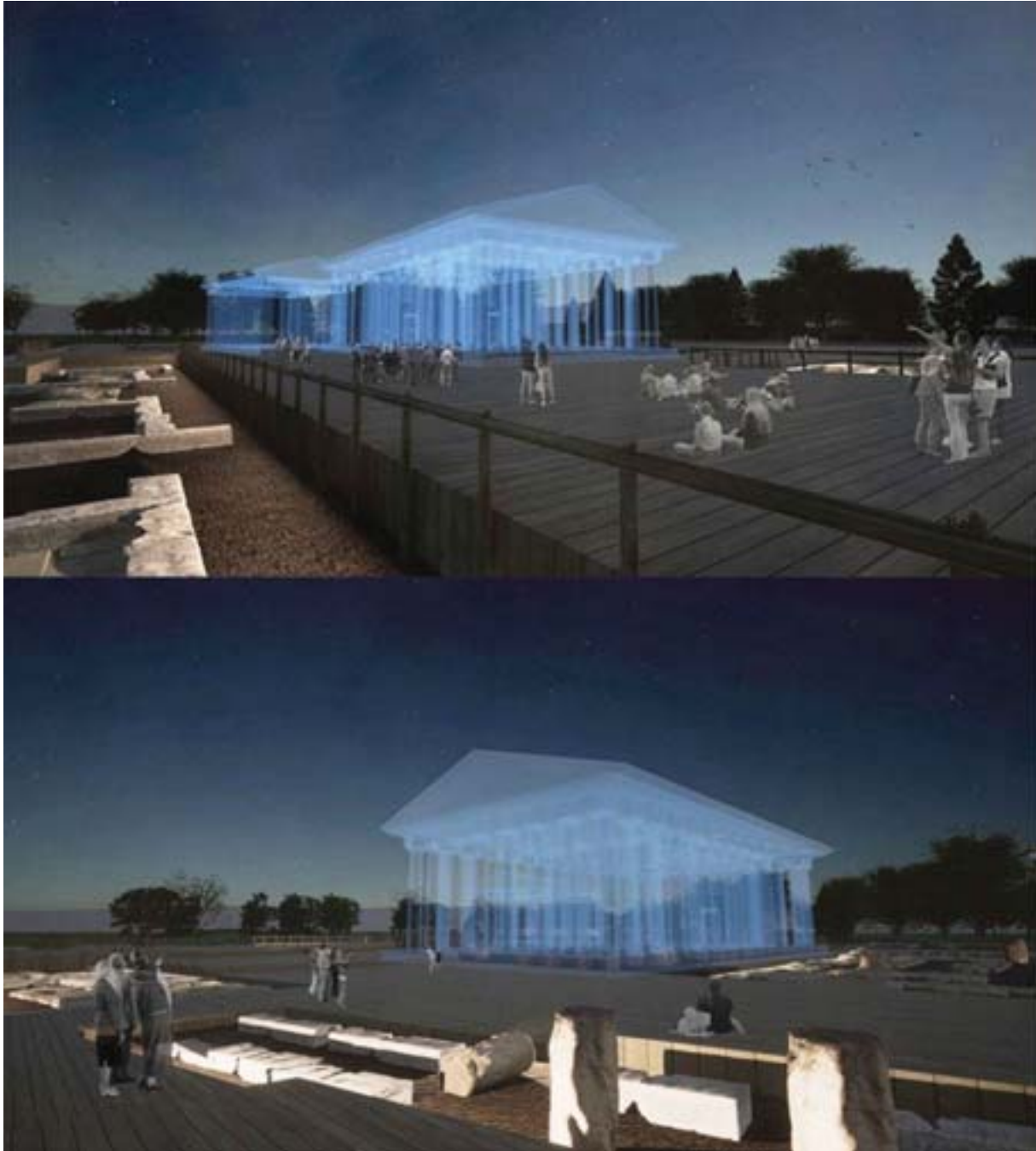
Fig. 7: Collage. Digital holographic reconstructions of the 'Temple of Hera' in the Metapontum Archaeological Park. Night images created within the Twinmotion software environment using the ray tracing technique)

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Environment' A.A. 2022-2023 on the theme 'Generating Museums and Archaeological Parks in Basilicata', headed by Prof. Arch. Antonio Conte, with the involvement of the School of Specialisation in Archaeological Heritage (SSBA), the director Prof. Maria Chiara Monaco and Dr. Vincenzo Cracolici, Director of the National Archaeological Museum of Metapontum with its Archaeological Park and the Temple of the Tavole Palatine, necropolis of Crucinia Metapontum.

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Cities and cultural heritages: resilient policies and safeguard measures

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Abstract

Cities represent living treasures of history, art, and culture. Every corner tells of a thousand-year-old past, intertwine civilization and showcases human ingenuity. However, over time, urban centres and their cultural heritages have become increasingly vulnerable to risks arising from rapid urbanisation, climate change and anthropogenic threats. In this study we will try to address this topic starting from the social and economic role that cultural heritage plays in cities - as a vehicle of identity and dialogue between different cultures - an important resource to be enhanced and protected through methods and strategies, as already specified in Target 11.4 of the 2030 Agenda. The objective is to identify the best political actions and specific safeguard measures to make cities and human settlements inclusive, safe, resilient and sustainable, strengthening the protection of cultural and natural heritage and promoting responsible cultural tourism, in order to avoid harmful and vandalistic behaviour. Our attention is paid to innovative and collaborative planning policies, which aim to implement projects for the recovery and protection, digitalisation and computer archiving of the cultural heritage present in cities. These are precious tools that allow the cultural testimonies of urban centres to be preserved, shared and made known to a global audience.

Keywords: Cultural heritage, identity, policy safeguarding

1.   Introduction

Cultural heritage, in all its forms, represents the identity and historical memory of the different peoples who lived in a specific territory [1]. It constitutes a fundamental and founding part of cities, expresses universally recognized values, bears witness to past civilizations and acts as a glue between different generations. It represents a tool for knowledge, dialogue and understanding between different cultures and is capable of generating economic development and social cohesion in mutual respect between the various populations and their traditions. A mosaic, rich and varied, made up of natural sites, archaeological areas, urban landscapes, museums, monuments, works of art, historic centres, literary, musical, audiovisual works, uses, habits of citizens but, above all, it is a resource to safeguard, enhance and pass on.

2.   Agreements and good protection practices

Due to the world wars - and not only - the cultural heritage of several cities has been put at serious risk and, over time, has been partly destroyed and stolen. This led the international community to adopt in 1954 a convention on the protection of cultural property - in the event of armed conflict - stipulated in Aia, Netherlands. Over the years, the convention was subsequently integrated and updated with other agreements, so much so that was signed "*Sendai Framework for Disaster Risk Reduction*" (2015-2030), having among its objectives the defense of cultural heritage from any form of aggression and danger. The European Commission, in 2016, published an Action Plan in order to develop, with EU Member

States, good practices for reducing the risk of cultural heritage, implementing all forces necessary for protection and conservation. Italy (fig.1), was the first European country to undertake protection actions on cultural heritage thanks to the actions of the "*Caschi Blu of culture*" operational unit, established with the "*Unite4Heritage*" Task Force. These are qualified experts with the main task of intervening, in crisis or emergency situations, on cultural heritage or in places of culture in general, combating the international trafficking of illicitly stolen goods and supporting the authorities of the requesting foreign countries. Among the interventions of the "*Caschi Blu of culture*" we remember the missions following a

violent earthquake in Nepal in 2015 and in Mexico in 2017; in Italy in 2019, after the Venice floods; in Albania after the seismic events of January 2020; in Lebanon, in August 2020 following an explosion that shocked the capital Beirut; in Croatia in 2021, when the city of Zagreb was destroyed by a strong earthquake. These are just some of the Task Force's operations that have produced excellent and successful results, becoming a reference model in the field of cultural protection in global crisis contexts. And it is precisely from this protection model that it has been better understood that cultural heritage at risk is a phenomenon to be analysed through a broad and systematic vision of the problem. In fact, it is necessary to take into consideration not only the heritages, but the contexts and communities of reference. It is the communities themselves who, when subjected to damage and loss of heritage, suffer not only economic, but social and cultural impoverishment, which can compromise the loss of identity and sense of belonging to the place. Recently, *open source* digital tools and platforms have been developed for the prediction, monitoring and surveillance, even in real time, of different types of risks in order to increase the preventive approach and therefore the resilience of an "asset" in the awareness that a planned and coordinated action of digitalisation of the cultural structures of a territory allows for the preservation, use and dissemination of knowledge as well as generating economy and well-being.

3.   The social and economic role of cultural heritage in cities

It has been demonstrated that cultural heritage contributes to the definition of the identity of cities and is a fundamental resource for social cohesion and economic development (EU, 2014). It follows that cultural conservation activities, in addition to representing an ethical duty, become a far-sighted and effective development strategy. During the European Year of Cultural Heritage 2023, more than 12.8 million people participated in more than 23,000 events. These numbers clearly highlight the potential impact that cultural heritage has on the economy and quality of life in cities. For example, urban or territorial regeneration interventions - based on the valorisation of cultural heritage, as well as the adaptive reuse of buildings or structures belonging to the local cultural heritage - stimulates social capital, cohesion, inclusiveness, as well as a sense of belonging and greater individual and collective well-being. A recent study - *Espon Heritage* (fig. 2) - finds that as many as 7.8 million people work in the tourism and related construction sectors, and over 300,000 in the cultural heritage sector. However, there is still limited understanding of the economic benefits that cultural heritage brings to cities. For this reason it is desirable that a transversal and cooperative vision is shared on the different scenarios and methods of involvement of the actors interested in protection.

Fig.1 - World Heritage List. Source: Istat based on UNESCO elaboration.

Fig. 2 - ESPON HERITAGE Project - Value chain of material cultural heritage and connections to economic sectors/activities.

4. Digitalisation and accessibility of cultural heritage

The use of *Information and Communication Technologies* is producing important changes on life daily (A/HRC/20/26) and in the tools and methods of conservation, valorisation and use of cultural heritage and in government policies (global, European and national). The digitalisation and networking of cultural heritage allows all citizens - at any time and in any place - to enjoy cultural heritage for study, work and leisure purposes and allows cultural institutions to continue to carry out their mission, i.e. access to and conservation of cultural heritage which for a series of reasons cannot be enjoyed by the public. Furthermore, digitized materials can be reused for commercial purposes or for other uses, such as the development of educational and instructive contents, documentaries, tourist applications, recreational activities, etc.. The digital means favor the recognition of the social dimension, the implementation of the participatory *governance* model of cultural heritage - as indicated in the 2005 *Faro Convention* - the transmission of assets to future generations, beyond valorisation as a tool for intercultural dialogue and international peace. In addition, from a different perspective, they constitute tools for the enjoyment of cultural rights. First of all, that of guaranteeing the right to participate in cultural life without any discrimination. This applies, in particular, to some vulnerable social groups, such as disabled people and minorities. Considering access to and enjoyment of cultural heritage as a human right constitutes a necessary and complementary approach to that aimed at its conservation and has acquired growing relevance in international policies and regulations. The digitalisation and online accessibility of cultural heritage constitute a driving force for economic development, particularly at a local level, increases attractiveness for tourists, strengthens territorial identity, stimulates urban regeneration processes, promotes creation of new products. This perspective is the subject of attention within the EU, in the context of the European framework for action for cultural heritage but also of the Digital Agenda for Europe, which aims to exploit the potential of ICT to foster innovation, economic growth and progress in various sectors, including cultural heritage. The EU has adopted a significant number of relevant instruments on the subject, from the Work Plans for Culture, to the digitalisation and online accessibility of cultural materials, to the Directives on the re-use of public sector information. An in-depth digitalisation of real estate assets is, therefore, an important database and tool for valorisation and management with a view to future interventions. In Italy, the *Digital Library* - Central Institute for the digitization of cultural heritage of the Ministry of Culture - has started the drafting of the *National Plan for the Digitization of Cultural Heritage* (fig. 3). This Plan constitutes the strategic vision with which the Ministry of Culture, in agreement with the Regions, promotes and organizes the digital transformation process in the five-year period 2022-2026 in the various sectors of the cultural ecosystem, using investment funds - M1C3 1.1 "Digital strategies and platforms for cultural heritage" - of the PNRR. The most important intervention of

national importance carried out so far is represented by the *Alphabetica* platform, an access point to the "digital ecosystem of national bibliographic services", active since December 2021. In addition to *Alphabetica*, in our country, there are other experiences of creating digital hubs generated by cooperation between entities and the creation of networks including various conservation institutes.
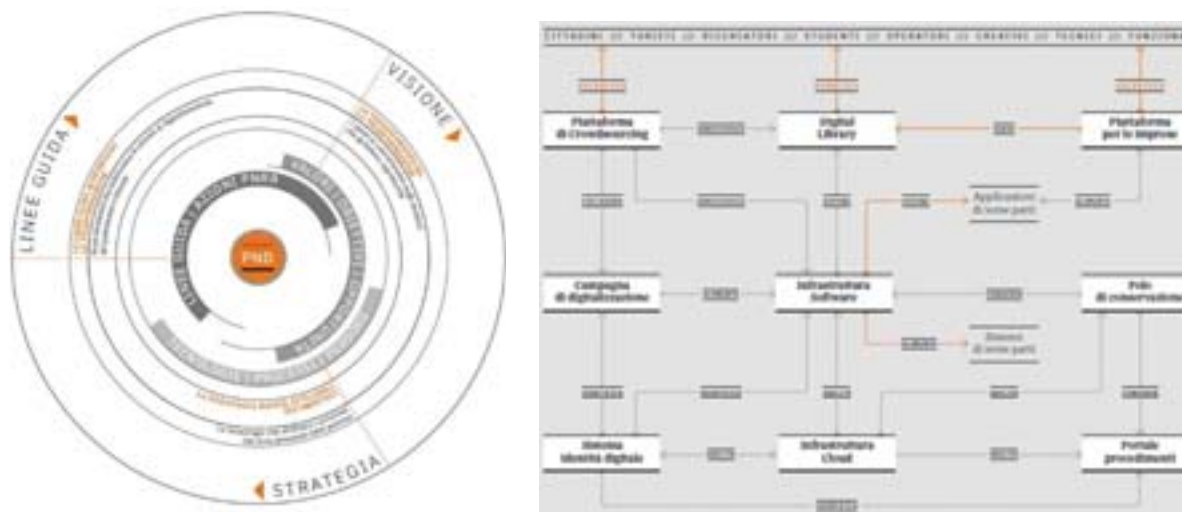
Fig. 3 - Graphic representation of the contents of the National Digitalization Plan and Existing relationships between the different projects into which the PNRR M1C3 investment is divided.

5.   A National Plan for the conservation of cultural heritage

There are many risk factors, natural and/or anthropic, that alter cultural heritage: earthquakes, volcanic eruptions, landslides, floods, climate changes [3-4], pollution, fires, structural failures, anthropic pressure. Hence the need for monitoring cultural heritage, a topic of great importance for the current Ministry of Culture which, over the years, has repeatedly tried to implement adequate policies and tools, how the *Extraordinary National Plan for Monitoring and Conservation of Immovable Cultural Heritage* (D.Lgs 109/2018) [5], in line with the objectives of the European *Mirror Copernicus* Program. In particular, it defines the criteria for identifying the assets to be subjected to preliminary monitoring and the consequent conservative interventions, as well as the necessary orders of priority for intervention, also on the basis of specific indices of territorial danger and vulnerability of the properties, and the instrumental control systems to be used, as well as the methods of implementing safety, conservation and protection measures. To guarantee the protection and conservation of cultural heritage, in fact, it is considered increasingly important to intervene not only in emergency phases, following natural disasters or in the event of armed conflict [2], but also and above all "*in times of peace*" to prevent or reduce the level of risk. The Plan aims to carry out the monitoring of the most vulnerable buildings and artefacts of cultural interest in relation to their structural safety, optimizing the projects already underway for monitoring the territorial and environmental context on which architectural and archaeological assets fall, through a "active" approach to the residual risk and interventions that are less invasive and more respectful of the historical building. To date, for the purposes of planning interventions on cultural heritage according to the risk level criterion, the only systematic tool available is the Cultural Heritage Risk Map (fig.4), a platform currently managed by the General Directorate of Security of cultural heritage, which works with other Ministry platforms (Vincoli in Rete, Sigec-web, Beni Tutelati, SecurArtWeb). This visualization, which allows the production of different themes, which are always updatable and superimposable, capable of defining the risk levels of the national heritage in different times and conditions, was made possible by the development of Territorial Information Systems. The cultural heritage monitoring plan consists of an interactive map (fig. 5) present within the national territory and includes projects on: Venice and the Lagoon; Provinces of Pisa and Livorno; historic centers of Ferrara, Pisa, Padua, Rieti, Verona; municipalities of Pienza and Volterra; village of Civita di Bagnoregio; the Aurelian Walls including the adjacent buildings of cultural interest; the "*Via Francigena del Sud*", within the municipal territory of Rome including the adjacent buildings of cultural interest; the area of the archaeological park of Campi Flegrei, Paestum and Velia, Morgantina and the Villa Romana del Casale in Piazza Armerina, Baratti and Populonia; the Submerged Park of Baia, the Ancient Port of Classe in Ravenna. This new important risk management and prevention tool - an international reference model for the conservation of world cultural heritage - goes hand in hand with the irreplaceable action of planned maintenance and prevention in the area, coordinated by the Cultural Heritage Security Directorate, in synergy with the Regional Secretariats and Superintendencies.

Fig. 4 - Risk Map – General Management. Security of Cultural Heritage.

Fig. 5 - Interactive map - National digital cultural heritage Plan.

Conclusions

Cultural heritage - tangible or intangible (ICOMOS, 2019) - is linked to identity, to the historical and cultural construction of memory, it is a symbol of the expression of a society and must be preserved. Unfortunately, however, the protection of cultural heritage - from natural or man-made disasters - is not considered a priority in territorial planning and management. Until now, the policies adopted have usually and specifically been in response to the occurrence of emergency situations when the property has already suffered damage and it is difficult to intervene. Strategies and procedures for the protection

of cultural heritage are not fully integrated into urban planning tools. There are sporadic interventions that refer to the theme of prevention and monitoring, in order to avoid or limit the damage, but nothing on the resilience of the asset, or that is the ability to return to the initial conditions, in the shortest time and with the fewest possible consequences. A reference model, exportable at an international level, is the Extraordinary Plan for the monitoring and conservation of cultural heritage which, together with the mapping of the danger and risk for the protection of the property, environmental monitoring and earth observation data, are currently the only useful tools for passing on the priceless planetary heritage to future generations.

Notes
All images are taken from the web.

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Evaluating safety in museums during pandemic emergencies: an integrated approach between Space Syntax and an AI-based analysis of visitors' flows

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Abstract
The COVID pandemic emergency has brought changes in the use of highly crowded public buildings, including large museums. Upon reopening, these institutions have faced the problem of devising strategies to manage visitor flow effectively, prioritizing safety without compromising the visitor experience. In this context, several studies have considered the application of methodologies and tools to analyze visitor movements in museums. On one hand, the "indirect" methodology, referring to configurational analysis (Space Syntax) [1,2], emerges as one of the most effective in interpreting the role of spatial configuration in guiding user movement [3]. On the other hand, a more "direct" approach utilizes modern AI technologies to collect and analyze visitor flow data [5, 6]. Examining the pros and cons of each of the two approaches and using Museo di Roma at Palazzo Braschi as a case study, this contribution aims to evaluate an integrated approach, targeted to set the guidelines for designing visiting strategies that prioritize safety and the quality of the visitors' experience.

Keywords: Museum, Space Syntax, artificial intelligence, circulation, Covid-19

1. Introduction
The cultural sector has been significantly impacted by the COVID pandemic, with over 90% of cultural sites experiencing closures in both Italy and globally. With the reopening of major public services, the need to adapt the ways in which users would interact with public spaces became immediately clear, especially in contexts characterized by high people flow, such as large museum buildings. While measures such as one-way paths were implemented to maintain social distancing, they often resulted in a reduction in the quality of the visitor experience. To understand user dynamics and flows within museums, several studies have applied configurational methodologies (Space Syntax) [1,2,7], originally developed for other contexts such as urban spaces, hospitals, and airports. These techniques, which we will refer to as "indirect" [3,4], analyze the influence of spatial structure and architectural and functional characteristics on relational dynamics, and consequently, on visitor satisfaction [8]. The practical applications of these methodologies in the international museum field [9,10,11] have led to the redesign of multiple scenarios, through new utilization strategies, resulting in the optimization of various museum areas and a revitalization of the museums' image. However, among the various architectural purposes, the museum represents a unique case as it serves as a "container" for valuable "contents." A museum cannot be considered as such without the presence of exhibited artworks [12], which form the core of the visitor experience. Therefore, focusing exclusively on the architectural aspect could be limiting, as it risks overlooking the central element of the museum experience: the artworks. In this scenario, interesting studies [13] investigate the effects that artworks have on museum visitors, finding a strong correlation between spatial behavior and aesthetic evaluations. In line with the growing trend towards digitalization in various economic sectors, the IoT is emerging as an essential element in museum contexts [14]. This research avenue, more analytical in nature, which we will refer to as "direct", considers modern AI technologies and cutting-edge sensor

technology [5,6] for visitors flow analysis. These studies aim to identify behavioral patterns [15] with the goal of optimizing flow management [16] and, more broadly, enhancing the quality of the visitor experience [17]. In line with the above-mentioned direct and indirect studies, this contribution explores the possibility of integrating these two complementary approaches, with the objective of developing an integrated methodology to design the visiting strategies that prioritize safety, enhance visitor experiences, and enrich the appreciation of cultural heritage.

2. The case study

This contribution explores cross-cutting themes related to the ARTEMISIA project [25], which finds its experimental location at the Museum of Rome in Palazzo Braschi [19]. Its current exhibition dates to 2017 [20] and is organized thematically across the second and third floors (the first floor hosts temporary exhibitions), with the concept that Palazzo Braschi can narrate the history of Rome from the 17th to the 20th century.

(a)   (b)   (c)
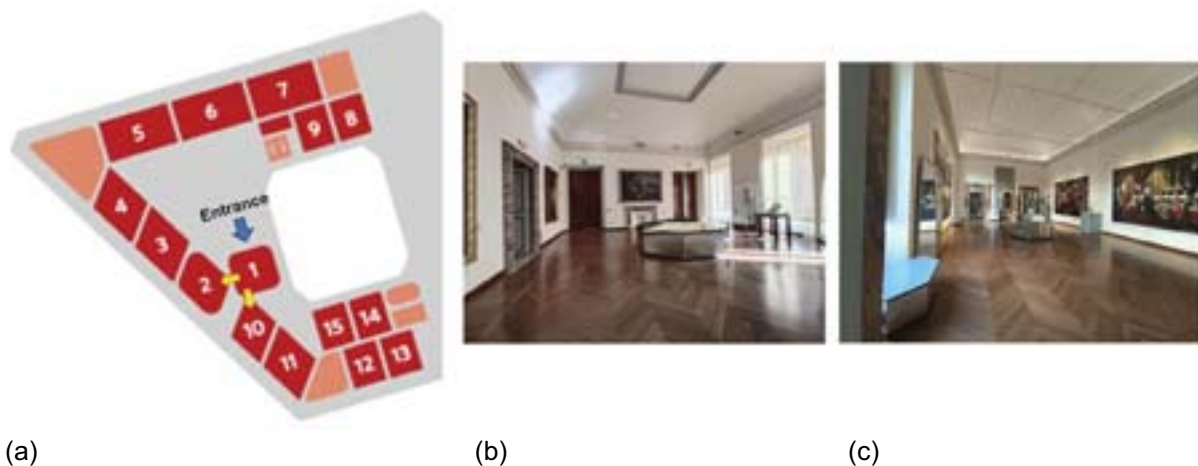
Fig. 1: Museum of Rome Palazzo Braschi (Rome, Italy): (a) second floor plan, yellow arrows denote the exhibition routes, in red the exhibition rooms; the project experimentation is conducted in (b) Room 1 and (c) Room 6.

The experimentation focused on the permanent exhibition (Figure 1a), specifically in Room 1 (Figure 1b) and Room 6 (Figure 1c), two pivotal points of the visit as they are located at the beginning and end of one exhibition route. Detailed plans of Room 1 and 6 are shown in Figure 2.

(a)   (b)
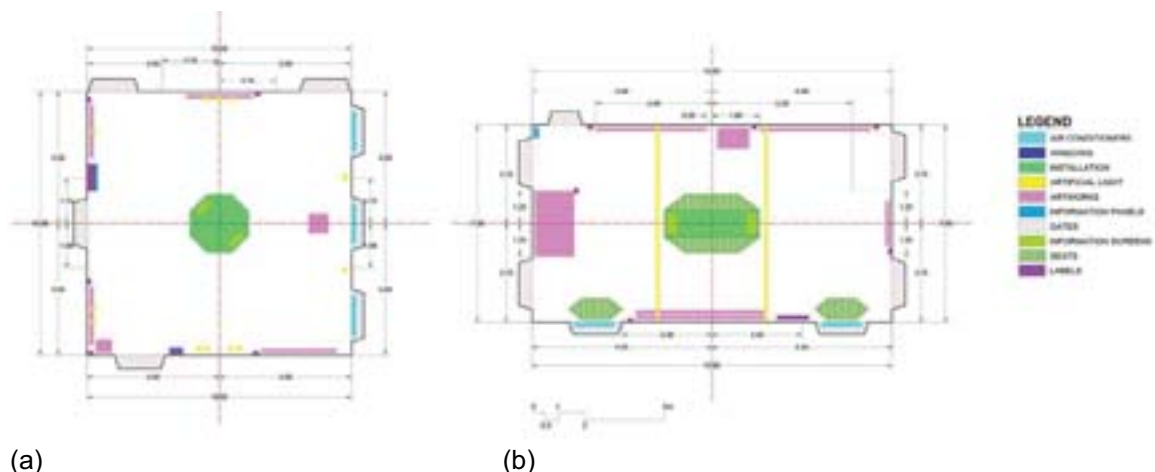
Fig. 2: Plans of Room1 (a) and Room 6 (b).

Room	Cod	Title	Category	Author	Year	L (m)	H (m)	Subject	Colour	Eye match
1	1.1	Teca con tazza da puerpera, vassoio e cucchiaio	Showcase	-	-	1.18	1.20	O	NIL	1
	1.2	Visita di Innocenzo X alla Fontana dei Fiumi a Piazza Navona	Painting	F. Gagliardi	1651	2.85	1.87	A	Hot	1
	1.3	Teca con statuette (Apollo citaredo, Fauno danzante, La musa Melpomene, Danaide, Flora Farnese, Ercole Farnese)	Showcase	-	-	0.60	1.20	O	NIL	1
	1.4	Ritratto equestre del Principe Camillo Rospigliosi	Painting	A. Masucci	1737	2.20	1.47	H	Cold	1
	1.5	Papa Gregorio XVI in visita ai Fori	Painting	P. J. Van Bree	1832	1.58	1.45	A	Hot	1
	1.6	S. Camillo de Lellis salva gli ammalati dell'Ospedale S.Spirito durante l'inondazione del Tevere del 1598	Painting	P. H. Subleyras	1746	2.48	1.72	H	Cold	1
	1.7	Multimedia installation	Installation	-	-	2.20	1.00	NIL	NIL	0
6	6.1	Interno della cappella Cybo in Santa Maria del Popolo	Painting	L. Garzi, C. Maratti, P.F. Garoli	1687	1.23	1.70	A	Hot	1
	6.2	Arrivo a Quirinale dell'ambasciatore veneto Nicolò Duodo	Painting	-	1714	4.86	1.49	A	Hot	1
	6.3	Ingresso a Roma da Porta del Popolo dell'ambasciatore veneto Nicolò Duodo	Painting	-	1714	4.86	1.49	A	Hot	0
	6.4	Modello della cappella Rospigliosi Pallavicini in S.Francesco a Ripa	3d model	-	-	2.50	2.50	A	NIL	1
	6.5	Clemente XI conferisce il cappello cardinalizio a Giulio Alberoni	Painting	P.L. Ghezzi	1724	4.25	2.75	H	Cold	1
	6.6	Teca con terracotta. Bozzetto per la statua di S.Longino nella chiesa di S.Pietro. Santo panneggiato con libro	Showcase	-	-	1.20	1.20	O	NIL	1
	6.7	Innocenzo X conferisce il cappello cardinalizio a Fabio Chigi	Painting	P.L. Ghezzi	1724	1.20	1.20	H	Cold	1
	6.8	Multimedia installation	Installation	-	-	3.60	1.00	NIL	NIL	0

Table 1: Detailed description of the Point of Interest (POI) for Room 1 and Room 6.

3. An integrated methodology

To investigate the spatial properties relevant to usability [21] and wayfinding [22], we conducted a series of *indirect* configurational analyses at two different scales: the floor plan and the two rooms under study. We used the open-source software *Depthmap X 0.8.0* [18] to examine the physical and visual usability of spaces, which, as demonstrated in various studies [23,24], significantly impact visitors' navigation and thus their visiting experience. In line with the research conducted during the COVID pandemic [3,4] and to enhance our understanding of relational dynamics, we initiated our analysis from the floor plan focusing on the areas dedicated to the visit route. From this abstraction, we derived the visibility graph to quantify connectivity, a measure assessing the number of spaces immediately connected to a given space (physical usability), and visual integration (HH), indicating the visual distance between all spaces (visual usability). Finally, a flow analysis based on *agents* was conducted to simulate flows within the floor spaces, analyzing the areas with higher or lower flow density. Moving to the scale of the two experimental rooms, the studies were limited to flow analysis based on agents. In both scenarios, the software employs a qualitative visualization of the results, delineating the different values of each analysis (connectivity, visual integration HH, and flow density) through a chromatic scale ranging from red (higher values), transitioning through yellow and green, to blue(lower values).

About the *direct* AI-based analysis, the ARTEMISIA [25] project focused on analyzing data from IoT sensors, specifically from Xovis PC2 stereo cameras. The acquired visitors' trace data included timestamps, anonymous visitor IDs, room identifiers, spatial coordinates *(x,y)*, and head orientation *(dx,dy)* on the horizontal plane. This contribution outlines two levels of analysis within the project: *heatmaps* and *stop points*. *Heatmaps* enable an effective visual analysis of visitor distribution in the studied spaces by transforming positional coordinates into pixel coordinates and using a chromatic scale to represent counts of stay within each pixel. *Stop points* are used to represent points of interest in the rooms under consideration. For each trajectory recognised by the sensors, particular points have been identified. These points represent areas of the room where the visitor stays longer, e.g. to observe artworks or multimedia installations. Stop points are identified using the density peak clustering algorithm [26], which finds density peaks in a data set (in this case the trajectory points) by calculating local densities and distances between the data. A *dwell time* is then associated with each stop point. After delineating the two distinct analytical approaches, direct and indirect, and deriving their results, it is necessary to undertake a third level of analysis, carried out jointly, to develop a comparative model of the information emerging from the first two. This process is essential for a more complete evaluation of the dynamics and relationships between the factors considered, in the next section we propose an applicative example.

4. Results

4.1 Understanding visitor behaviors

The application of the indirect approach to the areas of the second floor of Palazzo Braschi dedicated to the visit route are presented in Figure 3, both in a synthetic (based polygons and links) and an analytical (based on a grid) way. The connectivity analysis illustrated in Figure 3a reveals that among the rooms with higher connectivity values, Room 6 stands out, while Room 1, located at the beginning of the route, exhibits medium-low values, as one would expect. Similarly, the analytical results in Figure 3b highlight the presence of two main axes, derived by aligned openings between spaces, which display higher connectivity values. In absolute terms, this analysis confirms the high degree of connectivity of Room 6. The analysis of visual integration (HH), as shown in Figure 3c, reveals a scale of values with peaks observed in Rooms 6 and 5, as well as in the trapezoidal angular area, while

these values gradually decrease until reaching minimal values in Rooms 1, 8, and 11. Furthermore, the analytical depth highlighted in Figure 3d shows the presence of two main visual axes, which exhibit average values that increase in the trapezoidal angular space, where they converge. It is important to note that these axes do not intersect Rooms 1, 8, and 9, indicating them as the most penalized in this regard.

Finally, the agent-based analysis, initiated from the floor entrance, in Figure 3e reveals the highest density of flow in the central area of Room 1, then the flow subsequently becomes bidirectional, leading respectively to Room 7 and Room 11, exhibiting consistently decreasing values. In this regard, the analysis demonstrates that Rooms 9 and 8 are the least reachable.
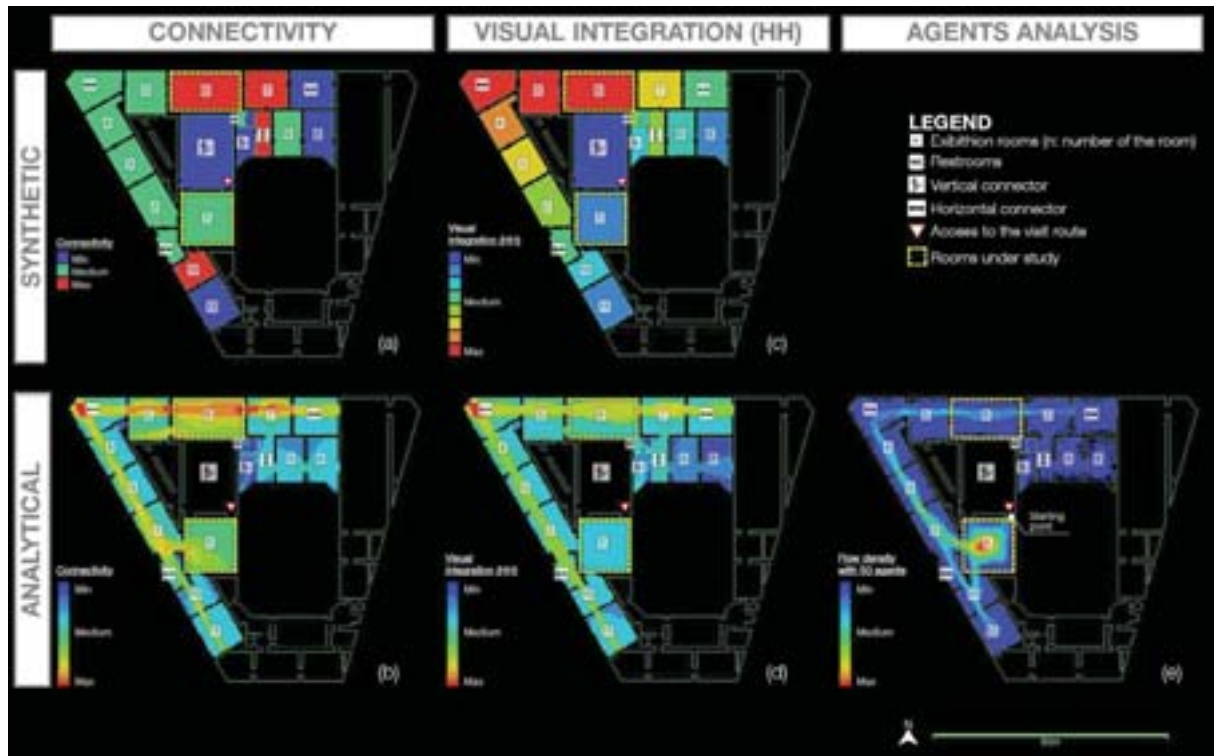
Fig. 3: Space syntax analysis at the scale of the floor plan: (a) synthetic connectivity; (b) analytical connectivity; (c) synthetic visual integration (HH); (d) analytical visual integration (HH); (e) analysis of flows through agents.

The second set of indirect results concerns the level of depth related to the two experimental rooms, involving all the elements included in each space (Figure 4). In both Room 1 (Figure 4a) and Room 6 (Figure 4b), the analysis of flow through agents reveals a similar behavior, indicating a flow pattern that, originating from the actual entrances, exhibits higher density in areas around the central installations, gradually diminishing towards minimal values at the walls.
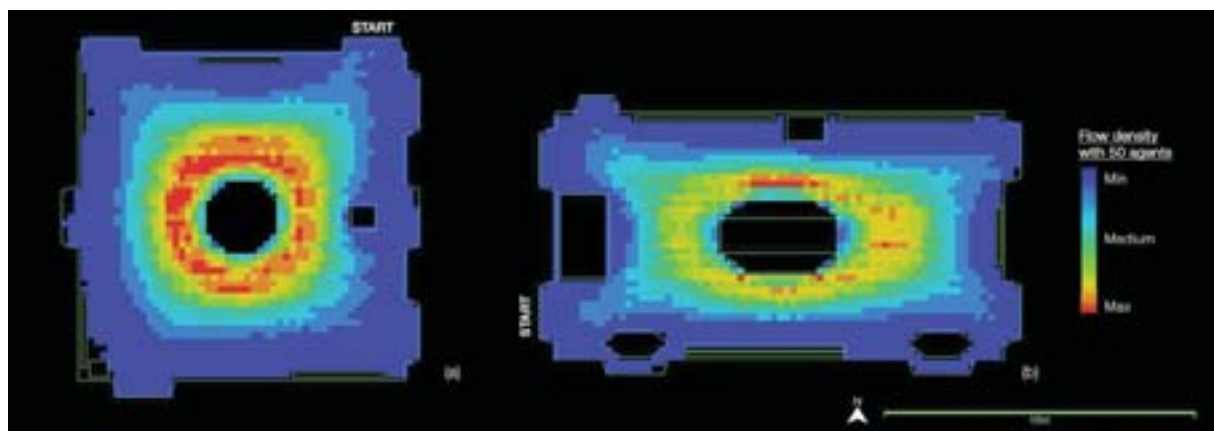
Fig. 4: Space syntax analysis at the scale of the two rooms under study: analysis of flows through agents of (a) Room 1 and (b) Room 6.

Analyzing the results of the direct approach, Figure 5 shows the heatmaps for the two rooms. The findings indicate a greater concentration of people near artworks and multimedia installations, as well as in the vicinity of room entrances (compare with Figure 2). This pattern is consistent across both rooms, although the density varies.

(a)   (b)

Fig. 5: Heatmaps of Room 1 (a) and Room 6 (b) produced with trajectories collected on 17 June 2023.

Figure 6 shows the results of the *stop points* estimation calculated with the algorithm described in Section 3. It also shows the *dwell time* associated with the stop points on the maps of the two rooms, such that they are displayed as blue circles whose size increases according to the value of the dwell times. In Room 1 the stop points with the longest dwell time are in the lower right corner, corresponding to point of interest 1.2 (see Table 1). In Room 6 the stop points with the longest dwell time are in the centre around the seats, at the bottom of the room near point of interest 6.2, and in the left-hand side near point of interest 6.4 (see Table 1).

Fig. 6: Map of the stop points (blue circles) in Room 1 and 6. The circle size corresponds to the dwell time of the stop points as described in section 3.2, more precisely larger circle size corresponds to longer dwell time.

4.2 Integrated implications

The joint analysis of the two proposed methodologies is based on the hypothesis that in a museum people's behavior is influenced by two different components: the space configuration, widely analyzed in the literature on Space Syntax, and the presence of artworks, that attract visitors and, in some sense, creates a *distortion* in the effect of the space on people. Indeed, if an indirect analysis considers *only* the influence of space on people's behaviour, the analyses performed with the IoT sensors consider *both* the combined effect of space and artworks. By comparing the two approaches we can better understand the effects of the two distinct components (space and artworks) on people's behaviour, which could suggest some changes in the room space organisation, as well as moving/exchanging the position of some artworks (if possible). For example, if we analyse Figure 4a, the effect of space on the visitor behaviours is quite symmetric, the high crowded place is a circular zone around the central part of the room map. Whereas, if we consider the heatmaps and the stopping points of Figure 5a and Figure 6a traced for the same room, the symmetry shown in Figure 4a is completely broken, people are clearly attracted by the artworks in the left side, especially in the lower corner. This fact could suggest a rearrangement of the artworks exhibited in Room 1.

5. Conclusions

The recent COVID pandemic has prompted significant shifts in the utilisation of crowded spaces like the public museums. Two distinct imperatives have emerged in case of future pandemic crisis: (i) maintaining adequate social distancing measures during visits to mitigate the risks of contagion; (ii) delivering high-quality visitor experiences. This paper considers two different methodologies for analysing visiting flows within museums. A first indirect approach is based on Space Syntax, and a second, more direct approach, harnessing advanced AI technologies to gather and analyse visitor trace data. Using the Museo di Roma at Palazzo Braschi as a case
 study, this paper provides a comprehensive understanding of their respective efficacy and delineates preliminary guidelines for designing visiting strategies that prioritise safety and enhance visitors' experience.

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Urban resilience: facing catastrophe, rebuilding community

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Abstract

In a world overshadowed by the specter of catastrophe, our urban landscapes are both witnesses to past calamities and potential harbingers of future resilience. This article embarks on a journey through the intersecting realms of disaster and reconstruction, exploring the profound implications of urban narratives in shaping collective memory and community identity. Drawing inspiration from a project in Formia, Italy, the transformative power of augmented reality in preserving cultural heritage and rethinking the urban landscape is explored. Through the lens of dystopian anticipation, we navigate the intricate web of human response to crisis, from the depths of anguish to the heights of creative resilience. As we traverse the rubble of destruction, we unearth not only fragments of the past but also seeds of hope for the future. With technology as our ally, we labor to preserve the essence of lost cities and forge new paths toward community renewal. This article seeks to empower the urban community, uniting it in the commitment to safeguard the treasures of the past and chart a course towards a more resilient and vibrant urban future.

Keywords: catastrophe, urban reconstruction, digital archives, cultural heritage, community resilience

1.   Premise

«Cities are special places. Those affected by major catastrophes are even more so», with this sentence opens Pier Paolo Zampieri's book [1], devoted to a social and urbanistic analysis of the post-earthquake reconstruction of the city of Messina. Anthropologist Vito Teti [2] similarly states «Ruin, calamity, disaster are not surprises, accidents. They are foretold, expected, feared, threatened. They are an integral part of our humanity and, against any misunderstood sense of emancipation, are even constitutive of that Western tradition of which we boast so much». Referring to *disaster studies*, Zampieri sees natural disasters as *accelerators* capable of reshaping urban space and its meanings, with their attendant social and political implications. He further argues that cities affected by disasters may find themselves experiencing a *bifrontal foundational myth*, at the intersection of a supposedly mythical past and a present desertified by events [1]. In a sort of positivist view, crises are believed to stimulate inventiveness, foster discoveries, and lead to the development of grand strategies [3]. In addition to the positions already outlined, this paper embraces the perspective of sociologist Alain Touraine, who in his work *Après la crise (After the Crisis)* [4] believes it is necessary to adopt an apocalyptic mindset: it is important to believe that catastrophe is not just a possibility, but rather an inevitability. He warns of the need to accept that efforts to anticipate doomsday scenarios may prove futile, because only by acknowledging the possibility of disaster can its effects be prevented.

1.1 A dystopian scenario

The sun could rise one day and illuminate nothing but a pile of ruins. It could mark the dawn of a new *ground zero* in human history. Would it really be so crucial to dwell on what happened immediately before? To analyze the causes, the faults, the responsibilities? Is it any different to gather the pieces of an earthquake, a bombing, an explosion? Is the human fear of climate migration or war on a different scale? Traditionally, when speaking of *Apocalypse*, one refers to a single, sudden calamitous event. Today this term has acquired a different meaning: for Enzensberger, one could speak of a *slow-motion Apocalypse* [5], as a slow decay caused by human behavior; for Maurizio Carta, one speaks of *Anthropocalypse* [6]*,* a general and global condition of anthropogenic cause. Whatever the cause, one thing is certain: post-tragedy, there remains sorrow and panic. However, human history is permeated with examples of extraordinary resilience; each *ground zero* has seen a plan for restarting, a will to restore at times, redesign at others, but still rebuild the city. Although plagued by anguish, soon the urban community finds the strength to rise again. Despite the fear of new adversity, it pursues hope and the possibility of a new beginning. «It is necessary to break with the past. It is necessary to question it and interpret it, without inauthentic nostalgia, trying to 'make it count,' retracing - and rediscovering - the omens, the precious elements that have been lost» [2].

2.   Facing catastrophe:

2.1 Re-imagining the city via digital archive

Referring to a term coined by a group of Yugoslav architects in the 1990s, at the height of the Balkan War, Maurizio Carta speaks of the *urbicide* of cities during conflicts. «In a war», he says, «cities are killed not only to eliminate strategic targets, but above all to strike at the identity, the social and cultural values of a community to be subjugated» [6]. The urban environment is the heritage and mirror of a community's memory, guardian and witness of its own history. Giorgio la Pira, mayor of Florence in the 1960s, asserted that «Cities belong to future generations, of which no one can violate the right and the expectation» [7]. Therefore, even if afflicted by anguish, the urban community will be guided by the memory of lost places, lived stories, and shared imagination. In the attempt to restore collective memory, it will be necessary to shape a new collective identity; digging through the rubble, hidden treasures and past stories will be discovered. At the heart of rethinking the city will be the search for information related to the destroyed heritage. Digital archives, *Urban Digital Twins* [8], as well as surveys, laser-scans, documents, photos, family films already allow and will increasingly allow images to be stored, information to be preserved in secure servers geographically distant from the calamitous event. This is a significant difference from the past: a digitally active city may never again face losses of knowledge as in the famous case of the Library of Alexandria. «The past must be safeguarded to provide alternative ways of seeing things and new values for another future» [2]. Starting from this digital cultural heritage, it will be possible to critically decide if and how to rebuild the lost city, creating an indelible bond with the past, as in an eternal Rome.

2.2 Re-building community via virtual tools: a case study

Starting from the dystopian image of an imminent catastrophe, this paper aims to propose, as a case study, the use of a narrative tool applied to the urban environment. On the basis of a project carried out in the city of Formia (Latina, Italy), the potential of augmented reality applied to the existing city as an opportunity for the recovery, preservation and reworking of the memory of the urban community is recounted, with the intention of involving citizens of all age groups in the creation of a new active and responsible community. The project described was implemented thanks to a grant from the Lazio Region for creative and innovative ideas. The first phase of the project first involved urban explorations and related ethnographic research, then historical-documentary research. Once the stories were collected, 9 narratives were selected to be deepened and returned to the urban environment. Today there are 11 narrative portals (called *Pop-Up,* as part of the larger *Pop-Up City_Siti* project) distributed along an urban path. Rooted in local culture, these stories fuel the creation of a shared imaginary and provide a social basis for the regeneration of the city and its community. In the creation phase, three types of *Pop- Up*s were developed: 1- portals that make inaccessible monuments visitable; 2- portals with

historical- documentary content, able to give voice to forgotten faces and places; 3- virtual windows on glimpses and lost landscapes. Access to these meta-physical rooms occurs through the user's smartphone, whose only task is to explore the city, find the plaques *(Pop-Up)* and point the camera at a combination of *QR codes* that can reveal the narrative contribution. The code leads each time to a different scenario: 3D reconstructions for inaccessible locations, short documentaries that tell the stories of the territory through the eyes of the protagonists, and digital painting with 360° technology to restore the vision of lost landscapes. The latter is the technique chosen for the ancient *Darsena di Mola*, located along the main street of the city. The current *Largo Paone* parking lot was once a small beach where fishermen moored their boats. The sea dominated the landscape and housed ancient Roman fish ponds (**Fig. 1**). The space of the so-called *Darsena di Mola* (**Fig. 2**) has now disappeared; due to the bombings of World War II, the sea was filled with the rubble of collapsed buildings, thus transforming that waterfront into what has long been called «the square of dead houses». The portal *(Pop-Up)* allows the user to enter today into a virtual room whose walls are digitally frescoed. The scenario displayed on the smartphone is utopian: the contemporary city coexists with the lost dockyard. The result is an ephemeral space that stimulates the imagination, intrigues, and places the citizen in a critical position (**Fig. 3**) regarding the places they inhabit every day.

3.   Conclusion

The choice of technological medium and multimedia narration presented aim to involve the diverse generations of the urban community, promoting the care of the *polis* and its treasures. The goal is to contribute to the formation of a new active and responsible community. Imagining every point in the city as a potential site of a portal to a virtual room opens up the possibility of an endless and intriguing process. The use of the virtual medium as a pre-catastrophe archive, post-catastrophe resource, and artistic tool for reconstruction offers the opportunity to reconcile the community with history and the urban environment, thus creating an empowered new community. As Maurizio Carta states [6], «it is in the city that the intertwining of territorial capitalism and network capitalism, ecological transition and digital transformation, cultural heritage and innovation, transformation and participation, research and development is forged». Therefore, the preservation of post-catastrophe community culture remains an important challenge, offering space for further research and future developments. As Einstein once said, «Creativity arises from anguish as the day arises from the dark night» [9].

Fig. 1: Formia, ancient *Darsena di Mola*, 1930s.

Fig. 2: Formia, panoramic picture of *Largo Paone* parking lot, 2024

Fig. 3: Formia, artistic reworking by illustrator Antonio Palma (contents of the *Largo Paone Pop-Up)*

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[8] *Urban Digital Twins* is an expression that refers to a virtual replica of the real city that, thanks to sensor technology that allows near real-time cyber-physical coupling, learns and evolves along with it (CASTELLI, G., MALVEZZI, R. *I gemelli digitali per le città: riflessioni e prospettive*, Conference: XIII Giornata Internazionale di Studi INU - Oltre il futuro: emergenze rischi, sfide, transizioni, opportunità, Napoli 16 dicembre 2022). These also serve as cutting-edge tools for disaster prevention and response; cities and territories can use them to simulate emergency scenarios and to plan and test in advance the most appropriate responses and actions (Referring Web Page: https://www.forumpa.it/citta-territori/il-gemello-digitale-urbano-un-nuovo-approccio-alla-gestione-delle- citta/https

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Knowledge and project for the protection of cultural heritage affected by calamities and conflicts: some case studies from Afghanistan

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Abstract
Afghanistan, a crossroads of cultures, has a rich architectural and archaeological heritage influenced by the interactions between Buddhism, Islam, Alexandrian Greece, and Achaemenid Persia. However, the country has faced significant damage to factors like illegal excavations, looting of museums, and armed conflict since 1978. These events have provided valuable lessons for the knowledge and protection of architectural and cultural heritage. This research aims to examine the documentation, redesigning, and cataloging of artifacts, comparing them to the progress made in cultural heritage rights protection in Afghanistan from 2001 to 2021. This research started from some conditions related to the presence of doctoral knowledge that intends to examine, through extensive documentation, the redesigning, and cataloging of some artifacts, comparing them to the progress made in the field of cultural heritage rights protection in Afghanistan from 2001 to 2021 and highlighting the efforts of local and international humanitarian groups in the process of historical preservation. The terms of protection and preservation carried out through appropriate regulations and legislation have been critically analyzed through some cases study. In addition, the foundations of contemporary legislation, tools, and methods for the knowledge and cataloging of heritage assets, and project management practices have been investigated.

Keywords: Afghan cultural heritage, conflicts and monuments, Safeguarding, preservation and memory.

1.   The cultural heritage: memory and armed conflict damage
Rosario Assunto, in the 1970s, defines beauty "*The beautiful is useful*" [1]. Cultural

heritage is beautiful because it defines our time and condition our social, personal, and professional relationships.

Afghanistan has been studied and protected by various organizations. Cooperation between Afghanistan and western institutions was severed between 1978 and 1992. Afghanistan's cultural heritage organizations have managed to preserve and protect the cultural heritages. Despite these efforts, conflict destroyed years of accomplishments, leaving the central government weakened. The Kabul National Museum suffered fire damage, and over 70% of its possessions were looted. The destruction of historical sites, such as Historical city of Herat, further weakened the country's cultural heritage [2]. Between 2001-2021, countries with collaboration of Afghanistan government provided program and financing for the rehabilitation of the cultural heritage. Therefore, initially our research question is: "What have been done during twenty years on cultural heritage of this territory to open a new horizon. Moreover, it provides fertilized ground for knowing cultural heritage of Afghanistan because it is historical country but there are till now with two sites in list of world heritage site and four sites on its tentative list.

Fig. 01: The Minaret of Jam, erosion caused by the rivers and its decoration. (Photo: © Bruno, 1962).
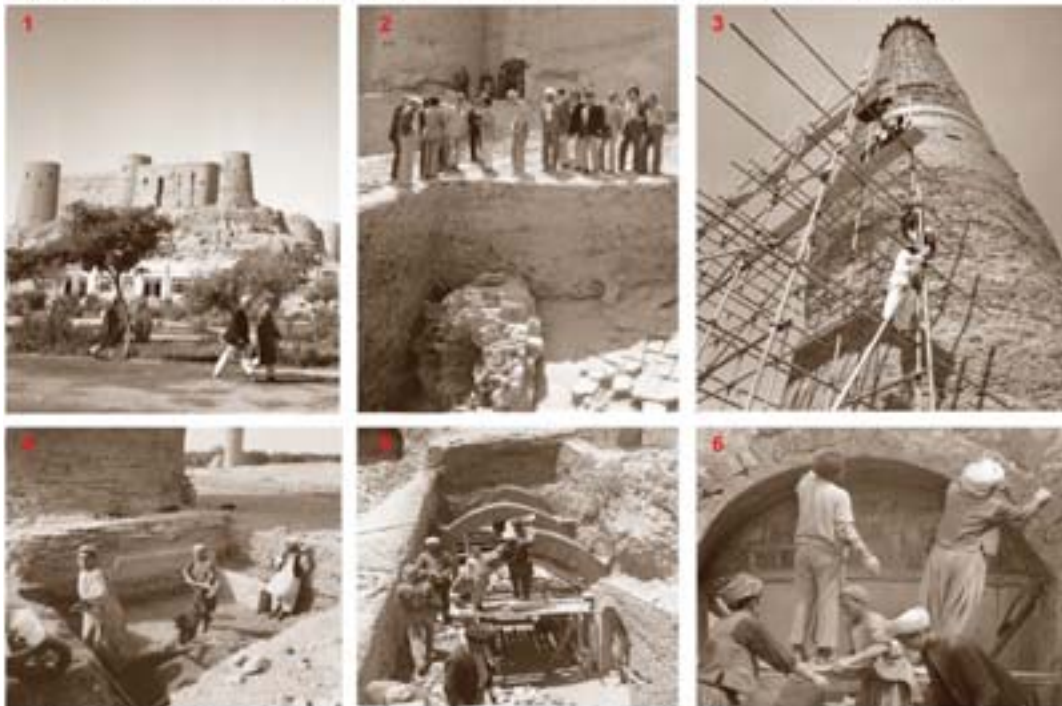
Fig. 02: 1. Eastern View of the Citadel of Herat (1960).
2. UNESCO delegations along with the Afghan officials visiting the UNDP/UNESCO project at the Citadel;
3. Assembly of scaffolding to reach the entrance of the Minaret of the *Husain Baiqara Madrasa*. (1977-79).
4-5. Afghan workers at the restoration site, Citadel of Herat (1978) (photo: © Bruno).

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2.   UNESCO's activities for safeguarding cultural heritage of Afghanistan

After starting UNESCO work since the 1960s, Italian architect, Andrea Bruno [3], was involved in the first UNESCO missions to the site of minaret of Jam (Fig. 01) [4] and in 1973, the Afghan Governmentapproved a National Cultural Policy for the Old City of Herat, which was later authorized by UNESCO in 1976. An UNESCO/Italian-led project aimed to restore the ancient citadel and *Madrasa* of *Sultan Husain Baiqara* and its four Minarets (Fig. 02) [5]. Following the establishment of the Taliban regime in 1996, UNESCO was no longer able to operate in the country.

After the fall of the Taliban regime in 2001, UNESCO was requested by the Interim Government of Afghanistan to coordinate international activities to safeguard its cultural heritage. In 2002, After opening its office in Kabul, in its first international seminar, UNESCO discussed the conservation status of cultural sites, existing programs, and coordination of conservation measures.

The International Coordination Committee for the Safeguarding of Afghanistan's Cultural Heritage (ICC) raised funds and maintained global attention on the significance of restoring cultural heritage, while the National Development Bank invests in public services to improve the country's culture [2]. The ICC's first plenary session in Paris in June 2003 involved seven Afghan Ministry of Information and Culture representatives and over sixty international experts. Key areas of concern included developing a long-term strategy, capacity building, implementing the World Heritage Convention, national inventories, documenting and rehabilitating the National Museum in Kabul and safeguarding of Bamiyan (Fig. 03), Herat (Fig. 04) and Jam (Fig. 05).

UNESCO has assisted in inscribing important Afghan cultural heritage sites on the World Heritage List, with the 'Minaret and Archaeological Remains of Jam' and 'Cultural Landscape and Archaeological Remains of *Bamiyan* Valley' inscribed simultaneously on the World Heritage List [6].

Fig. 03: Safeguarding in Bamyan.
1- 2. Before and after destruction- Eastern Buddha (Photo: © UNESCO). 3- 4. The 3D textured model and its actual empty niche (Photo: Gruen & Remondino, 2006). 5. Scaffolding erected to commence preservation work on the Eastern Buddha. 6. The mausoleum before restoration. 7. The restored mausoleum. 8.-9. Conservation project at *Shahr-i Ghulghulah* (Photo: © UNESCO).

3. Recovering from Cultural Disaster: Approaches, Funding, and Modes of Collaboration and research in Afghanistan

Following the 2001, the MIoC started to collaborate with international organizations to restore the country's cultural heritage. The World Bank, through the Aga Khan Trust for Culture (AKTC) foundation and its Historic Cities Programme (HCP), has been instrumental in funding the restoration process, focusing on architectural conservation and protecting major cultural monuments and sites like Old City of Kabul and *Bagh-e Babur* [7].

According to MoIC the level of looting and illegal trafficking has been reduced compared with the Taliban government. Related to this field, Afghan authorities have ratified the 1970 UNESCO Convention and the 1995 UNIDROIT Convention to protect cultural property from illicit traffic. The 1980 Law on Cultural Heritage was updated with UNESCO's help, allowing Afghan authorities to demand the return or restoration of their cultural property taken overseas. These agreements provide legal authority for Afghan authorities to protect their cultural heritage [8].

Fig. 04: Safeguarding in Herat.
1. Plan of the Bar Durrani quarter of the Old City of Herat (Photo: © AKTC). 2. Restoration of *Ikhtyaruddin*, (Photo: © Franke, 2004). 3. Aerial view of the *Ikhtyaruddin* citadel following restoration and consolidation works. (Photo: © AKTC, 2011). 4. Restoration of the *Ikhtyaruddin* citadel undertaken from 2006-2010. (Photo: © C. Gutschow). 5. South Elevation of *Gawharshad* Mausoleum. 6. Drum Plan of *Gawharshad* Mausoleum after intervention (Photo: © UNESCO). 7. A large hole at mid-height and vertical and horizontal cracks on the Minaret in Herat. 8. Emergency stabilization of the Minaret: Installation of wooden belts to protect the shaft of the Minaret. (Photo: © UNESCO, 2003). 9. The restored internal ceiling of *GahwarShad* mausoleum (Photo: © Franke, 2010).

Rehabilitation work was progressing in Afghan Films, the Public Library, and the National Archives, with support from Greece, the United Kingdom, the United States, UNESCO, and the Society for the Preservation of Afghanistan's Cultural Heritage (SPACH). Policy forums, conferences, and technical meetings have been instrumental in reconstructing

the Afghan cultural heritage sector. UNESCO, in collaboration with the MoIC, endorsed the Kabul Charter for Sustainable Development in 2010, aiming to streamline recommendations on integrating culture into development. The Heritage Management Advisory Board has improved coordination and capacity in the culture sector, enabling quick action to address challenges. The government policy has shifted towards increasing local expertise, ownership, and coordination, moving away from bureaucratic mechanisms [6]. International organizations like the

Fig. 05: Safeguarding in Minaret of Jam. 1-2. Geophysical survey of the Minaret of Jam. 3-6. Minaret during the strengthening work. (Photo: © UNESCO, 2006).

Aga Khan Trust for Culture, the Society for the Preservation of Afghanistan's Cultural Heritage, and the Afghan Cultural Heritage Consulting Organization have contributed to the heritage sector and efforts torebuild civil society.

In general, there are two main modes of cultural heritage preservation deployed worldwide: proactive (preventative) and reactive (emergency support for stressed systems). In Afghanistan, the latter has been the main mode of preservation in recent years, with rescue archaeology being an example. However, due to ongoing conflict and rapid economic growth through resource extraction, this approach is likely to become more focused in Afghanistan.

To address national-level problems and anticipate emerging threats to heritage and protect resources, a proactive orientation is needed. This requires inter-organizational cooperation, and our purpose for research and University collaboration, through the signing of Framework Agreements, we believe can play a fundamental role in reorganizing even just archive material and comparing it with the state of conservation of heritages, including legal issues related to repatriation of looted and illicitly exported artifacts.

4.   **Post-conflict conservation and rehabilitation process** (Case studies in Kabul)

4.1. **District of *Murad Khane* in the historic center of Kabul**

The *Murad Khane* district, traditional neighborhood in the north-eastern section of the historic center of Kabul was selected for rehabilitation by the Turquoise Mountain Foundation (TMF) in 2006, following the AKTC's guidelines. The TMF was established at the behest of HRH the Prince of Wales and received support from the president of Afghanistan. A consortium was formed, including financial backers, to carry out the work independently. The TMF's appointment as a design and build contractor was confirmed through contracts with the United States Agency for International Development (USAID) and the Canadian International Development Agency (CIDA). Afghan officials began to understand the rampant, unregulated development across Kabul and a coherent approach to urban planning had yet to be defined. *Murad Khane* was faced a compulsory purchase order (*Istimlak*) due to a Soviet-era master plan in 1978, but was delayed due to war and civil conflict; In theory, the area remained at risk of demolition to make way for prefabricated concrete housing blocks of the kind seen in the Macrorayan districts of the city (Fig. 06) [9]. The TMF appointed specialists in heritage preservation to draw up a 'Conservation and Development Plan' in line with international standards (e.g. The Venice Charter 1964; The Burra Charter 1999), which was recognized and later adopted by the Ministry of Urban Development to be incorporated into their Metropolitan Plan for Kabul. That fact, combined with two presidential decrees (*firmans*), was sufficient to safeguard *Murad Khane* and provide a space for more sensitive development to take place [7].

The TMF worked with local elected representative (*Wakil-e-guzar*) to address disputes and transfer informal ownership over the years. For example, in the case of the Great *Serai*, a residential area in *Murad Khane*, which was privately owned, was eventually transferred to Kabul Municipality (Fig. 07). The survey and documentation of the Great *Serai* involved measurements, detailed architectural drawings, oral testimony, and a comprehensive photographic record. These activities provided quantitative and qualitative data for decision-making and created an archive for researchers, historians, academics, and students. The intent was to preserve the authentic architectural character of the Great *Serai* with minimum intervention, using traditional Afghan techniques and materials like stone, raw bricks, wood, and saturated mud [10].

Fig. 06: Macrorayan districts based on master plan of 1978 for Kabul. (Photo: Kiana Hayeri for The New York Times 2020).

Fig. 07: Safeguarding in *Murad Khane*.
1-2. The house of Peacock before and after restoration (Photo: © Turquoise mountain). 3-4. The Great Serai before and after restoration (Photo: © Turquoise mountain).

4.2. The Baghe-Babur (The garden of Babur)

In 2002 an agreement for rehabilitation of the *Bagh-e-Babur*, historic terraced grave-

Fig. 08: *Bagh-e-Babur*. Top: Plan. Down: View of Babur's Garden following restoration. (Photo: © AKTC, 2009

garden (tomb of the first Mughal emperor) (Fig. 08) was signed between the Aga Khan Development Network (AKDN) and the Afghan Administration with cofounding from the Federal Foreign Office of Germany.

The project was to be carried out through the Trust's Historic Cities Programme (HCP), with cofounding from the Federal Foreign Office of Germany. The goal of the works has been to restore the original character of the landscape and conserve key buildings, while ensuring that the garden, which is the largest public open space in Kabul, continues to be a focus for recreation for inhabitants of the city.

The rehabilitation project was based on the most extensive data ever collected in a landscape garden. In order to understand the original nature of the landscape, six seasons of joint archaeological excavations were undertaken by the German Archaeological Institute and the Afghan Institute of Archaeology. Architectural elements, from gravestones to parapets and waterfalls, were found to have been re-used at random throughout the garden [11].

Its history was revealed over the course of 13 seasons of well recorded archaeological excavation, by the examination of historical documents, drawings, pictures from the nineteenth and twentieth centuries and miniature to re-establish the original character in a manner that conforms to international conservation practice. The codified formal repertory of Persian gardens was used to aid in data interpretation and garden restoration. Following a detailed survey, conservation of the mosque was initiated in 2003 with the removal of the modern roofing and laying of traditional lime concrete, and replacement of cracked marble structural elements. With the completion of the rehabilitation in 2006 and the implementation of the institutional management plan within the framework of the MoU in 2008, *Bagh-e Babur* is the only carefully managed public space in Kabul that offers recreational facilities to the citizens (Fig.09) [12].
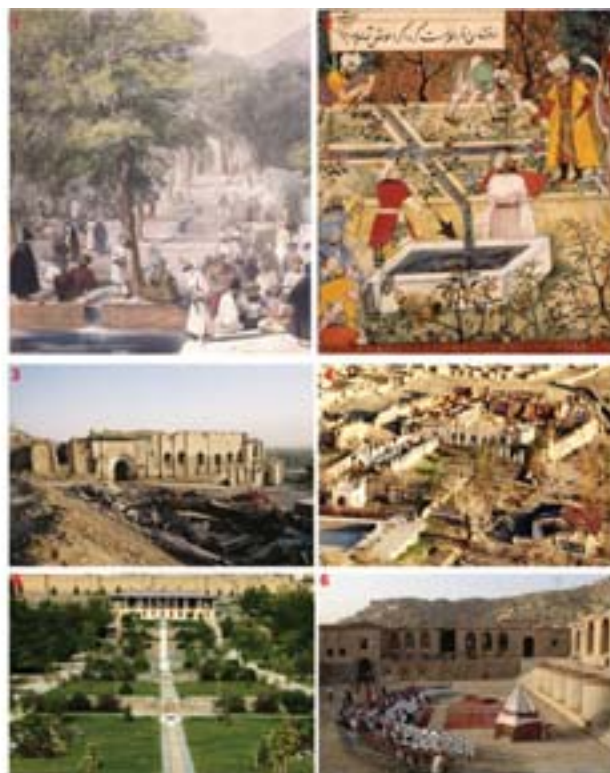
Fig. 09: *Bagh-e-Babur*. 1. A watercolor rendering of the central avenue of *Bagh-e-Babur* by James Atkinson, 1839. 2. Tempera and gouache on paper, from the Baburnama. (Photo: © V&A images, victoria and albert museum). 3-4. *Bagh-e-Babur* before restoration. 5. *Bagh-e-Babur* after restoration and 6. Reuse of garden as public space. (Photo: © AKTC).

5.   Results and future visions

The aim of this research is to organize a new Representation Symposium for the development of multidisciplinary programs oriented towards internationalization with Afghan cultural heritage, to be held in Matera and Kabul in autumn 2025.

This new idea of an International Symposium will be able to start a structured discussion by working tables defined by geographical areas and by development actions to deepen, through some case studies, the specific characteristics of the various cultural and administrative contexts and to strengthen new interests. The objective of the Symposium is to realize consolidation meetings between researchers and lecturers who would like to undertake relations and research activities in which project lines are proposed regarding the development of future actions of the Design Community in Afghanistan [13].

The Symposium aims to explore, through discussion and debate, opportunities and channels for the promotion and strengthening of international activities in the areas of research and teaching, specialized doctoral training with seminars and conferences in presence, online and in new digital spaces. The intention is to identify appropriate channels for the dissemination of the outcomes of the Symposium, which will contribute to the enhancement of our SSD topics in the international context for the consolidation of new collaboration networks [14] [15].

The experience gained from our research in the landscape-villages of the Matera hills and in the rural areas of southern coastal China [16] [17], finds in this exchange project the maximum contact between the cultural memory of the built environment in Afghanistan and its vast natural heritage, opening up future challenges in terms of conservation and sustainability, which, due to their type-morphological and naturalistic richness represent a rich landscape and architectural palimpsest such as to identify pilot cases for the scientific experimentation of good knowledge, cataloguing and classification practices for the systematization of a small part of the tangible and intangible heritage useful for the regeneration of these fragile territories scattered throughout Afghanistan. The interweaving of historical, cultural and physical similarities between places located in such distant geographical areas will make it possible to experiment, through the knowledge of artefacts and urban fabrics, project designs and visions for a different and sustainable local development that involves the communities with greater awareness. The method of investigation is defined through the measurement, survey and graphic restitution of parts of cities and their cataloguing, in order to understand and identify possible elements of strength for the development of a pilot project for the requalification and perhaps the urban regeneration of these immense dispersed heritages [18].

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Revitalizing Joybareh: A Case Study of Endogenous Development & Contextual Design for a Historic Neighborhood

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Abstract
Revitalizing historical fabrics within cities presents crucial challenges due to their multifaceted nature and diverse needs. This research explores these concerns using the case study of Joybareh neighborhood in Isfahan once a protected urban development area (designated in the 2000s) but now facing resident dissatisfaction and neglect.

The challenges stem from a lack of adherence to Endogenous Development principles, focusing instead on superficial interventions. Residents' needs and the unique historical context haven't been prioritized.

This qualitative study employs a descriptive-analytical approach. Criteria for Endogenous Development and Contextual Design are derived from literature review. A SWOT analysis of Joybareh, based on field observations, document analysis, and interviews, assesses the current situation. Finally, recommendations for improvement are proposed.

This research offers a framework for revitalizing historical neighborhoods using Endogenous Development and Contextual Design, ensuring resident participation and respect for the unique character of the place. Joybareh serves as a valuable case study, and the findings can be applied to similar contexts worldwide.

Keywords: In-situ development, Mixed-use development, Pedestrian access, domain-driven design, Resident engagement, Joybareh neighborhood Isfahan

1. Introduction
Endogenous development offers a dynamic and comprehensive approach to urban renewal, encompassing all aspects of human life within a historical context [1]. It fosters self-renewal, organizational restructuring, and a holistic shift in the economic and social systems [2]. This approach goes beyond simply achieving a static balance; it seeks to address ongoing challenges and create lasting solutions for diverse sectors within the historical fabric.

However, revitalizing these worn-out structures presents a significant challenge. Their multifaceted nature, complexities, and unique intricacies necessitate tailored planning, decision-making, and actions informed by various fields of expertise: social, cultural, economic, financial, and scientific [4]. Years of neglect, abandonment, unfinished projects, and construction patterns incongruent with the historical setting have devalued the land, eroded public trust, and even led to emigration [4].

Historical areas have a crucial role to play in preserving a city's cultural and historical identity [5]. Revitalization efforts should prioritize assigning these structures a purpose that aligns with their historical and cultural significance. Thoughtful restoration can transform old neighborhoods into vibrant cultural centers, showcasing and transmitting the city's heritage [6]. The city of Isfahan exemplifies the impact of historical continuity and disruption. Its urban fabric, initially organic (since 2500 years ago and later in Islamic era more in Seljuk[1] period) and later transformed into a grid-like structure (Safavid[2] era), maintained a sense of spatial coherence due to the principle of connecting important urban elements [7]. However, inappropriate interventions during the Qajar[3] and Pahlavi[4] periods disrupted this network with wide, intrusive roads. These disruptions continue to affect the historical fabric today [7].

These organic structures, once intertwined with their natural, social, and economic resources, thrived thanks to the collaborative efforts of the people. However, rapid and unplanned urban changes in recent decades have left them unable to adapt and maintain their traditional way of life [8].

This research focuses on the historical fabric of Joybareh in Isfahan, examining how the principles of endogenous development, applied through context-oriented design, can contribute to its sustainability. Unfortunately, many historical fabrics in Iran have been lost due to neglect of these principles. A thorough and well-planned approach, informed by this research, is crucial for the remaining historical areas. The results can be widely applicable, given the prevalence of similar challenges faced by historical fabrics throughout Iran.

2.   Endogenous Development: Revitalizing Cities from Within

Endogenous development is a strategic approach to urban renewal that prioritizes investment in specific areas within existing communities. This focus falls on vacant or underutilized land, with the goal of revitalizing and redeveloping these areas [9].

The Urban Research and Development Center in Washington defines endogenous development as the process of utilizing vacant or underutilized lands within existing urban fabrics [10]. They highlight the prevalence of such underused spaces within most cities.

This approach offers a practical solution to urban sprawl by encouraging the redevelopment of vacant land within city limits, rather than encroaching on undeveloped areas and rural green zones [10]. As the American Planning Association suggests, endogenous development promotes a regenerative approach to urban living [11]. In essence, it focuses on transforming vacant and underused land within established urban areas [11, 12].

The benefits of endogenous development extend beyond simply improving physical infrastructure. It fosters a more vibrant and sustainable urban environment by enhancing the lives of citizens and strengthening social structures [4]. This comprehensive approach prioritizes productivity, improves urban spaces, creates local jobs, and ensures better access to essential services, ultimately creating a balanced and sustainable environment for residents.

The goal of endogenous development is to cultivate smart, dynamic, and sustainable cities. These cities retain their unique cultural and historical character, becoming attractive and desirable places to live and visit [4]. Since cities are hubs of culture and economic activity, successful urban development serves as a powerful engine for national development, attracting valuable resources [13, 14]. Continuous improvements in urban infrastructure not only contribute to economic growth, but also strengthen residents' sense of belonging to their city by enhancing their quality of life [13, 14]. Table 1 provides a comprehensive overview of endogenous development aspects, synthesized from various literature reviews on the subject, along with the most significant related domains [1, 15].

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[1] Seljuk era in Iranian History is contemporary to 920 – 1194 AC.

[2] Safavid era is contemporary to 1501-1736 AC.

[3] Qajar era is contemporary to 1789 to October 31st. Of 1925.

[4] Pahlavi period divided to two era , first Pahlavi from December 15th ,1925 to September 16th., 1941 and Second Pahlavi September 16th. 1941 to February 1979
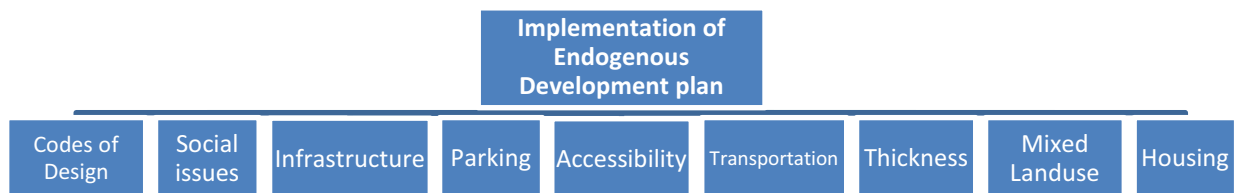
Fig 1. Implementation of Endogenous Development plan

Ground-Oriented Design: Preserving Identity in Urban Planning

The ground-oriented approach is a cornerstone of achieving a cohesive city. It views the city as a symbolic system with physical, historical, human-centric, and socio-cultural dimensions [16]. This approach emphasizes understanding a place's unique characteristics and incorporating them into contemporary design [17]. While acknowledging spatial differences, it advocates for preserving the existing physical values of the context [17, 18]. However, it doesn't reject innovation; new elements can be introduced if they establish a connection with the existing fabric [19].

Table 1. The areas emphasized in Endogenous Development

aspects	Criteria for Endogenous Development
Managerial-Legal	Government policies Municipal performance, Role of local councils Feasible housing policies, Laws, and regulations Neighborhood-focused economic development
Environmental	Open space green spaces and trees, Environmental quality Air quality
Socio-cultural	Resident participation, Identity, Social inclusion/exclusion, Sense of belonging Crime, Security, Cultural and artistic functions, Education, Mental image, Sense of place, Poverty
Economic	Investment level, Land and housing ownership on the site, Local businesses, Public-private participation, Economic growth
Service-Infrastructure	Parking, Land use balance, Diverse urban amenities and services, Appropriate access to communication networks and urban facilities"
Physical-Spatial	Mixed land use, Functional scale, Appropriate access for vehicles and pedestrians, Historical sites, Degree of obsolescence, Mixed housing, Housing quality, Livability, Natural landscapes, Aesthetic appeal of the environment, Building lifespan

Contextual design, a key aspect of the ground-oriented approach, focuses on understanding the inherent values of a place and ensuring their continuity in future development [21]. It aligns with the physical, historical, and socio-cultural context, integrating past ideas and forms into contemporary urban landscapes [22, 23]. A successful contextual design establishes a dialogue between the "self" (existing physical, historical, and cultural context) and the "non-self" (elements introduced for improvement) [24]. New elements must be adaptable and create a sense of connection with the existing fabric to avoid rejection.

Historical Significance and Challenges

Historical fabric holds a unique significance due to its rich cultural value as a heritage from ancient civilizations [25]. It serves as a repository of collective memory and urban culture, fostering a sense of identity for citizens [25, 26]. These areas are not only crucial for cultural and social identity, but also hold economic value as part of a nation's wealth [27]. Unfortunately, some historical areas have lost their central role and struggled to adapt to rapid changes, failing to preserve their essence [28]. Once vibrant spaces interwoven with their natural and social environment, they now stand stagnant, in need of revitalization.

Renewal Strategies

One of the well-known strategies for addressing challenges in historical areas is the renewal of deteriorated urban fabric, while safeguarding and preserving civic values [29]. This becomes increasingly important as these values diminish. As referenced in Table 2, effective urban development policies can include intervention programs for historical fabrics, considering social, cultural, environmental, and physical dimensions [30, 31]. However, formulating cohesive and comprehensive policies for intervention remains a critical gap that needs to be addressed [32, 33].

Table 2: Principles and criteria of contextual design in historical spaces

"Historical principles".	"Social-cultural principles".	"The principles of urban form/design".
Preservation and restoration of original elements alignment with historical patterns attention to the physical and geographical environment historical studies and research ancient and historical values of the site preservation of historical and architectural features	Emotional attachment community participation sustainable use and development management preservation of cultural identity interaction with the physical environment preservation and revitalization of cultural values	Compatibility of elements with context continuity of facades to create a relationship between buildings floor heights and hierarchy of building heights unity within a single structure alignment of openings selection, application, and combination of materials the character of rooflines weaving and colors of buildings local diversity

3.   Isfahan's Historic Heart: The Joybareh Neighborhood

Steeped in history, Isfahan boasts a vast old city encompassing over 1300 hectares. This network of ancient neighborhoods, however, faces challenges. Renovation efforts begun in 2002 have been hampered by property ownership and construction regulations [34].

Isfahan's historic districts are known for their harmony and interconnectedness. The unique Joybareh neighborhood stands out as a significant cultural and tourist hub. Tracing its roots back to the Achaemenid Empire, Joybareh was the heart of Isfahan's ancient city. While historically a center for the Jewish community, it shouldn't be defined solely by this past [35].

Located northeast of Isfahan, Joybareh is bordered by Qods Square, Masjed-e-Seyed, Hatef Street, Atigh Square, and Soroush Street. An important historic axis runs through the neighborhood, starting from Atigh Square and the Ghaz Bazaar. This route passes by synagogues, the tomb of Kamal al-Din, the two minarets of Darolzifa, and reaches Kamal Street. It then continues through Kamal al-Din Isma'il Park towards the Sarban Minaret, Mirza Baqer Bazaar, and ends at the Forty Girls Minaret. These axes were once the main access routes from the Seljuk city center and hold immense historical significance [34].(fig.1).
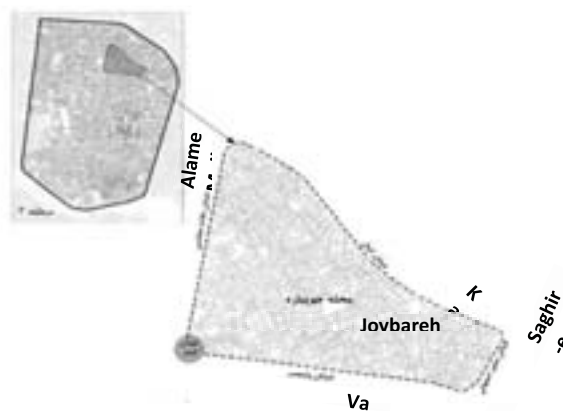
Fig 2. Joybareh Historical Neighborhood on the Aerial Map of Isfahan City

Joybareh boasts a wealth of historical structures, including Atigh Square, the Jameh Mosque of Isfahan, Saraye Noor, the tomb of Kamal al-Din Ismail, old Jewish houses, and synagogues. Several minarets grace the neighborhood, some dating back to the Seljuk era, including the Sarban Minaret, the two minarets of Dar al-Ziafeh, the Forty Daughters Minaret, and the Minaret of Masjid Ali [34].

3.1 Challenges and Considerations

Despite its rich history, Joybareh faces the threat of decline. While the neighborhood once displayed religious diversity, the original Jewish community has largely dwindled. Many remaining residents' resort to street vending, contributing to a perception of neglect [36].

The social makeup of Joybareh has shifted from a traditional urban lifestyle. Migration patterns and affordability have led to a resident population struggling with a lack of economic opportunity. With many buildings becoming havens for drug use, the neighborhood faces significant social challenges [36][34].

organization and renovation of the historical axis and tourism of Joybareh in Isfahan commenced in 2002. The planning and execution of this project were carried out by the Construction and Housing Company of the Central Region as the executive arm of the specialized parent company in urban construction and improvement in Iran[36]. This was done under the supervision of the Housing and Urban Development Organization of Isfahan Province. Recognizing the historical past was among the fundamental principles for the activities of improvement and organization of the old fabric. After conducting necessary assessments, the historical ranking of the specified area was determined[37]. Following the identification of valuable and prominent spaces within that zone, a plan for organizing was prepared, emphasizing efficiency along the route with minimal expenditure through the following methods:

- Gathering construction debris and waste from ruined spaces, proposing new uses considering local conditions and possibilities, and designing plans for these areas, possibly aiming to establish a balance in public service levels.
- Harmonizing building materials used in facades to create a coherent structure.
- Balancing the skyline.
- Defining regulations and limiting consoles and projections in limited-width passages.
- Highlighting valuable and historical elements, introducing them to passersby through appropriate structure-building and highlighting the entrances of these buildings.
- Paving pedestrian paths, defining specific routes for pedestrians, cars, and bicycles, and designating temporary parking spots for vehicles.
- Creating green spaces along the route and specifically marking the entrance of valuable buildings and markets along the axis.
- Establishing suitable conditions for surface water drainage along the route.
- Illuminating prominent elements along the path, introducing them to passersby, in addition to providing necessary lighting along the route.
- Reviving and organizing neighborhood centers.

Research by Momeni et al. in 2003 highlighted resident dissatisfaction with several aspects [36, 37]:

- Poor communication with project officials.
- Limited renovation scope.
- Lack of housing improvements.
- Persistence of narrow streets.

Residents also expressed:

- Moderate satisfaction with social improvements like increased security.
- Disappointment with the limited economic benefits.
- A desire for the project to leverage Joybareh's historical significance to attract tourists and generate income.

Finally, Joybareh revitalization project achieved some improvements but fell short in resident participation, economic benefits, and overall neighborhood renewal. Increased focus on communication, a broader renovation scope, and attracting tourism could significantly enhance the project's success.

Constructed [ ]   Abandoned [■]

fig 3 The occupied and vacant spaces within the study area

Commercial Area [ ]   Housing [ ]

fig 4: The land use map of the study area

Fig5: The current state of the fabric
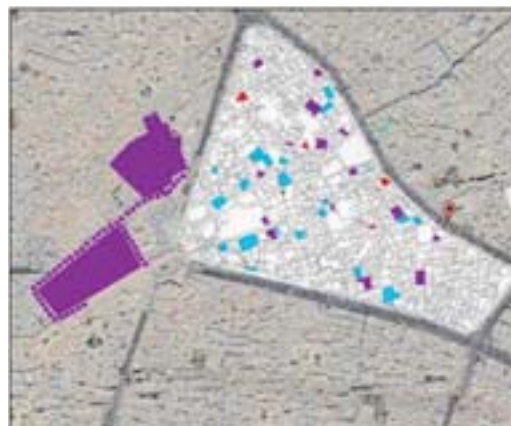
Historical buildings [■]   Comercials [■]
Pahlavi   Buildings [■]

Picture 6: The Historical buildings situation in study area

3.2 Limited Revitalization Efforts in Joybareh

While recent efforts have been made to revitalize Isfahan's Joybareh neighborhood, studies suggest they haven't been entirely effective in preserving the area's historical fabric.

To understand the situation better, a two-step approach was implemented:

SWOT Analysis: Table 3 and 4 present a SWOT analysis of Joybareh's current state. This identifies the neighborhood's Strengths, Weaknesses, Opportunities, and Threats.

Expert Consultation: To enhance the analysis, a SWOT analysis was distributed to 20 professionals in urban planning, conservation, and management. They were asked to rate each factor on a Likert scale. The results are presented graphically below. This combined approach helps pinpoint key priorities and needs for effective intervention in Joybareh's revitalization. (look to fig 7)

In the subsequent phase, an initiative was undertaken to enhance the professionalism of the project by categorizing and implementing a SWOT analysis table among experts. This table was distributed to 20 professionals specializing in urban planning, conservation, and management, with a request for them to assess these components within the Likert spectrum. Following this, the collected data was graphically represented as shown below. This procedure aids in the identification of priorities and necessities within the table, facilitating a systematic prioritization for effective intervention.

Table 3. SWOT of Joybareh

Strengths	Weakness
Presence of historically valuable buildings in the neighborhood Attention to the historical context of the neighborhood for new developments Significance of recognizing valuable buildings from the residents' perspective Adequate access to various infrastructures in the neighborhood (water, electricity, gas, etc.) Heightened sense of belonging among the residents to the neighborhood Easy access to the area due to its proximity to the city center	conversion of unusable buildings into storerooms inadequate pedestrian access in the neighborhood inappropriate placement of neighborhood parking L ack of parking spaces in the neighborhood Majority of building owners residing outside the neighborhood Insufficient government support for entrepreneurship in the area Disregard for the potential for initiating changes in the neighborhood Deterioration of most buildings in the area Presence of abandoned and dilapidated structures in the fabric Use of alleyways and streets for vehicle parking Location of the neighborhood on a transit traffic route
Opportunity	**Threat**
Existence of historically valuable buildings in Joybareh Potential for attracting population due to low density in the neighborhood Possibility of utilizing home-based businesses and boosting employment among residents Opportunity for leveraging historically significant structures to attract tourists Potential for encouraging private investors in the area Presence of nostalgic spaces within the neighborhood Opportunity to repurpose deteriorated sections to accommodate needed uses	Possibility of losing valuable neighborhood structures by converting them into storage facilities High vehicular traffic flow into the area due to adjacency to main streets Low financial capacity among residents for economic investments and the need to attract outside investors Declining population trend within the neighborhood Existence of ethnic segregation within the area Growing trend of decay within the neighborhood Increased air and noise pollution if traffic is not controlled Penetration of warehouses into the neighborhood fabric

Table 4: Analysis of SWOT

SWOT matrix	Strengths	Weakness
	The existence of valuable historical buildings in the neighborhood	Inadequate pedestrian access in the neighborhood
	attention to the historical background of the neighborhood for new developments	Inappropriate location of neighborhood parking lots
	the importance of recognizing the valuable buildings from the residents' perspective	Lack of parking in the neighborhood
	-convenient access of the neighborhood to various infrastructures (water, electricity, gas)	Majority of building owners residing outside the neighborhood
	the diversity of ethnicities in the neighborhood	Dilapidated condition of most neighborhood buildings
	urban management support for entrepreneurs	Presence of abandoned and dilapidated buildings in the area
	attention to new architecture and urban planning for neighborhood transformation	Use of alleys and streets for vehicle parking
		Location of the neighborhood on a transit route
Opportunity The presence of historical buildings in the neighborhood The opportunity to create employment opportunities through home-based businesses and craftsmen The lack of parking in the neighborhood The majority of building owners living outside the neighborhood The deteriorated condition of most neighborhood buildings The presence of abandoned and deteriorated buildings in the area The use of alleys and streets for vehicle parking The location of the neighborhood on a transit route	Increasing public awareness about the special status of the Joybareh fabric and the necessary promotion to attract investment, using context-based design for designing empty lands, Endogenous Development of the fabric in terms of physical aspects, parking design, and upgrading the infrastructure to retain the original residents and strengthen their sense of belonging.	Assessing the potential of historical buildings for investment and transforming the neighborhood into a tourist destination in various forms such as heritage tourism, religious tourism, and social enhancement. Utilizing the neighborhood's infrastructure potential to attract investors and using existing management potentials in the fabric for internal neighborhood development with a pattern-based approach.
Threat The possibility of valuable neighborhood buildings being lost by being converted into warehouses High traffic flow into the fabric due to adjacency to main streets The declining population trend in the neighborhood Increase in noise and air pollution if traffic is not controlled Infiltration of warehouses into the fabric The trend of increasing obsolescence in the neighborhood The presence of ethnic segregation in the neighborhood	Placing priority on in-situ development plans, considering the context-based design approach and paying special attention to the daily needs of the residents, which would strengthen the sense of belonging and revitalize the historical fabric of the neighborhood.	The transformation of historical buildings into warehouses and the loss of their architectural, social, and cultural authenticity, as well as the conversion of these buildings into abandoned and low-quality spaces, and the infiltration of incompatible land uses into the fabric, which will lead to the displacement of original residents and their replacement by vulnerable and marginalized populations. This also leads to the disappearance of architectural patterns and a reduction in the focus on Endogenous Development within the fabric.

4.   The Importance of Revitalization and a Resident-Centric Approach

Globally, there's a growing recognition of the irreplaceable value of historical urban fabric. The focus is on leveraging existing strengths to address critical weaknesses and revitalize these areas.

In Iran, historical cities and their old neighborhoods hold immense value, often forming the heart of a city's identity with important historical and cultural landmarks [36, 37]. Interventions in these areas should prioritize restoring a vibrant social life and urban vibrancy.

The most effective solutions for revitalizing old neighborhoods depend on the specific problems faced – their type, scale, and severity [38]. Therefore, a comprehensive approach is needed, starting with a thorough examination of the issues, including their scope, causes, and the historical context of the neighborhood's development [39]. Additionally, the physical and social connections to surrounding areas must be considered.

Crucially, those involved in revitalization efforts should move beyond a top-down approach. Residents hold invaluable knowledge about the neighborhood's challenges and potential. Regular communication and collaboration with residents are essential for success. No group or organization can truly understand the neighborhood's situation and its problems as well as the people who live there.

Fig. 7. The prioritization and significance of the items presented in the SWOT

The SWOT analysis assessed Joybareh's historical fabric and its potential for medium-term development. This information, when combined with context-sensitive design principles, can guide future planning and restoration efforts that aim to breathe new life into Isfahan's historic core (look to table 4).

Acknowledgment

Table 4: An Internal Development Proposal with a Specific Focus on Contextual Design for the Joybareh

aspects	Endogenous Development	context-oriented design	Suggestion to apply Endogenous Development principles and domain-driven design in the context of Juybar.
Physical- spatial	Certainly, here are the translations: • Mixed land use; • Functional scale • Proper access for both pedestrians and vehicles Level of deterioration Mixed housing Housing quality • Livability • Indigenous landscapes Environmental aesthetics Compatibility of new development plans with existing parking infrastructure Usage balance. Urban facilities and diverse services. Adequate access to communication networks, urban services, and equipment Open spaces Green space and trees Environmental quality	Compatibility of scale elements with the context. Facade continuity to establish relationships between buildings . Building heights and hierarchy of floors Unity of individual buildings. Alignment of openings (windows, doors, etc.) Selection, function, and combination of materials Roofscape of houses. Weave and colors of buildings. Local diversity.	Utilizing the potential of vacant spaces for designing interstitial areas based on urban patterns and revitalizing the context by diversifying usage, thereby retaining current residents, and attracting more tourists. Utilizing historical buildings for restoration and revitalization, promoting historical tourism culture. Attracting investment for the revitalization of buildings through changing their usage. Using empty spaces for design to increase greenery within the urban fabric and aiding Endogenous Development.
Socio-cultural-economical	Resident participation Social segregation Sense of belonging among residents. Crime and criminality Security. Cultural and artistic functions. Education. Mental imagery. Sense of place. Poverty and investment levels. Land and housing ownership. Local businesses. Public-private participation. Economic growth.	Emotional attachment Community participation Sustainable use and development management Preservation of cultural identity Interaction with the physical environment Preservation and revitalization of cultural values	Strengthening residents' sense of belonging and preventing further migration by preserving and revitalizing areas rich in collective memories. Neighborhood lighting and enhancing the safety of the urban fabric. Defining appropriate uses for abandoned and historical buildings that, in addition to promoting Endogenous Development, also aid in preserving the fabric's values.
Historical	Building lifespan. Identity. Historical sites.	Preservation and restoration of authentic elements. Alignment with historical patterns Attention to the physical and geographical environment. Historical study and research Ancient and historical values of the place. Conservation of historical and architectural features.	Increase the social awareness about the values of fabric and neighborhood. Revitalization of historical monuments in the neighborhood Recognize and introduce of historical values in national scale .

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The spatial articulation of the Valley d'Itria pignon buildings, a UNESCO protected architectural asset.

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Abstract
In the panorama of architectural typologies, it is rare that a particular construction technique, which identifies a well-defined, unique and characterising typology of an area, is placed under the aegis of UNESCO for its protection and preservation.
This paper, in proximitỳ of the 30th anniversary of the annexation of the Alberobello trulli among the UNESCO World Heritage Sites, intends to investigate this particular architectural speech, in order to better explain its roots and its future evolution.
The study conducted on building types and techniques, investigates some characteristic cases of these particular architectures, carrying out an analysis of the dry-stone construction technique with which these factories are built. These constructions, in fact, are presented as wonders of statics, being realised without the support of scientific calculation but only with the experience of the *mastri strullai* who, handing down their knowledge orally, make it possible to create the typical cone-shaped roofs that define these characteristic architectural volumes. The adoption of this particular architectural language, expressed by peasants and shepherds, has contributed to characterise a large number of territorial areas, creating a widespread architectural speech from Gargano to Salento.
The goal of the paper allows for reflection on the future of this architectural typology, which UNESCO, sensitive to the evidence produced by cultures of the past, has recognised its importance by declaring it a World Heritage Site.

Keywords: UNESCO, trulli, cone costructions, S.A.P.R., structure from motion.

1. Section Genesis of trullo architecture

In Apulia, the adoption of a particular architectural idiom, expressed above all by farmers and shepherds, has helped to shape and characterise many of its territorial areas.
This is an architectural idiom widespread from the Gargano to the Salento region, and has been used for the purpose of building artefacts to support agriculture and sheep-farming.
The term identifying this type of architecture, known as a trullo, originates from the ancient Greek word *trullos* – conical - and defines a type of construction made of dry stone, with a circular or square plan and a conical roof.
The origin of the trulli dates back several centuries, when large landed estates were in the

possession of the barons. The farmers and shepherds working the land, needing a place to shelter and store their tools, began to use the stone found on the land they cultivated to build shelters using the dry-stone technique, giving rise to this characteristic architectural type.

The feudal lords allowed the peasants to reside on the land assigned to them and for this reason they allowed them to build for themselves, very rural, simple, dry-stone dwellings, with an absolute ban on the use of mortar, lime, etc. In this way, the Counts circumvented the Prammatica de Baronibus, desired by the Aragonese, which prohibited barons from building new urban agglomerations without royal approval. These dry-stone constructions, in fact, could easily be demolished in the event of an inspection [1].

2. The construction of the trullo

The construction of the trullo began with the delimitation of the perimeter, which could be circular or square. Subsequently, the perimeter masonry was constructed, resting directly on the limestone, which

in Apulia is found at a shallow depth, thus lacking an actual foundation. The walling is composed of a double liner of stone blocks, filled with finer gravel mixed with clay soil, called *bolo*.

The external structure of the masonry is regular both in geometric form and in the uniformity of the stone sizes used. This face has a wider base than the upper part, in order to improve the structure's statics, and is composed of larger stones (Fig. 1).

Once the lower part of the construction had been completed, we moved on to the roof, which in most cases ended with the pinnacle that has a purely decorative function (Fig. 2), although some historians see in this element the evocation of the central pole of the primitive hut [1].

The outer covering of the cone is made of *chiacarelle* or *pianche*, limestone slabs of various sizes, arranged in consecutive overlapping, circular courses, inclined 15-20 degrees from the horizontal. The first ring is mounted with the inclination towards the outside, to facilitate water drainage.

Also in the roof, between the inner and outer facing, we find a layer of stone chips and clay soil.

Fig. 1: Alberobello - Bari. Trullo sovrano. Section with masonry and cone structure composition.

Fig. 2: Pinnacles.   **Fig. 3:** Inner side of the cone cover.

3.   Type evolution

The model of this specific architectural typology present throughout the Apulian territory, is the expression of that architectural speech that the ancient generations of farmers and shepherds related to the need to have a shelter for themselves and for their tools directly on the land where they worked.[4]

These processes triggered the evolution of trullo construction, precisely from the wise intuition of considering the unicellular architectural volume as a volumetric module. This conceived the possibility of using the unicellular architectural element as the nucleus of a building enzyme whose combinations produce the dwelling, the farmhouse, the agglomeration, the village, the hamlet.

The evolution of the typology does not stop at the internal volumetric expansion, by aggregating several modules, but also in the external appearance, which becomes more refined to emphasise the living use of the trullo.

In this way, the entrance to the trullo also becomes more structured. In the rural trullo, the entrance was a small opening cut into the masonry. With typological evolution, it was elaborated by placing a vaulted doorway with an external roof made of pitches, which is called a pediment (Fig. 4).

Fig. 4: The *frontone*. Evolution of the entrance to the trullo with arch and pitches.

4.   The survey of cone roofs using the structure from motion technique

Undoubtedly, in the field of surveying today, laser scanner technology is the most widespread, thanks also to the increased power of computational machines for the increasingly discrete processing of the point cloud.

In the case of the survey of this particular architectural speech where the roofs have a cone shape and the composition of the materials is very particular, the laser scanner survey has limitations inherent in the filming technology, i.e. the need to shoot from several points in order to avoid shaded areas, as well as to position the instrument in a detected point to allow the scanning of the trullo's roofing cones.

These problems were overcome by using a Remotely Piloted Aircraft System (S.A.P.R.), consisting of a drone equipped with a high-resolution camera mounted on a gimbal.

Surveying with S.A.P.R. makes it possible to survey buildings that are difficult to access, as well as large areas of land in a short time.

With the structure from motion algorithm, it is possible to use the images taken by the drone to create a point cloud that can subsequently be transformed into a polygonal mesh for the

three-dimensional model.

The case under study is the Casette di Castigliolo compound in the countryside of Altamura (Bari), which features a trullo consisting of two cones surrounded by a dry-stone fence wall. (Fig. 5 - 6).

By processing the model from the high-density point cloud with the Building Texture technique, it was possible to match a texture to the 3D model for the generation of the photorealistic model.

The post-production with LUMINAR © architectural filters it is possible to obtain a particularly real model of the texturised built environment cloud (Fig. 7).

Fig. 5: Drone flight plan.

Fig. 6: Distribution of pictures shot by the drone.

Fig. 7: 3D model with texture. Post-production with LUMINAR © architectural filters.

5.   The future of an old architectural heritage

From the analysis carried out on the Apulian territory, it is possible to read in this architectural typology a cultural and experiential repertoire with which generations of farmers and shepherds have expressed themselves in architectural matters, making the Apulian territory a reservoir of the most conspicuous architectural idioms.

Unesco, sensitive to the evidence produced by cultures of the past, has recognised its importance by declaring it a World Heritage Site.

The study of the settlement sites of these particular build unit has revealed that when the trullo performed the functions of temporary shelter and tool storage, it fulfilled operational needs at the beginning and end of the working day. The position of the trullo had specific locations with respect to both the roadways and the agricultural land on which it was built. In fact, in the

majority of cases, it was built close to the road leading to the agricultural field, or rather it was connected to it by short driveways that became indispensable elements for the parking of farm wagons [4].

Now more than ever, it is a question of protecting a heritage of world culture.

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The new physical model about the ancient city of Pergamon for the Pergamon Museum Berlin

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Abstract

As part of the ongoing general renovation of the Pergamon Museum Berlin, a building that houses a large number of museums, including the Collection of Classical Antiquities, one of the most prominent objects of which is the actual Great Altar, the so-called Pergamon Altar, the display models in the same main hall are to be updated to reflect the latest scientific state of the art. While for the 1:20 scale model of the actual altar this merely means integrating the 3D scan of the Giant Frieze and reconstructing it using tangible material, for the model of the city mountain this means a completely new concept. It is now beyond question that the majority of the mountain was built on and not a spacious park with a few large structures as the old model suggested. The basis for this is provided by the virtual overall model of the metropolis created by the authors for the first monographic exhibition in 2011. However, this model was designed for visualisation, which opens up many possibilities, but also implies significant limitations. A plastic model that can be viewed from all sides, on the other hand, requires a meaningful visual representation of archaeological knowledge from any conceivable viewing angle. The special method of visualising uncertainty in knowledge is of benefit here, which will be exemplified in the paper.

Keywords: Visualisation, Architecture, Archaeology, Knowledge, Hypotheses

1.   Introduction

Pergamon is more than just the ancient metropolis (Fig. 1). Pergamon is also the Great Altar in the museum of the same name in Berlin and – including other pieces in scattered museums – is not only spread across different spaces, but also across different realities, namely physical and virtual reality.

Fig. 1: The ancient metropolis of Pergamon including its Roman extension

It is here that Pergamon differs in the degree of realism. For fifteen years we have been working in continuous collaboration with the excavation in Bergama, which is being carried out by the Istanbul department of the German Archaeological Institute DAI. From the very beginning, the ambition for the representation of the metropolis was precisely not to be a digital twin, but the visual reflection of the state of research in as unaltered a form as possible. This essentially consists of uncertain knowledge. It has therefore always been necessary to utilise expertise in visual perception from architecture in order to create images that nevertheless make an architectural statement and are thus intuitively perceived as architecture, despite the uncertainty due to the sometimes enormous abstraction of the model. However, whereas in the past the focus has always been on perspective or axonometric, in any case composed visual projections (Fig. 2), supplemented in some cases by sequences of moving cameras at those points in the model where this is possible, two new challenges are currently being faced.

Fig. 2: View from the Roman temple of Trajan on the Roman city extension

One is a physical model as a projection of the virtual model back into physical reality. The other is an implementation in augmented reality. Both endeavours harbour their own challenges. The physical model is also to be designed as a tactile model, which places particular demands on the fragility of its elements, but above all it will be able to be looked at from all sides for the first time. The existing images hinted at this possibility, but ultimately never really realised it. Views from the rear have simply not been of interest up to now. Now, however, it will no longer be possible to conceal delicate areas that science has not hypothesised to such an extent that the question of their appearance has not yet arisen. This means that things will become apparent, some of which will have to be concretised for the first time. The flexibility of the method of visualising uncertainty, which allows even very vague suggestions to be portrayed, naturally accommodates this circumstance, but even a vague suggestion requires a clear sculptural design. Abstract geometry in particular is interpreted above all by its context, and in the previous images this is part of the composition, which primarily consists of defining a section that remains comprehensible as an overall image. If the possibility of composition is omitted, the physical model must nevertheless always be able to convey an architectural statement, i.e. an architectural idea. The physical model on a scale of 1:333 will ensure for its small size alone that abstract geometry cannot be perceived without any context and thus becomes incomprehensible. Meanwhile, the actual research continues. The current focus is on the expansion of the city in the valley at the foot of the city hill that the Romans built, which

included all the common largescale buildings that a Roman city of this size would have, from the circus and baths to the theatre and amphitheatre. For the exhibited movie see [1].

2.   The expectations of the museumon

The Pergamon Museum Berlin is currently undergoing extensive restoration work, and the opening will be spread over several years. The so-called Altar Hall, in which the eponymous Great Altar is located, will reopen in 2027 at the earliest. It will essentially continue to remain in its former state. Only the two central non-ancient exhibits, the model of the mountain of the city from the early days of the museum and the model of the altar in its entirety - only half of the original building is actually exhibited in the hall - will be replaced by new models that reflect the current state of research - precisely that of 2023. This state of research is defined by the Istanbul Department of the German Archaeological Institute DAI. Although there is also new research on the altar itself and on various other large complexes on the imposing city hill, the most significant change compared to the earlier model is the now undisputed finding that the mountain was almost completely built on its entire southern and eastern slopes. This impression is far from obvious in its present state, but excavations have clearly confirmed this in the past. And so it should be made clear to prospective visitors that the Great Altar was not situated in a spacious park landscape like a temple in an English garden, but - although set on its own terrace and exposed on the slope - was ultimately surrounded by a dense and extensive metropolis.

Fig. 3: Optional sections of the upper city of Pergamon

The absolute size of the model was defined in consideration of the spatial situation in the museum, the comparison with other existing models, the flow of visitors, the relationship

between the ancient original and its model and, not least, between the two new models, the city mountain and the altar. Due to these requirements, the scale of the altar model was fixed early on at 1:20, while the city mountain was still being negotiated. The great challenge for visitors to the altar hall is to realise the actual spatial layout: the altar had an almost square floor plan, around which the so-called giant frieze wraps. This fact is difficult to grasp because only about the front half of the altar is actually installed in the museum, while the frieze unwinds along the opposite wall. Not least for this reason, the relatively large model of the altar alone is a great, if not necessary, help. The model of the city mountain, on the other hand, is intended to contextualise the altar, showing not only its size in relation to the city, but also its embeddedness. Within this model, the absolute size of the altar is therefore of secondary importance, as long as it can be found fairly easily so that it can be associated with the original. This last aspect was ultimately decisive for the decision to choose a scale of 1:333, which made it possible to show the essential part of the upper city, namely the entire acropolis, as well as a part of the profane area that is sufficiently recognisable as a city texture, while at the same time the central building, the altar, is actually located in the centre of the model. When choosing the section, the spatial extent was therefore determined, so that the aim was to select a defined rectangular section that would be able to reproduce the characteristics of the city as accurately as possible (Fig. 3).

Several aspects were taken into account, such as the relationship between built-up and unbuilt-up slopes, the recognisable end of the built-up area at the rear of the actual acropolis, where only the city wall appears behind the arsenals, but no further buildings, and not least the orientation of the Great Altar, which would appear in the same orientation as its original, if the section in the hall was chosen appropriately, and in front of which the model would stand (Fig. 4).
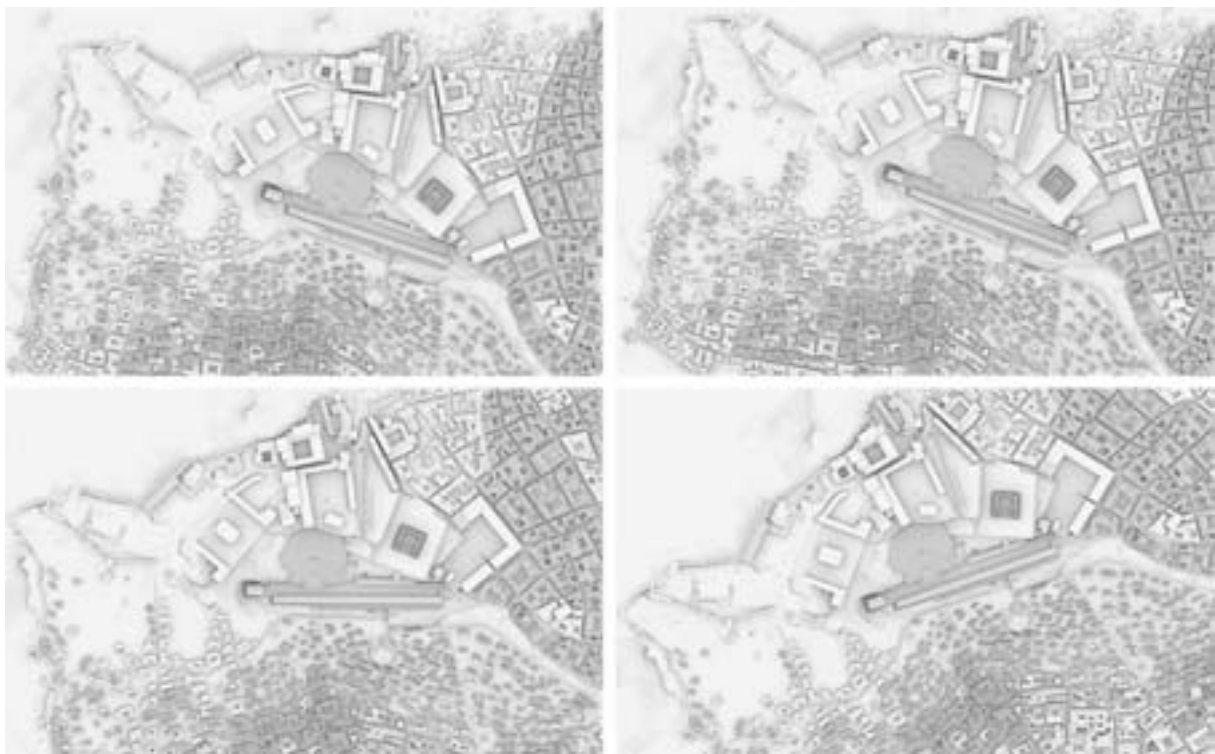
Fig. 4: Optional sections of the upper city of Pergamon in simulated top views on the physical model

The overall topography around the city hill, which is quite moving, was also to be taken into account in the model, which is why the four views of the plinth, on which the model is to stand without any further offsets, were simultaneously checked for their visual effect. The resulting undulation of slopes can be considered to essentially reflect the topography, even if there is no direct correlation to their perception on actual location (Fig. 5). The choice of the height of the plinth and thus the absolute height of the model in the room has not yet been finalised; the

criteria here are also the dual requirements of remaining accessible both for seeing visitors in larger groups (Fig. 6) and for tactile visitors, in some cases also from a wheelchair.
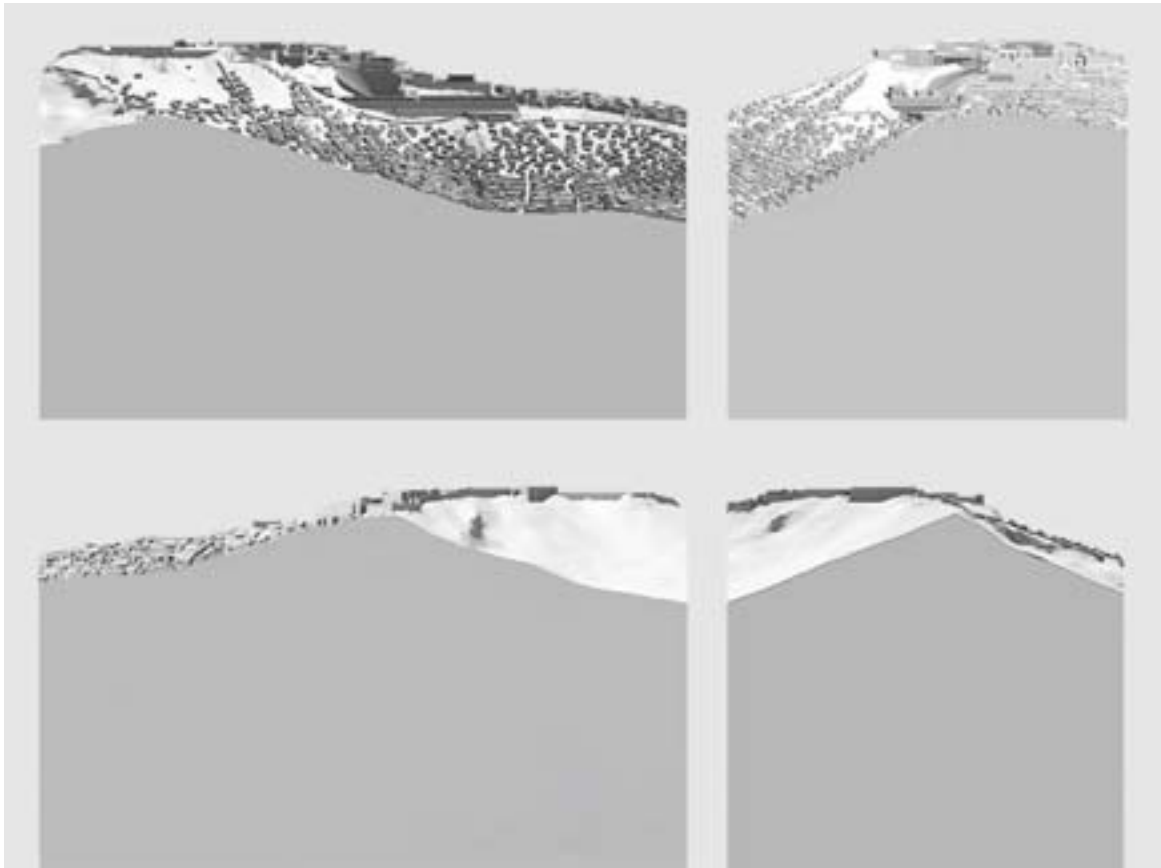
Fig. 5: Selected section of the upper city of Pergamon in simulated model elevations
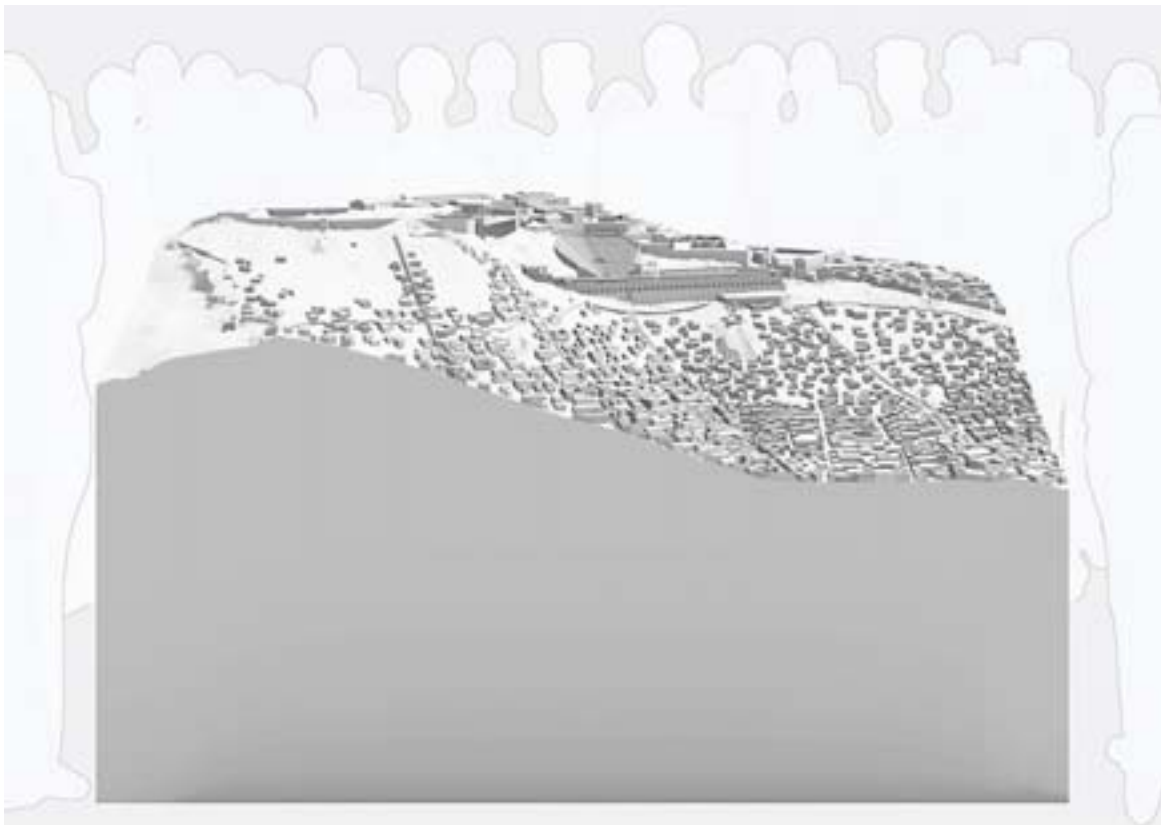
Fig. 6: Physical model of Pergamon in human scale comparison

3.   Design of abstraction

All these requirements lead to a modelling that has to meet several different requirements. As in the visualisations that have been created for over fifteen years and have been repeatedly updated in line with research, the superordinate goal is the proximity to science combined with the intuitively graspable uncertainty in knowledge. Additionally, the production conditions must be taken into account, as Corian is still the planned material, and cannot be printed additively, but only milled subtractively. This process requires that all shapes must be accessible to the milling tool. But even a five-axis milling machine has its own physical presence, a volume in space and a shape whose space requirements must be taken into account during the milling process. After all, the resulting shapes must be reasonably stable in order to at least withstand accidental damage caused by touching. But the model should not be able to withstand rough vandalism; it would have to be too rough for that. In order to be able to resolve the most demanding constructive visual situations resulting from production and tactility in advance, we have composed a compact test body, which is not a cut-out, but an assemblage, which is intended both to challenge the milling machine and to test the subsequent stability against being touched (Fig. 7). Even with models that are only to be viewed, not touched, the stability of the print model must be taken into account. And here, too, the procedure is not standardised. Fragile components made of alternative materials are often inserted, for example wire pins for columns. But as these have a cylindrical shape, and are therefore completely straight, their visual character contradicts one of the essential characteristics of ancient columns, which narrow towards the top. In additive 3D printing, this also leads to colonnades that are open in the original being modelled with supporting walls (Fig. 8) rather than remaining open but appearing rough. It is far easier to accept and internalise an idea that what we see does not correspond to reality if the difference is easy to understand cognitively. The reality that the colonnade was open can also be easily described verbally. However, the impression that a column is altogether delicate on account of its complex formal silhouette consisting of a narrowing that is difficult to grasp on a numerical level, and that it changes almost imperceptibly from a cylindrical to a conical shape from bottom to top, is much more difficult to summarise even linguistically.
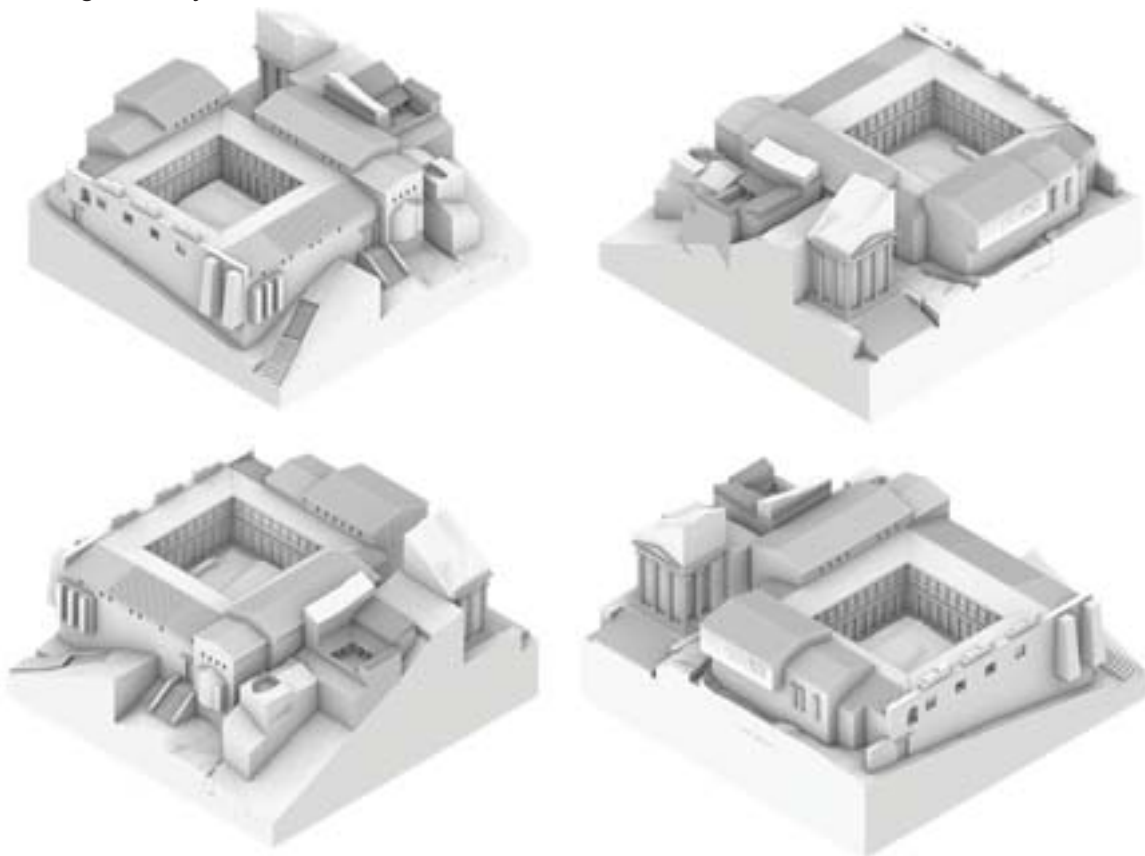
Fig. 7: Composition for exploring the capabilities of a five-axis milling machine

4.   Conclusion

The creation of a tactile model presents a particular challenge. Not only the all-round visibility, which would also have to be taken into account when producing an additive 3D print, but above all the production and stability are challenges that could tempt to neglect the most important aspect, which is the scientific statement. Ensuring that the model nevertheless fulfils the high standard of remaining visually representative of the state of research on the metropolis and its emblematic altar is the greatest challenge. As is so often the case, the greater emphasis on formal characteristics, such as the entasis of ancient columns, is ultimately a design decision. Visual design is the factor that decides what is ultimately perceived by the viewer and visitor, what they take away with them at the end and what they leave with them as a reminder of their visit, which is why the architectural view ultimately determines the appearance of the printed product. The production process will probably be completed by the time this paper is published and, if all goes well, both models will be on display in front of the altar when the altar hall opens, presumably in 2027.
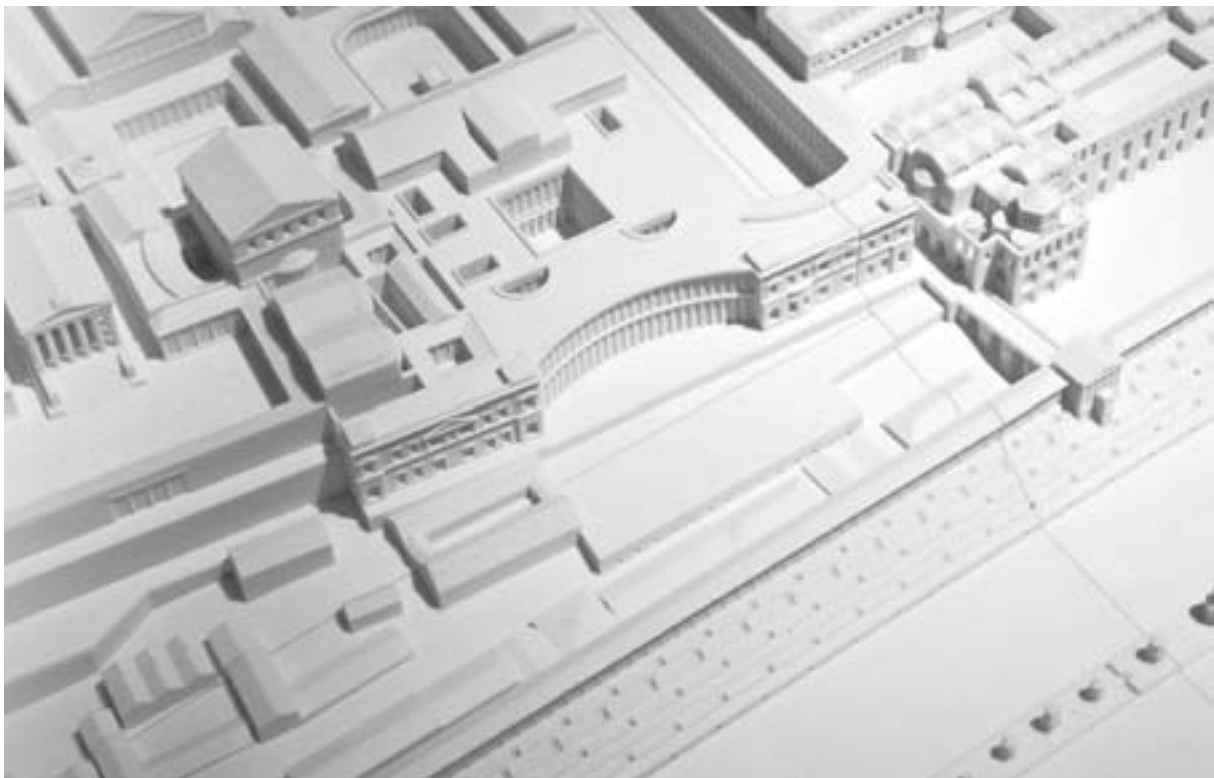
Fig. 8: The Palaces on the Palatine hill in Rome in the 3rd century CE
(a project in collaboration with the architectural department of the German Archaeological Institute DAI, Berlin, exhibited in the Pergamon Museum Berlin among others [2, 3])

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Digital Twin Cities
Helsinki case study

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Abstract
Digital city twins represent an innovative perspective for improving the urban environment, resource management and control, and quality of life for citizens. These virtual models reflect the status and functioning of urban infrastructure in real time, enabling more efficient and sustainable resource management. In this context, several cities have adopted advanced digital twin solutions to address environmental, functional and social challenges. Through data collection and analysis, these systems enable better urban planning, transport optimisation, pollution monitoring and emergency management. The research aims to structure the digital twins of the city of Chicago and Helsinki according to precise metrics. Metrics originated from various studies and therefore from heterogeneous sources, with the aim of providing a common language that is comprehensible to the community of insiders and that allows them to concisely communicate an assessment of the various characteristics, the aim is to understand, starting from the comparison, which aspects are positive and to be encouraged in order to create a perfect collaboration between digital twin, city and people.

Keywords: digital twin cities, digital twin of Helsinki

1. Introduction
The digital twin concept has its roots in the aerospace industry but is rapidly spreading to other sectors, revolutionising design, planning, maintenance and decision-making processes. This tool connects physical and virtual worlds in real time, enabling accurate assessment of unforeseen scenarios. The key to the digital twin is the virtual representation of physical objects with real-time data, enabling dynamic and predictive simulation.
Definitions of digital twin are varied, but all emphasise the two-way transfer of data between the physical and digital counterparts. This vital connector between the physical and digital worlds requires the integration of human beings and artificial intelligence. The digital twin is not just a static representation of a physical object, but a dynamic, self-evolving model that reflects its real twin in real time. The goals of the digital twin may vary depending on the context, but all aim to improve the efficiency, safety and reliability of processes and systems.

2. Structure of the digital twin
We will now examine the metrics used to analyse and understand the functioning of existing digital twins and apply them to the case study of the Helsinki City digital twin. The purpose of these metrics, which come from various sources and studies, is to create a common language that can be understood by practitioners, enabling them to briefly assess the characteristics and capabilities of the digital twin. The metrics focus mainly on the digital twin in the construction sector, making them relevant for our context. Although other metrics exist in the literature, we have selected those that are most widely used and remain meaningful even when applied on

a larger scale. Although metrics specific to urban digital twins have not yet been developed, the proposed classifications suggest concepts that are also applicable at other scales.
The metrics considered are as follows:
- Domain
- Integration levels
- Degree of Automation
- Maturity levels
- Key levels
- Data Acquisition
- Implementation
- Simulation
- User experience
- Stakeholders

The domain and stakeholders are not considered real parameters. By domain, we mean what the digital twin is used for. By stakeholders, on the other hand, we indicate which figures are involved, economically or socially, for the formation of the digital twin.
Integration levels have been theorized by Kritzinger et al. (2018)[1] with regard to digital twins in the manufacturing sector, but have also been adopted in the field of Architecture, Engineering, and Construction. (AEC). The levels of integration are in ascending order: digital models are the least integrated while DTs represent the highest level of integration.
- Digital model: The basic digital model does not integrate automatic information flows between the physical and virtual worlds. Changes must be made manually as there is no automatic link between the two environments.
- Digital shadow: This layer integrates an automatic unidirectional flow of information from the physical to the virtual world, but not vice versa. Sensors transfer data from the physical model to the virtual model, allowing passive but non-interactive monitoring of the physical environment.
- Digital twin: Represents the highest level of integration, with a two-way flow of information between the physical and virtual worlds. Information moves automatically between the two environments, allowing active interaction and continuous synchronisation between the digital model and its physical counterpart.
Turning to the concept of 'Degree of automation', there is a convergence towards the creation of city digital twin (CDT) incrementally, reflecting the gradual implementation of digitisation. Therefore, it is possible to validate a city digital twin concept that grows over time. The degree of automation can be set on four spectrums, as follows: (i) input, (ii) output, (iii) sub-programmes and implementation rules, (iv) access and security.
- Input-(a) manual, (b) semi-automated, and (c) automatic.
- Output-(a) manual, fully customised, (b) semi-automated, mixed, and (c) automatic, fully predefined.
- Sub-programs and rules of actuation-(a) manual, fully customised, (b) semi-automated, mixed, and (c) automatic, fully predefined.
- Access and security-(a) full access and (b) limited.
In the "Maturity levels", the proposed model is based on the work of Fjeld (2020) [2] and classifies the DTs according to their degree of development As it is an incremental model, the more advanced levels integrate the elements of the lower levels. The classification proposed by Mêda, P. et al. [3] has the merit of bringing together in a matrix the different factors that are descriptive and influence the maturity of a DT.
Levels of development' describe the increasing complexity of DTs, moving from descriptive and informative levels to predictive and autonomous levels. Each level represents an increase in data processing capabilities and simulation and prediction capabilities as follows:

Static twin	The static twin (level 100) represents the first approach of most actors in the construction industry to digitisation. It takes place through BIM, focusing mainly on 3D

		modelling. At this level, there is no integration between the physical and virtual environment. This static DT is a graphic representation from the physical to the virtual. At this stage, it is essential to focus more on information, looking for machine-readable data for the purpose of interoperability, enriching the details of the information to move to the next level. The expected results are 3D representations of physical assets, where the software used to run the model can provide IFC formats to be used by other types of software. For example, a company has a 3D model of a single house in Autodesk Revit and is able to export it in IFC format. However, the model will contain geometric information about a wall, but no alphanumeric information about the type of wall, e.g. masonry, concrete or drywall. At this level, the data only relate to the design of the building.
Detailed twin		In the detailed twin (Level 200), the application of BIM is enriched by focusing on a more detailed information management approach. There is a partially unidirectional integration from the physical to the virtual environment based on data input of the project product specifications. At this level, it is possible to extract a complete or partial bill of quantities (BoQ) of certain products based on the detailed information of the assets. In addition, it is possible to perform building sustainability assessment methods (e.g. LEED, DGNB or BREEAM). Furthermore, with this detailed data, it is possible to estimate the CO_2 emissions of the project over its entire life cycle. At this level, the data is not only related to the geometry but also to the products that will be used to construct the building.
As-built twin		In the As-built twin level, there is still only one-way integration from the physical to the virtual environment. In this case, as-built information based on the construction phase is adapted to the models.

	Conventionally, this information is ratified or corrected manually. All product and process information from the construction phase must be catalogued. In most cases, this information is partially filed in physical format (paper) and digitised (files containing, for example, pdf files). Again, using digital data, it will be possible to review the DDT and create a digital building register (DBL). The main result at this level is a database of up-to-date project information. The as-built is a regular activity that must be performed once the construction phase is completed, in order to enable the subsequent phases of use, and thus the operation and maintenance of the building. At this level, for example, it is possible to measure the emissions produced cradle to handover and estimate the expected emissions for the subsequent use and end-of-life phases.
Sensored twin	The "sensorized" twin allows you to add to the virtual twin populated with data related to the elements that make up the building (specifications and "as-built") IoT systems. This makes it possible to monitor buildings and places, enabling the smart building (and smart city) dimension. In the first three levels, data collection and processing is entrusted to people who manage the systems and provide information. Thanks to IoT sensors and systems, more autonomous bidirectional integration from the physical to the virtual environment becomes possible. The implementation of IoT allows you to obtain a large amount of data. The greater the number of items detected (e.g., workers, users, products, equipment, and environmental conditions), the greater the amount of information and the more possibilities for analysis. In this level, the data is related to the building (assets), people, project performance, and environmental conditions. For subsequent levels, the data

	collected is always the same size. However, in each level the processing and autonomy of the twin increases.
Responsive twin	IoT devices collect data from the physical environment autonomously and in near real-time. Limited two-way integration from the physical to the virtual environment is possible: as a result of inputs from the virtual environment, it becomes possible to operate actions on the physical twin on the basis of pre-established rules or on the initiative of an operator. The interaction between the physical twin and the virtual twin allows, for example, to calibrate temperature or electricity consumption, to manage the opening and closing of doors and windows, and the switching on or off of equipment and systems. This phase is the starting point for developing rules and algorithms for a more advanced and smarter twin.
Adaptive twin	It benefits from a more significant amount of data, and the operations of analyzing or learning the actions and operations carried out in the previous phase is conducted through safer and more precise algorithms, as well as rules for autonomy. In this context, it is possible to develop a system capable of simulating scenarios and a high capacity for process automation. However, human evaluation is still needed to verify the machine's decision-making, especially to calibrate the system. Semi-two-way integration from the physical to the virtual environment is therefore possible.
Intelligent twin.	Incremental learning makes it possible to develop a fully autonomous sister platform, where a completely bidirectional integration from the physical to the virtual environment takes place. This evolutionary development generates and tests reliable algorithms to avoid errors and biases, increasing safety and accuracy. As a self-learning and self-regulating DT, it is able to carry

	out corrective and preventive actions to increase the performance of buildings. Human interaction is not required, although a compliance check should be performed from time to time to verify the performance of the system.

The objective of Key levels is to evaluate the skills of digital twin by expressing themselves through a descriptive language, each key level is in turn divided into 5 levels, as shown in the following table.

Key Levels					
	Level 1	Level 2	Level 3	Level 4	Level 5
Fidelity	The DT has low accuracy and can only be considered a conceptual model.	The DT has a low to medium range of accuracy and can be used to extract measurements.	DT has a medium accuracy and can be used as a reliable representation of the physical environment.	The DT can produce precise measurements.	The DT has a high level of accuracy and can be used in case of life safety and crucial operational decisions.
Learning	The DT has no dedicated learning components.	The DT is programmed using a long list of commands.	DT is trained with a supervised learning approach (using labeled data that can provide feedback and predictions) DT is trained with a supervised learning approach (using labeled data that can provide feedback and predictions)	The DT is trained using unsupervised learning (the twin does not use labels and tries to make sense of the environment on its own)	The DT uses reinforcement learning by interacting with the environment. DT learns from feedback and past experiences to find the optimal way to improve performance
Intelligence	The DT has no intelligence	The DT has reactive intelligence (the twin responds only to stimuli, cannot use previously acquired experiences to	DT uses learning to improve their response and is also able to learn from historical	The DT understands the needs of other intelligent systems	DT is self-aware, with human-like intelligence and self-awareness

		inform their current actions)	data to make decisions		
Authonomy	Complete absence of autonomy, with the user controlling all aspects of the DT.	Partial autonomy, the DT has the ability to alert and control the system in a few ways.	User-assisted level, where alerts and notifications of system activity are expected, but autonomy is limited.	High autonomy, the DT is able to perform critical tasks and monitor conditions with little to no human intervention.	It can operate safely in the total absence of human intervention.

Fig.1: The framework moves through five conceptual levels, starting with a digital model that more or less faithfully represents the physical reality of the environment, and then evolving to the higher levels where machine learning capability, domain generality and scalability potential come into play, particularly relevant in the case of DT at urban scale.

Data Acquisition, indicates where and how data is retrieved. Dividing them into:
- Dynamic: information that changes with a high frequency, which is updated over time frames of hours, days and weeks.
- Socio-economic: aspects of a given society considered in the totality of social and economic relations or interrelations, subject to change over a period of about 10 years.
- Static: data that do not vary over time, or that vary over a period of time of not less than about 40 years.
Implementation, a parameter that indicates whether in some way the data received and processed returns to the real environment, through an implementation, in the form of a measure, resolution and/or decision. Simulation, indicates whether there is the ability to simulate future scenarios.
User experience: how the interaction between the user and the 'digital twin' model is used is made explicit. Identifying a private (without information in our possession) or public (indicating the type of platform) dissemination.
Integrating Digital Twin concepts into the urban context requires a deep understanding of integration levels, automation, maturity, and development. Through the case study, of the city of Helsinki, we can explore how, through the metrics described above, we have a structuring of the digital twin.

Helsinki

Dominio	Livello di integrazione	Livello di automazione	Digital twin maturity level	Key levels	Acquisizione di dati	Attuazione	Simulation	User experience	Stakeholders coinvolti
Energy Mobility	Digital shadow	**Grade 1 input** – (c) automatic **Grade 2 - output** – (b) semi-automatic, mixed **Grade 3 Sub-programs and implementation rules** – (b) semi-automatic, mixed	Adaptive twin	- Fidelity livello 5 - Learning livello 4 - Intelligence livello 2 - Authonomy livello 3	- Sensors Dynamic data	Public Participation GIS Survey (PPGIS)	Energy/solar/wind simulation. Autonomous vehicle testing.	Public Web platform: https://kartta.hel.fi/3d/#/	Smart Kalasatama

		Grade 4 Access and Security – (a) Full Access							

Fig.2: Structure of the digital twin of Helsinki. Table with described parameters.

3. Conclusion

Today, several urban digital twins have been developed. However, every implementation has been different, and there is no clear picture of what an urban digital twin is. This is also due to the fact that the characteristics vary significantly depending on several factors, as we have been able to see. As the adoption of urban digital twins is at an early stage, the existing scientific literature is also limited and the terminology is often confusing. This is evident in the misuse of the term urban digital twin to refer simply to a 3D digital model of a city. This confusion is partly fueled by the fact that the 3D digital model of the city is used as the basis on which to build urban digital twins.

While implementing digital twins in the urban environment is considered beneficial to the city, its citizens, and its administrators, it is not without its drawbacks.

The development and implementation of digital twins comes at a higher cost than simpler control and monitoring systems. In addition, due to the technical complexity of a digital twin, skilled professional profiles are required to design, install, and maintain it.

In addition, the technical complexities should not be underestimated. The datasets of digital twins of cities are large and complex, requiring a great deal of computing power to process them, with the associated costs.

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The eighth day

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Abstract
Nowadays change has become a constant, but in this vortex of unpredictable variables and events that transcend human beings, we cannot forget the material and immaterial heritage that has made our history.
There are many initiatives taking place in the artistic sector for the protection and valorisation of art and architecture, often the object of disgrace in conflicts, almost as if to inflict a sort of "damnatio memoriae".
We can essentially distinguish two macro-categories of initiatives, denunciatory art which with its works demonstrates against the war and fundraising initiatives by museum bodies and individual artists to financially support the tormented populations.
A special case is New Palmyra, a platform that is based on memory and rigorous historical foundations to return to the global community a testimony of a partially destroyed cultural heritage
Keywords: remembrance, art, artistic statement

1.   The identity value of artistic heritage

Our society has evolved in a relatively short time if we consider the timelines of the last centuries, toward a fragmented, highly complex scenario, characterized by elements of discontinuity and changing events. Knowing how to be in the world makes us aware that the experience of cultural interaction is moving toward a direction of concertedness, where heterogeneity and cultural plurality is understood as added value.

Expression through codes and languages is typical of tangible and intangible heritage and takes on a strong identity value. Precisely this highly symbolic value of it has in the past been, and today is, affected to create harm to the population in case of conflict.

The artistic and architectural evolution of territories, is no longer considered in a hierarchical manner, but in its unitary conception of expression, it takes place in dynamic equilibrium with the environment that surrounds them and draws inspiration from it, takes shape in different typologies all expressions of identity[1] of a community, the sizing of which ranges from small to large scale, depending on the common features considered.

Common memory is determined by the set of artistic and architectural artifacts recognized as identity in the construction of an area's artistic heritage.

"Memory is a cultural material and is subject to the understanding and perceptions of an era. The current historical moment is grappling with an upside-down process of redefinition: we create and destroy our perceptions of history as we continue to construct them from our changing memories. Our perception of memory acts viscerally-not an intellectual exercise like history-and integrates past and present."[2]

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[1] The document, 1966, produced by the Parliamentary Commission (L. 26 April 1964, no. 310) chaired by the Hon. Francesco Franceschini defines cultural property as "everything that constitutes material evidence having civilizational value"
[2] Toshiko Mori: "The memory" https://www.domusweb.it

Fig. 1: Geheugen (Memoria), Cornelis Cort, after Frans Floris (I), 1560[3]

2.   The role of the artist in society

The artist, a free and independent creator, actively participates in the life of society with his or her own conscious identity open to the context around him or her.

"Why must a work be? Because the essence of art is dictation, but the project can only be insofar as it is foundational, laying the foundation and resting in it the open.

Why, however, must the essence of art as dictation be in this way? Because dictation is a happening of truth and because truth "is" always in conformity with the ground; and precisely, in such a way that it is a mode in which truth springs forth. Art, an origin of truth. Fundamental mode of its becoming. Art is history. Enterprise and thought."

There have been several artistic manifestations condemning war conflicts, and we can lump them into two macrocategories, denunciation interventions and economic support interventions.

A solidarity exhibition in tribute to the Ukrainian people and the one organized at Moma in New York, entitled "in Solidarity[4]. The exhibition brings together and exhibits works made a century ago by native Ukrainian artists, some who ventured to faraway places. "The works on view, executed in various mediums, reflect a wide range of approaches: from abstraction to representation, the mechanical to the handmade, the everyday to the mystical."

A related event titled "post presents: Art, Resistance, and New Narratives in Response to the War in Ukraine" investigates the relationship between the historical events of artistic expressions and the violent events that occurred in Ukraine from the very beginning.

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[3] https://www.rijksmuseum.nl/en/collection/RP-P-1974-144- The personification of Memory sits on a pedestal of an antique column and records history in a book. Next to her a dog that faithfully waits for her. Below the performance a Latin verse: Praeterios memori et prudens si respicis actus ad res praefentes hinc erit utilitas.

[4] https://www.moma.org/calendar/galleries/5454

Fig. 2: Kazimir Malevich
Suprematist Composition:
Airplane Flying1915 (dated on reverse 1914)
Fig. 3: Kazimir Malevich
Reservist of the First Divisionfall-winter 1914

MAXXI-Rome's initiative, "Ukraine: Short StoriesContemporary artists from Ukraine," organized with Fondazione Imago Mundi, is financially supportive as proceeds are donated to the Ukraine Humanitarian Emergency Fund. "The exhibition presents 140 works created by young and emerging artists and established authors already present in the most important international museums and galleries who, with strength and passion, reflect a society that is reinventing itself, through instability, ideological and social changes, cruel conflicts, constantly searching for new ways to deal with history, and assert a new artistic freedom."[5]

Fig. 4: MAXXI-museo nazionale delle arti del XXi secolo-web foto.

The primary goal of the "Ukraine Stories of Resistance" photo exhibition is to highlight the everyday experiences of the people affected by the conflict. This exhibition, which took place two years after the start of the conflict, showcases the destruction caused by violence, from the ruins of buildings to the hopeful acts of volunteers who provide meals for doctors, military personnel, and journalists. To commemorate this event, a medal was created..[6]

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[5] https://www.maxxi.art/events/ukraine-short-stories/

[6] The medal, designed by the School of Art and Medal, depicts on the obverse the Berehynia statue, symbol of Ukrainian patriotism and protector of freedom, created by the sculptor Anatoliy Kushch in

Fig. 4: "Two Years of Ukrainian Resistance" commemorative medal in support of young patients in Lviv hospital.

Marina Abramovic's participatory art is both a time for reflection and awareness raising and in some cases a fundraiser.

The Crystal Wall of Crying is an extension of the Western Wall of the Temple of Jerusalem that runs through Babyn Yar, and it symbolizes the tragedy of Babyn Yar and the Holocaust. It is a forty-meter-long and three-meter-high structure made of anthracite and 93 quartz crystals, and visitors are encouraged to interact with the crystals and meditate. Marina Abramovic created the Crystal Wall of Crying to reflect on the impact of mass murder on collective memory and the healing potential of focused reflection for future generations. The wall serves as a space for individuals to think, remember, and reflect on the tragic events of the past and draw personal conclusions. The interaction with natural quartz crystals aims to heal the wounds of the past by reconnecting with individual body experiences, and the Crystal Wall of Crying is a new permanent installation for the Babyn Yar Holocaust Memorial (@babynyar), marking the 80th anniversary of the first massacre in Babyn Yar.

Fig. 5: Crystal Wall of Crying-web photo

2001. At the bottom, "DCCXXX" to indicate the 730 days of resistance of the Ukrainian people to the war of Russian aggression since the beginning of the invasion.
On the reverse the "tryzub", the trident of the Ukrainian emblem, is depicted in a circle. Around, the writing "WE WILL GIVE BODY AND SOUL FOR OUR FREEDOM", taken from the Ukrainian national anthem.

Fig. 6: Marina Abramovic in front of the Crystal Wall of Crying. [7]

With the re-release of the historic performance "The Artist is present[8]" engaged in a fundraising effort for Direct Relief, which provides medical assistance to the people of Ukraine.

Fig. 7: "CND Soldiers", Bansky

Through the Myartbroker.com platform, Bansky's work "CND Solidiers" was auctioned for more than 95,000 euros to be donated to the Okhmatdyt Children's Hospital in Kiev, which provides medical care for both children and all those injured in the conflict.

3.   New Palmira[9]

In his book, In Between Memory and History: Les Lieux de Memoire, Pierre Nora explains how to differentiate between memory and history. According to Nora, history is a rational and secular discipline that requires analysis and critique. On the other hand, memory is a sacred and emotional concept that belongs to specific groups. As Maurice Halbwachs pointed out, there are as many memories as there are groups, and while memory is collective and plural, it is also individual. In contrast, history has a universal authority that belongs to everyone and no one. Nora's work emphasizes the importance of understanding the distinction between these two concepts in order to appreciate their unique qualities and functions.

The New Palmyra platform was created to reconstruct the memory of a place through the photographic memories of all those who wished to collaborate.Through the photos, architectural models of the triumphal arch, the Roman theater, the tetrapylon, the Elabel Tower

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[7] https://www.reuters.com/world/europe/artist-marina-abramovics-crystal-wall-crying-commemorates-jews-killed-babyn-yar-2021-10-06/

[8] https://www.moma.org/calendar/exhibitions/964

The over 70-year-old Serbian artist (1946) first presented this performance in 2010, it lasted over three months and some 1,500 people sat in front of her including her former work and life partner Ulay, who later passed away.

[9] Pierre Nora, Between Memory and History: Les Lieux de Memoire, in Jorge Otero-Pailos (a cura di), Historic Preservation Theory: An Anthology, Design Books, New York 2022, p. 405.

and various statues all listed under models were reconstructed. Through a series of outreach events such as "Beyond destruction: archaeology & cultural heritage in the middle east," visitors were invited in a pop-up space to express themselves through drawings, phrases or otherwise around the slogan "They may Destroy but we can create"

Fig. 7: Pop Up Palmyra, art in response to the destruction of the past

4. Conclusion

Memory is articulate and changeable. Some memories are strong and recall things that have happened; Others are cruel. Still others are delicate, subtle and personal. Memory has an impact on our social behaviors and emotional lives. Its variety and plurality forms the foundation of civilization. It is a common feature of humanity in its relentless refusal to submit to the authority of history.

It is possible to use memories as a powerful tool to recast, reframe and redefine the ongoing and dynamic process of recall, reconciliation and reconstruction of the future. The power of memory is demonstrated by studies of race and gender, which explore areas of knowledge and perception that were previously unknown.

Memory has diverse origins and references; it may have to do with events, places and experiences.

Reconfigured monuments can become testimonies of truth, memory reborn as a powerful record of shared experience.

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![World Heritage and Dwelling on Space / World Heritage and Cities in Emergencies — XXII International Forum, 14-15 June 2024 Napoli Capri — Le Vie dei Mercanti]

Surveying visual-spatial Relations between Bisentina Island and its Environment. The Atlas of the Coastal Villages of Lake Bolsena, Italy

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Abstract
The beauty of the territory surrounding Lake Bolsena, Central Italy, facilitate our ongoing research aimed at establishing a permanent investigation laboratory, which aims at documenting the heritages nestled into the various coastal villages. The possibility to dwell these places, to traverse them from land, water and sky, has allowed us to identify the tangible and intangible qualities of this environmental heritage; multidisciplinary readings through surveying actions in which the languages of Drawing and Photography stand together complementarily.

Keywords: Photography, Architectural Survey, Bisentina Island, Landscape, Lake Bolsena Italy

1.   Complexity and Beauty of a Mediterranean Heritage

The complexity and the deep beauty of the territory of Lake Bolsena, Alta Tuscia, Central Italy, facilitates us in the conduction of a research still ongoing oriented towards the construction of a permanent investigation laboratory. The 'qualities' of this immense environmental heritage leave space for multidisciplinary readings that we have elaborated through surveying actions in which the languages of Drawing and Photography are integrated. The possibility of inhabiting these places – of crossing them from the earth, from the water and from the sky – both in daily life and for events connected with the research activities addressed, has allowed us to always find new opportunities for deepening and investigating. This is why we are proposing on this occasion a new piece that makes up the Atlas of the Heritage of Lake Bolsena for the documentation of a complex system. A permanent observatory to reflect on the conservation, communication and valorisation of a Mediterranean landscape in its tangible and intangible qualities. [1]

The cultural dimension of these assets in their mutual relations with the territory is communicated by comparing heterogeneous documentary sources on the basis of a general survey project.

Urban and landscape morphologies, architectural emergencies and minor architectures compose a fascinating and diversified system in which, as is well known, the presence of the Farnese family played a significant role, configuring urban spaces and choosing as its shrine, the Bisentina Island, the larger and orographically more diversified of the two islands in the Lake Bolsena basin.

This contribution refers specifically to the oratory of Santa Caterina, which is part of a system of seven oratories arranged along the coastal boundary of the island Bisentina. It is an octagonal temple that in the view from the southern coastline connotes the imposing tuffaceous wall that characterises the profile of the island.

From a geological point of view, we recall that this volcanic lake, whose extension is among the largest in Europe, is the result of a calderic depression, of which the two islands constitute residual eruptive cones. The eastern shore of the lake has a rectilinear north-south morphology which demonstrate a clear compression linked to the presence of numerous 'faults': one of which crosses the entire lake and the Bisentina island along an east-west axis from Valentano to Bagnoregio. [2][3][4]

The satellite view of the Bisentina Island shows has a variously articulated coastline of about 2000 metres characterised by natural and artificial inlets of rare beauty, delimiting an area of about 15 hectares. It is located at an altitude of about 300 metres above sea level and is predominantly flat on its western side, while it has elevations between 20 and 55 metres on its eastern side. The island has a conformation similar to a scalene triangle with the longest side of about 600 metres on the eastern side.

An extensive vertical wall of tufa that constitutes one of its main features. On this side of the island, we have conducted investigations that are the subject of the present discussion.

The drawings of the general planimetry show how interesting this stretch of coastline is. From South to North, in a little more than 600 metres, we can see that the profile is marked by four 'heights' – the Rocchina, Monte Calvary, Monte Tabor and Monte Oliveto – from 20 to 56 meters above sea level on which a number of Oratories are arranged. (Fig. 2, 4, 6) The oratory of Santa Caterina (H) located to the south, on heights called the Rocchina, at an altitude of 320 metres above sea level, visually referable to the coastal village of Capodimonte (with its octagonal Rocca Farnese) and to the village of Montefiascone (with its Rocca dei Papi) and the small Church of Santa Maria di Montedoro.

What these three architectural emergencies have in common is their relationship with the drawings of Antonio da Sangallo the Younger; they are preserved in the Uffizi Gallery in Florence, they are also available as a copy in the permanent collection of the Museum of the Architecture of Antonio da Sangallo the Younger inside the Rocca dei Papi in Montefiascone (Fig.1) [5] [6] [7]

The cloister for the complex of S. Maria di Montemoro in Montefiascone is referred to the same cycle of solutions by Sangallo (it is illustrated in Drawing Uffizi no.1275). (Fig.5) [8] [9]

2.   Timeline - Historical Notes

The Bisentina Island became property of the Church from 1261, when Urban IV (1261-1264) annexed it to the papal territories to put an end to the struggles between the lords of Bisenzio and the Orvietani. The Farnese family established in the territories of Tuscia and promoted its development. (Fig.3)

In the first half of the 1400s, Ranuccio Farnese became commander of the papal army and, in agreement with Eugene IV, built the first church in Bisentina for the Friars Minor Observant, later replaced by the present church of Saints James and Christopher.

In the period between 1450 and 1460, five more oratories were built on the Bisentina. They are still preserving the frescoes commissioned by Pope Pius II to commemorate his visit to the island. They are attributed to Benozzo Gozzoli, a well-known Florentine painter who was in Viterbo at the time, to create the cycle of frescoes of Santa Rosa, the patron saint of the city of Viterbo to whom an important annual ritual is dedicated, consisting in the transportation of a tower through the streets of the city. [10] [11] [12]

In 1534, Alessandro Farnese became Pope with the name of Paul III, Antonio da Sangallo the Younger, became papal architect and was commissioned to build the last two temples of the Bisentina: Santa Caterina on the promontory of Rocchina, south side, and a second one on Mount Oliveto. The famous Uffizi drawings reveal a visual spatial correspondence between the two sites that were to house two 'twin' temples of which only that of Santa Caterina remains. [13] [14] [15]

In 1880 the ownership of Bisentina Isle passed to the Piatti family, then to the Potenziani, the Fieschi Ravaschieri and the Del Drago. In 1925 the Bisentina was declared of important

historical-artistic interest. Since 2016, it is currently owned by the Rovati family, which has launched an important and complex recovery, protection and revitalisation project.

3. The Sangallesque Cloister as the Fulcrum of the Survey Project.

The monumental park of the Bisentina Island in Lake Bolsena is characterised by the presence of significant 'punctual episodes', both architectural and natural, connected to each other as components of a single architectural-environmental complex structured on the system of 'paths' leading, away from the enclosure to the oratories located on the island's highest and most panoramic edges.

The system within the park was monitored according to three categories following the legend of the Catasto Gregoriano. (Fig.4) The first category includes the monastery complex and the seven oratories. The second category includes the internal and external 'interfaces': the distribution paths; the hypogean structures such as the Malta Dantesca and the Colombario located below the oratory of Santa Caterina. The third category concerns the green areas. [4]

On the basis of a general survey project – integrating direct and indirect instrumental methodologies – two spheres of investigation were set up, one intrinsic and the other extrinsic: the first looks inwards and is referable to the system of paths connecting the oratories; the second is oriented outwards and can be identified in the system of oratories located along the island's coastal heights in their visual-spatial relations with the coastal towns.

The cross-sections of the lake basin are referred to these urban settlements, passing through an ideal centre, a spatial and visual fulcrum, which has been established to refer to the Sangallesque cloister of the monastery on the Bisentina Island. Considering that the altimetric altitude of Lake Bolsena is 305 metres above sea level, the altitude of the cloister was assumed as the relative zero.

A general topographical survey polygon was referred to this 'centre', aimed at surveying the convent complex, the oratories, and the connection paths with the interfaces arranged along the island's coastline.

The monastery complex with the porticoed cloister and the Church of Santi Giacomo e Cristofaro, is geometrically configured as the 'incentre' of an ideal triangle, which is recognisable when observing the plan of the Isola Bisentina from the satellite view. (Fig. 2)

A system of orthogonal Cartesian axes subdividing the lake basin into quadrants was centred with respect to the cloister, to support the survey of the section-profiles passing through the coastal settlements. (fig.1, 5)

The study was aimed at representing the spatial and visual relationships between the coastal and island urban centres, reconstructing both the bathymetric conformation of the lake basin and the orography of the island, through the integration of cartographic information and satellite, aerial and terrestrial photographic documentation.

4. Dwelling the Bisentina Island

Inhabited since ancient times, it is with the Etruscans that the Bisentina Island releases traces of structured habitation testified to by the numerous archaeological artefacts preserved in the most important state museums. Modes of dwelling that delineate and shape spatial patterns within the tuffaceous spur, linked to different rituals that attest to the presence, if not of a stable settlement, certainly of a recurring frequentation. We refer to the numerous natural and artificial interfaces that characterise the eastern coastal profile of the island, including: the 'columbarium', the 'refuge' and the 'little bridge'; these places have been frequented since ancient times. Inspiring places for meditation and contemplation. A living model belonging to the religious and lay communities that have inhabited and still inhabit these places.

At the end of these brief notes that make up a piece of the Atlas of the Patrimony of the Lake and Bisentina Island – allowing an understanding of the complex of relations that over the centuries have determined a *unicum* in the Italian Cultural Heritage – we recall that the recent acquisition by the Rovati Foundation has allowed the reopening to the public, after major restoration and securing, of the main architectural and environmental emergencies. On the institutional website of the Isola Bisentina, one can read some notes on the 'Mission': "Isola

Bisentina is a place of contemplation, a shelter for biodiversity, a space for research and education in the field of science, art and culture". [16]
That is to say that They are aiming at the protection of biodiversity but also at the preservation of this, extraordinary and inspiring, tangible and intangible cultural heritage.

Credits: This paper is the result of a common discussion and elaboration between the authors Antonella Salucci (paragraph 1; 3; 4 and elaborations) and Francesca Liberatore (paragraph 2 and elaborations). The original photographic documentation and the elaborations are by the authors.
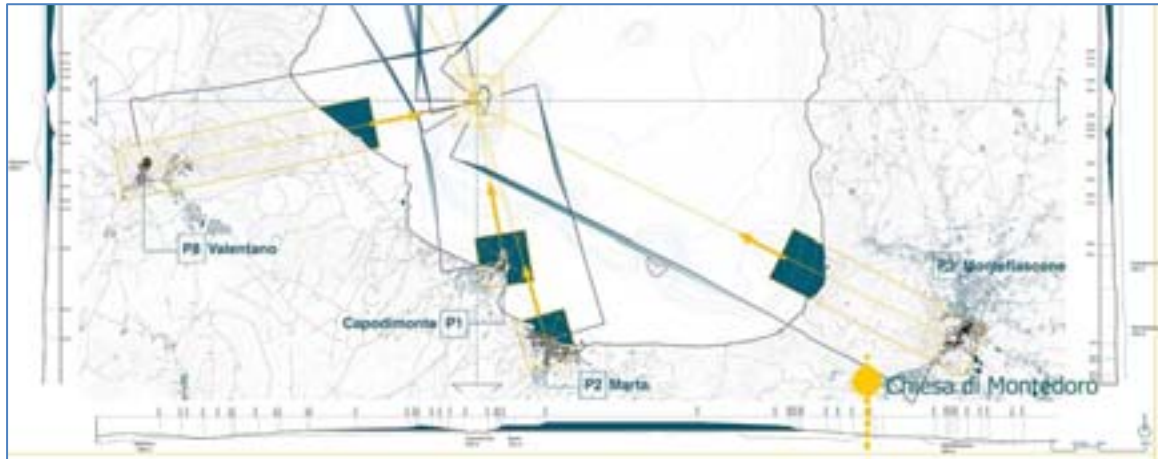
Fig. 1: Visual relationships between the Bisentina Island and the coastal villages in the south area of Lake Bolsena (VT) Central Italy: Valentano, Capodimonte, Marta, Montefiascone, Valentano and the Church Santa Maria di Montedoro. [Drawing by Authors].
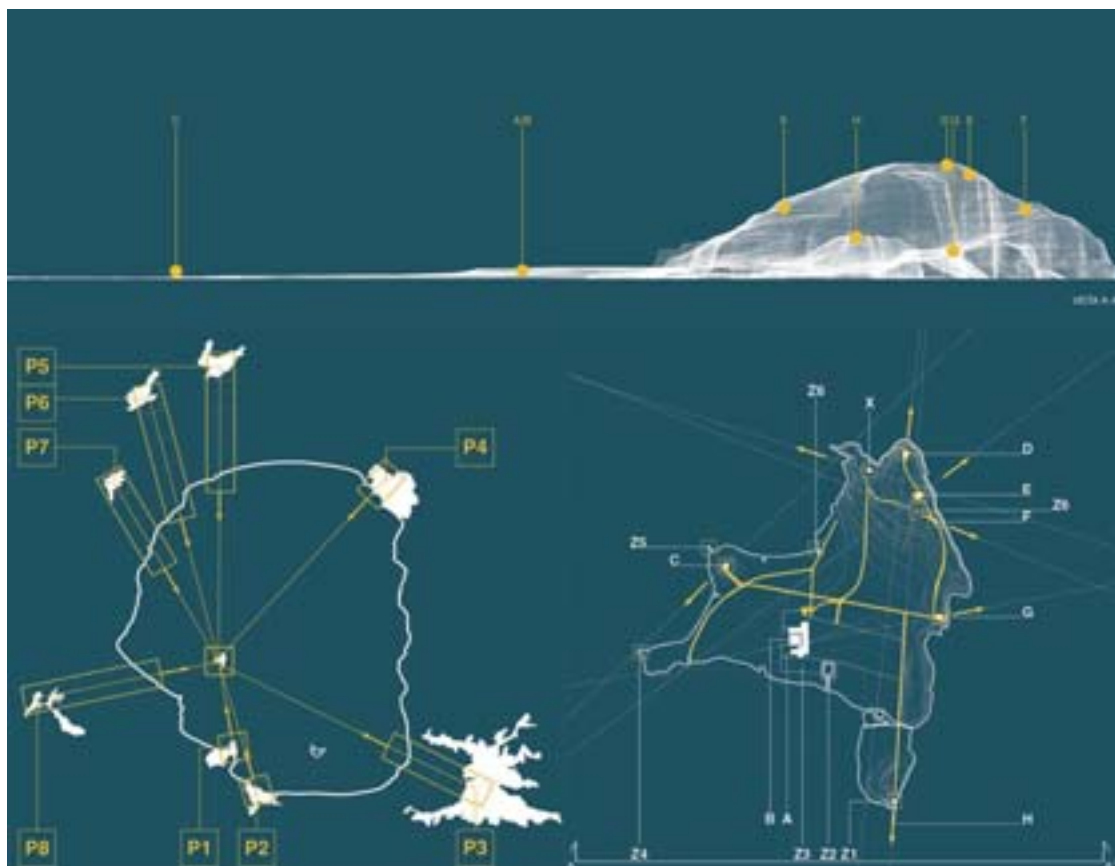
Fig. 2: General Plan for an Atlas of the Heritages of Lake Bolsena and Bisentina Island; (above) Three-dimensional model, projection from the AA plane (south) of Isola Bisentina with indication of architecture and environment; (left)

Spatial visual relationships between the Bisentina Island and the coastal villages of Lake Bolsena; (right) Anthropic and natural emergencies of Bisentina Island. [Drawing by Authors].
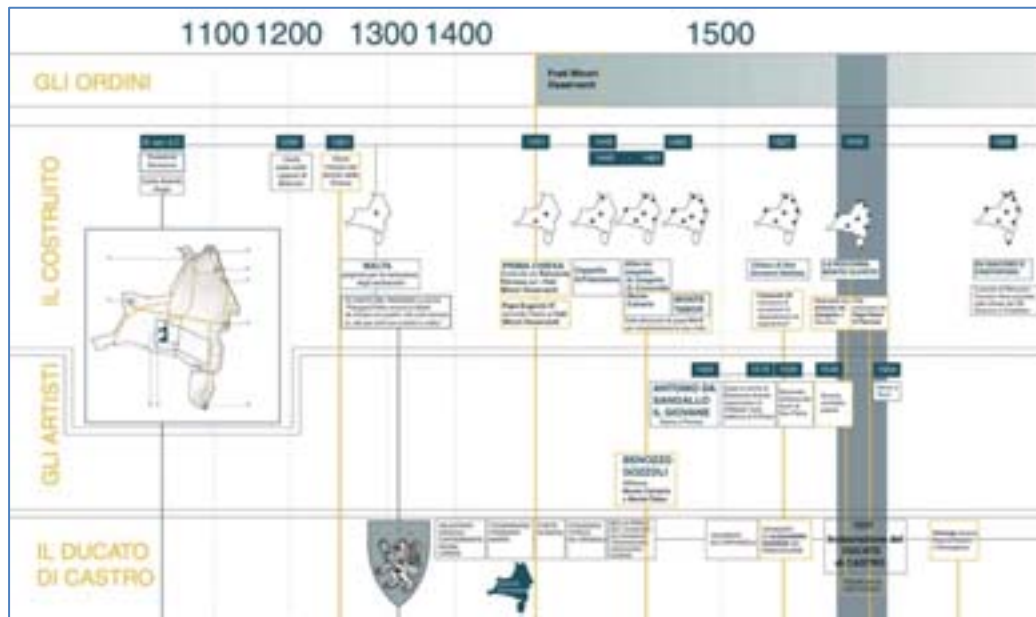
Fig. 3: Timeline. Interaction between the Bisentina Island History, Artists, Popes, Families, and the construction of the architectures. [Drawing by Authors].

Fig. 4: The System of the Oratory. Graphic and photographic abacus. Bisentina Island, Lake Bolsena, Central Italy. [Drawing and photographs by Authors].
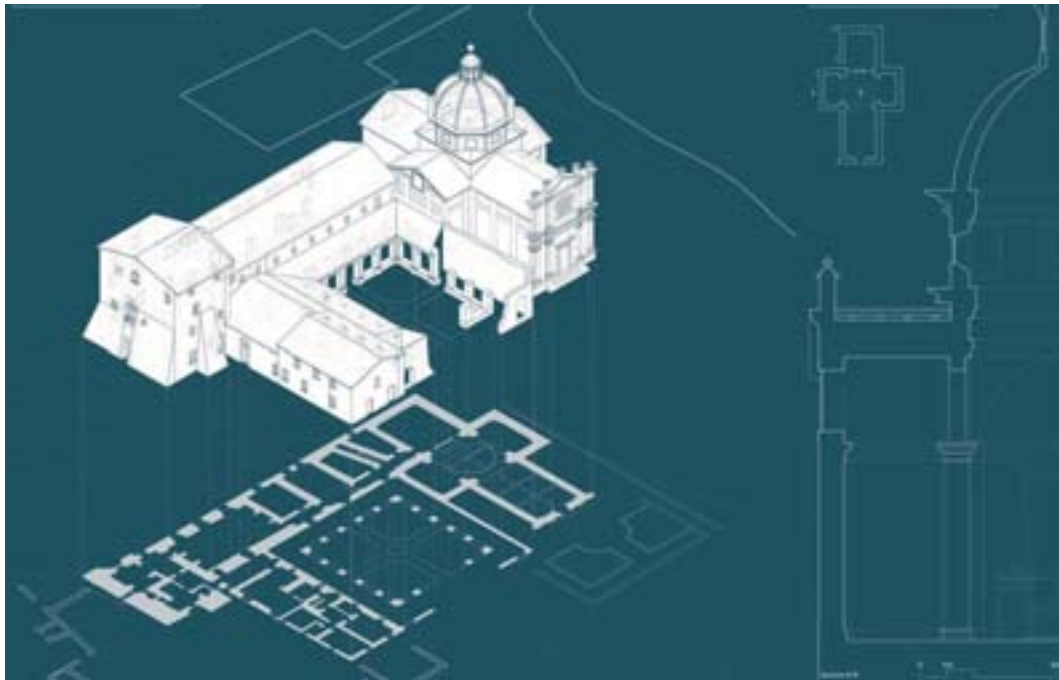
Fig. 5: Bisentina Island, Lake Bolsena, Central Italy. Convent and Church of Saints James and Christopher. The cloister is taken as the centre of the system and re-proposes the design created by Sangallo for the Church of Santamaria di Montedoro. [Drawing by Authors].

Fig. 6: Surveying the East side of the Bisentina Island, Lake Bolsena, Central Italy. Horizontal and vertical section of the oratory of Santa Caterina. General plan and view from the AA section plan of the terrain model. Highlighted in yellow color, the historical paths that connect the Oratories located on the peaks, (from left to right): oratory of Santa Caterina on the 'Rocchina'; oratory of the Crocefissione on the 'Monte Calvario'; oratory of San Gregorio near the Well of the Malta Dantesca (dashed); oratory of the Trasfigurazione on the 'Monte Tabor'; oratory of the Orazione all'Orto on the Monte Uliveto. [Drawing by Authors].
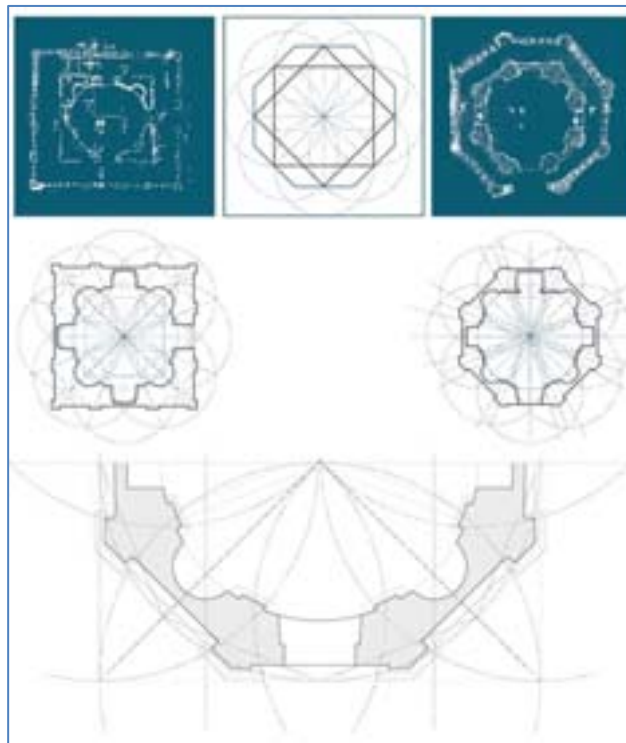
Fig. 7: Analysis of latent geometries with reference to Antonio da Sangallo Il Giovane's drawings for the temples on the island Bisentina. As Vasari reports, one of the two temples was octagonal outside and round inside, the other was square outside and eight-sided inside. [Drawings by Authors]

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Multirisks and multiresilience planning

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Abstract

The term resilience is used in many disciplines due to its adaptability to the theories of complexity, including economics, ecology, political science, cognitive science, new technologies, and land use planning. Consequently, Zolli and Healey's [1] definition of resilience as "the ability of a system, company or person to maintain its fundamental purpose and integrity in the face of radically changed circumstances" integrates ecology and sociology and offers an overview of the multidisciplinary nature of the issue.

Cities, in fact, are not just uniform landscapes of people distributed randomly, but organized places that produce socio-economic differences; it is therefore not easy to describe a city as resilient in its entirety. The sole reference to the Covid-19 pandemic [2], for example, has led to problems of security, fragility and differences in resilience not only between the affected cities, but also between the areas within them. If to that of the pandemic, questions related to conflicts are added it is possible to comprehend that the adaptation require a more complex typology of resilience capable to involve both the safeguard of cultural heritage and safeness of people.

Therefore, aims of this study - carried out in the framework of the PRIN 2020 "SUMMA" research project are to: propose an original method to identify multiple risks present in public spaces, the factors that determine them and their perception from users of the places and project interventions for both adaptation and enhancement of cultural resources of the places; and guide lines for multiresilient planning which take into consideration safeness of people and their cultural heritage.

Keywords: resilience, adaptation, multirisk places, urban design, cultural heritage

1   Complexity in resilient planning

The complexity of current territories is due to the increasingly growing circumstance that several crises occur simultaneously causing great difficulties in responding to them adequately. Indeed, resilience [3,4], often considers the events that cause a crisis in a system to be the same despite having different characteristics and does not distinguish sudden events from unwanted ones, leading to some ambiguities.

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problems of security, fragility and differences in resilience not only between the affected cities, but also between the areas within them [2,5]

Adaptivity, like resilience, is a term that lacks an unambiguous interpretation [6]. Adaptive planning, adaptive governance, adaptive management, adaptation of institutions, adaptation of the city, its public spaces, its buildings are some of the meanings that are used to decline this concept giving different meanings to the concept of adaptivity.

It may therefore be useful to define the term multi-resilience [7,8], i.e. the ability of a system to react to a situation of co-presence of multiple risks and, taking into consideration the peculiarities of the place, the characteristics of the individual risks, the participation of the various subjects, with a view of inclusion, return to the initial situation [9-16].

In line with the concepts stated above, as well as for multi-resilience, it may also be useful to define the concept of multi-adaptation, i.e. the ability of a system to react to a multirisk and unexpected situation by creating a new balance capable of taking into account the specificities of the territories, types of risks, actors involved and new needs with a view of inclusion [17-21]. These definitions were the framework for the ideation of a method of analysis and design which led to the identification of the principles for multirisk resilience and adaptation place design [22].

Therefore, aims of this study - carried out in the framework of the PRIN 2020 SUMMA "Sustainable modelling of materials, structures and urban spaces including economic-legal implications", #20209F3A37 research project within the ISMed-CNR Unit (of which the author is responsible) and the related agreement between Sapienza University of Rome and ISMed-CNR - are to: propose an original method to identify multiple risks present in public spaces and project interventions for both adaptation and enhancement of cultural resources of the places; and guide lines for multiresilient planning.

2. Mapping multirisk places

The method which was created [26] to analyse multirisk places comprises nine phases, five of analysis and four of design.

These phases include: identification of single "urban" risks; analysis of factors contributing to the risks; analysis of the effects due to the coexistence of risks; risk perception questionnaires; analysis of plans/projects/programmes/policies for adaptation; analysis of potentialities and qualities; multi-risks analysis; dynamic area identification; and dynamic project interventions.

The final products are represented by two maps, one that systematizes all the data collected separately in the previous phases, the other that presents the adaptation and enhancement project interventions.

The first phase concerns the analysis of the place with the identification of the individual present or presumed urban risk. This is carried out by detecting these risks with the use of a database: the risk is detected by observing the places and quantifying it with respect to its presence in slight, medium or notable. The second phase is carried out by observing which elements and factors influence or may influence the present or possible risk or risks. The third phase concerns the observation and analysis of the effects that may occur if several risks analysed in the first phase occur or may occur simultaneously. The database will detect the type of risk, the effect or effects and the relative amount of the detected effect, measuring those as slight, medium or notable.

The fourth phase concerns the risk perception questionnaire. This consists in the identification of the perception of risk or risks by the people who use the place. This aspect of the analysis is very important as from the answers it will be possible to understand how much and if people perceive each risk and if they think they can contribute to their resolution.

The fifth phase concerns the identification of the plans, programs and policies that are active in the place under analysis.The sixth phase is the identification of the factors and quality elements of the place, such as historical monuments of interest, historic buildings, public spaces, greenery, historical urban fabric, perspective views. This information is important to understand if that place is a resource or a potential and if its use can be flexible or if that place or perception or other can also be enhanced in another way.

The seventh phase concerns the creation of a map that presents all the present risks. The map will contain all the risks present in relation to public spaces, the factors that contribute to this

perception of present or possible risk, the results of the questionnaire on the perception of risk by people and those identified on social networks and the quality elements of the place with its use. The eighth phase consists in identifying the dynamic potential of the area. In this phase, observing the multi-risk map, both the most flexible spaces are identified on it at the same time where it is possible to think of a resilience and improvement/enhancement project. The result will be a sort of mosaic where areas of greatest risk are indicated where an action of adaptation and improvement/enhancement is most necessary.

Finally, the ninth phase is the identification of dynamic project interventions, located in the areas already identified in the previous phase. These project interventions concern the possible actions to be carried out to adapt to the risks and at the same time enhance the places in a liveability perspective.

The result will be a dynamic map that will identify flexible interventions to be implemented both in the case of existing risks and possible risks. This map is the last step in the planning process, where the information contained in the complex map of analysis, after being filtered and transformed into resources, gives rise to proposals for the construction and enhancement of a sustainable multirisk places.

Fig. 1: Leonessa, Rieti, detail of Piazza Garibaldi (photo by the author)

Fig. 2: Leonessa, Rieti, Via Durante Dorio (photo by the author)

Fig. 3: Cittaducale, Rieti, Piazza del Popolo (photo by the author)

Fig. 4: Cittaducale, view of Piazza Cerreto Piano (photo by the author)

3. Principles for multiresilient planning

The various case studies that have been carried out to test the method have led to the identification of principles for multiresilient planning: These principles follow the idea that the risk can be an opportunity to review aspects of the territory that can be improved and enhanced and therefore resilience can be interpreted as a component of sustainable regeneration. The mentioned case studies include: Cittaducale and Leonessa in Lazio Region, Siena, Naples, Paris, Madrid and Rotterdam. The case studies have been chosen for the presence of one or more present or probable risks: Cittaducale and Leonessa are interested by seismic risk and depopulation; the historic centre of Siena, Naples and Madrid by mass tourism and globalization; Rotterdam and Paris by flood and possible lack of place identity as regard the first and mass tourism as regards the second. According with the concept of flexibility and adaption, the following guidelines are meant as an output that can be continuously updated depending on possible new kind of risks or combinations of them which could be detected in further case studies. The identification of the dangers related to a place must take place in a preventive manner, through analyses involving material and immaterial factors.

Fig. 5: Paris, detail of Parc Rives de Seine (photo by the author)

Fig. 6: Paris, detail of Parc Rives de Seine (photo by the author)

1. The identification of risks and possible damages must take place with reference to a single event or more potential events that can occur simultaneously.

2. The perception that the population or, more generally, the user of a place has, is a fundamental element in the study of dangers and risks and must be detected through ad hoc questionnaires.

3. Fragile individuals must be taken into particular consideration both for the survey of their perception of risk and for the project of adaptation to them.

4. The survey of the urban qualities of the place - cultural heritage, materials, equipment - are elements to be considered in multi-resilience/adaptation projects/policies, in order to transform them into opportunities to improve liveability.

5. The multi-resilience/adaptation project must be constantly monitored in order to be able to foresee sudden events and to be able to react in a sustainable manner.

6. Flexibility is one of the essential characteristics of the multi-resilience/adaptation project and must be understood in an inter-scalar (from the building to the city) and interfactorial way, integrating urban, socio-economic, cultural and environmental aspects.

7. A multi-resilience/adaptation project cannot be used in any place even if characterized by the same risks, but must be carried out respecting the different characteristics, as each site (historic centre, suburbs, regeneration area) has its own peculiarities to take into consideration.

8. The communication of dangers and risks as well as of projects, plans and policies for multi-resilience/adaptation must be carried out in an appropriate manner for all age groups and abilities.

9. New technologies must be used to support both the communication of risks and dangers.

10. The disclosure of all the measures adopted or to be adopted in the case of a crisis of various types, should be clearly and widely illustrated through ad hoc web portals, apps, social networks, sensors, interactive maps.

Conclusions and future steps

Resilience often considers the events that cause a crisis in a system to be the same even if they have different characteristics and does not distinguish sudden events from unwanted ones, leading to some ambiguities.

It is also true that adaptation, like resilience, is a term without a univocal interpretation: adaptive planning, adaptive governance, adaptive management, adaptation of institutions, adaptation of the city, its public spaces, its buildings are some of the meanings that are used to decline this concept giving different meanings to the concept of adaptation.

Consequently, I proposed the terms multiresilience and multiadaptation to frame the behaviour of a place in multiple risk situations that are increasingly occurring in contemporary territories. The principles for multiresilient planning which were proposed are the results of the case studies carried out with the illustrated method that can be considered as a flexible tool to design multirisk places, resilient and adaptable to unexpected new kinds of multirisk situations.

Future steps will concern the ideation of the dynamic place index, to measure the multiple resilience and adaptation of a place. This index, starting from the results of the ninth phase with the construction of the dynamic map of design, will measure the flexibility of the different parts of an area interested by many kinds of risks contemporaneously to welcome different project interventions according with the current and/or unexpected needs.

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Acknowledgments

Cultural heritage in danger. Fragments of the Appia Antica from *Sinuessa* to Mondragone

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Abstract

The world cultural heritage, unfortunately, nowadays is significantly at risk due to both ongoing climate change and war events that bring death, destruction, and irreversible damage to the environment.

Art cities, archaeological areas, monuments, and cultural landscapes are in danger of being severely disfigured in their texture and disappearing forever, depleting our identity as inhabitants of the earth. It is necessary, therefore, to monitor the health of cultural heritage to address the major future challengesaimed at protecting and preserving our planet.

With the awareness that the recommendations and intervention strategies elaborated by Unesco and the various national and international Observatories must be supported by an action of dissemination of the knowledge of the state of the many cultural assets present in our territories, the contribution proposes to document through the tools of surveying and representation some surviving traces of the via Appia that still preserve the original *summum dorsum* at the area of ancient *Sinuessa* up to Mondragone, in the province of Caserta. These are territorial assets not yet valued as they should be, although they represent evidence of civilization and therefore the identity heritage of a place and its inhabitants.

Keywords: Appia Antica, *Sinuessa*, Mondragone, Geographic Information Systems, digital survey.

1. Introduction

At a time when, in addition to climate change, armed conflicts also seriously threaten the safety of human beings, their environment, and their cultural heritage, it is deemed necessary to foster peace actions to safeguard human beings as such and all that belongs to them as a testimony to their "inhabiting the Earth and Space."

For decades now, cultural heritage has assumed an increasingly important role in development models based on local peculiarities and the enhancement of the endogenous resources of territories thanks in part to the revaluation of intangible assets, linked to traditions, knowledge and creativity that have enriched the very notion of heritage.

On the basis of these premises, it is deemed appropriate to identify and point out the critical issues present in the area of the protection and preservation of the Italian cultural heritage scattered throughout the territory in order to foster an increasing awareness on the part of the inhabitants and the relevant local governments to cooperate in the preservation of their own identity heritage to be considered a resource for sustainable development.

In this contribution, which is part of an ongoing research project, attention is paid to some

surviving sections of the ancient Roman route of the Via Appia found in the coastal area of Campania, Italy, extending between ancient *Sinuessa* and the town of Mondragone in the province of Caserta.

A digital photographic and photogrammetric survey and Geographic Information System project document these precious fragments of the Roman road.

For a unified reading of the ancient roadways within the landscape of the Campania coastline, a Geographical Information System (GIS) has been set up that has made it possible to associate each stretch of road identified in the territory with a documentation that is also georeferenced, describing its physical, geometric, and documentary consistency based on multiscale applications. It is hoped to implement during the research the data so far acquired and, in this contribution, exposed.
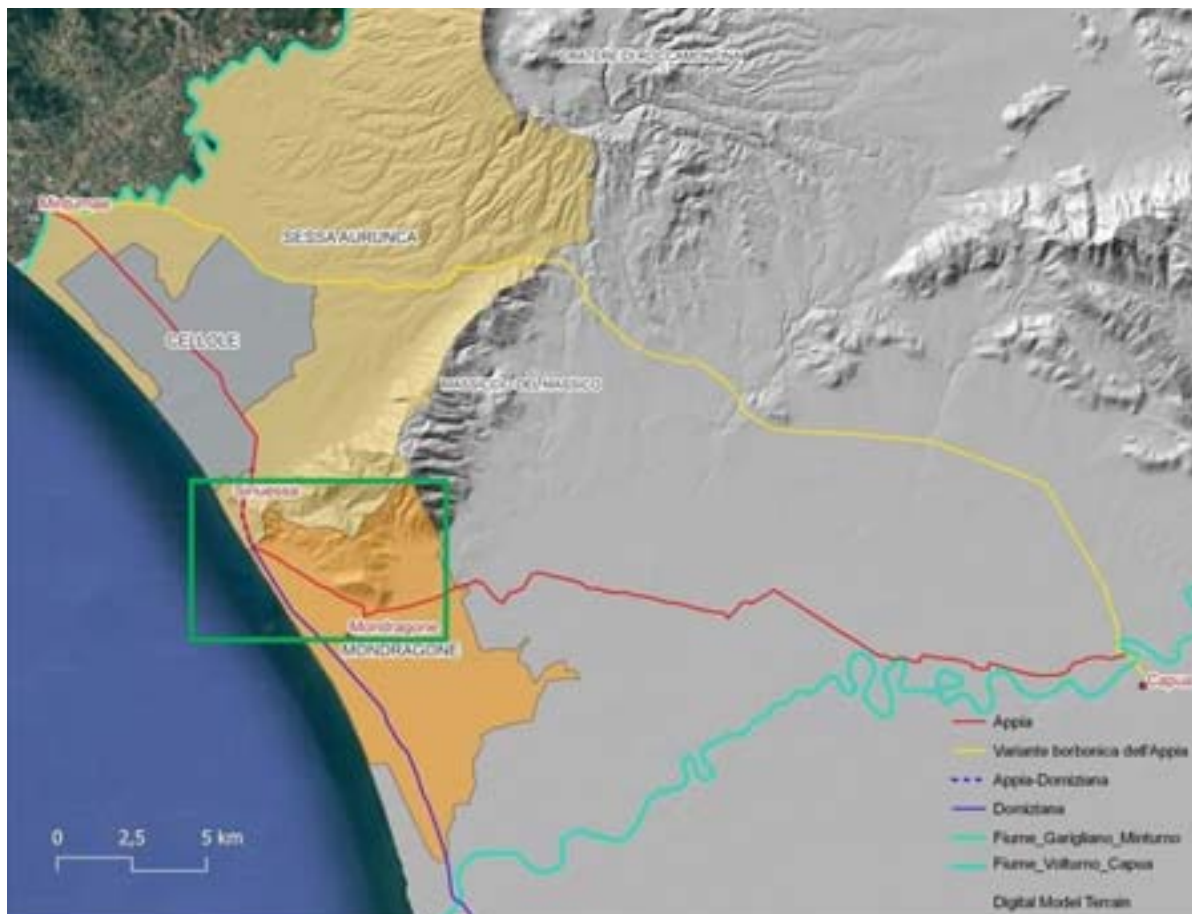
Fig. 1: Territorial framing of the investigated area. Map drawn in Gis - scale 1:150,000.

2. Territorial framing

To represent the area under study three-dimensionally, a Digital Terrain Model was designed in Gis, generated based on a Digital Elevation Model, to which a geoprocessing operation was applied for shading [1] (Fig. 1). The route of the ancient Via Appia, from Minturno to Capua, was represented with a linear-type shapefile shown in red in Fig. 1, based on a webGis networked by the Ministry of Culture of the ancient Roman road [2]. Figure 1 also shows the "borbonica" variant to the Via Appia, now called State Road 7, and the Domitian Way built by Emperor Domitian in 95 AD to connect Mondragone to Pozzuoli. In current toponymy erroneously the Domitian Road begins before the junction with the Via Appia, as Maiuri already reported it in 1934 [3].

In the context of this research, reference is made to the original nucleus of the ancient Roman colony of *Sinuessa*, which later expanded into the present area in which the city of Mondragone developed.

3. The Via Appia from *Sinuessa* to Mondragone

The path of the ancient Via Appia that connected Rome to Capua and then later to Brindisi via Taranto left a strong mark on the territory with the construction of numerous colonies along its route, including Terracina, Minturno, *Sinuessa*, Benevento and Venosa [4].

In the section through Campania, the coastal route of the ancient Via Appia has not retained its original paving stones for long stretches, as is the case in the Latium area immediately outside Rome, or in other areas such as, for example, between Terracina and Itri where a strong monumentality of the road is also evident. In the area north of Campania, in fact, this mark on the territory is very fragmented and is visible in the areas close to the ancient Roman colonies. This is the case, for example, of the coastal area between ancient *Sinuessa*, founded in 296 B.C., in the locality of Santa Eufemia in the municipality of Sessa Aurunca, and Mondragone, on the slopes of Mount Petrino of the Massico mountain range [5], where only a few years ago an archaeological park was established, which is discussed in the followingparagraphs.

In this area, the subject of this contribution, fragments of the Via Appia and its branches have been found that were part of the Roman road system later abandoned by the Borboni.

Fig. 2: Via Appia from *Sinuessa* to Mondragone. From 1 to 4 sections of the road investigated.

Unfortunately, at present these fragments of Roman road are in a state of physical and cultural neglect being in an area unfortunately marked by wild building development that has brought irreparable damage, tampering and destruction, despite a 1980 archaeological constraint decree protecting the perimeter of the ancient Roman colony of *Sinuessa* [6].

The archaeological map of the area of the original core of *Sinuessa*, published in 1990 by Mario Pagano

[6] was georeferenced in a Gis environment to read the spatial continuity that no longer exists betweenthe ancient Via Appia and the surrounding area.

In this way, the route of the Roman road was highlighted, locating some stretches of paving still visible, respectively in the locality of S. Eufemia (1), north of the village of Baia Azzurra (2), along Via Giulio Cesare within the same village (3) and near the cemetery of Mondragone (4) (Fig. 2).

3.1 The Via Appia in the countryside of ancient *Sinuessa*

As documentary sources show, the history of *Sinuessa* is linked to that of nearby Minturno, in Latium. In fact, to control the coastal plain and to defend against the Samnites as part of an expansionist policy toward the south of Italy, in the third century B.C., the Senate of Rome planned the foundation of twin colonies. They were built *Minturnae*, near the mouth of the Liris River, today Garigliano, and *Sinuessa*, located in the narrow flat passage between Mount Cicoli and the sea, from which there was access to the *ager Falernus* and the Volturno plain [7]. The Via Appia in the road system of the colonia civium romanorum of *Sinuessa* represented the cardo maximus, currently recognizable by an unnamed country road that retraces its original route. Along this road there is a section of decumanus in limestone pavement flanked by walls in tuff square work, which came to light in recent investigations since the 1990s by the Superintendence of Caserta and Benevento [5]. Unfortunately, no signage indicates the presence of such an asset, devoid of any protection (Fig. 3).

These new researches have made possible a more precise definition of the urban layout of the Roman colony of *Sinuessa*, which, as attested by bibliographic sources, underwent an expansion in 174 B.C. with the construction of a new town wall, a forum and a sewage system by Questore Fulvio Flacco [8]. Immediately to the south of the area that included the colony, a Roman roadway is visible among a thick uncultivated grass, near a soccer field located within the present tourist village of Baia Azzurra, which branched off from the Via Appia and in a direction orthogonal to it went toward the dune cordon on the beach.

Fig. 3: *Section 1. Sinuessa. East decumanus of the Via Appia. Georeferenced photo (Qgis software).*

Fig. 4: *Section 2. Sinuessa*. Road path orthogonal to the Via Appia heading tow ard the coastal dune cordon. Right: remains of cyclopean walls of the ancient city w all; in the background the village of Baia Azzurra (C).

On the opposite side of this route, remnants of cyclopean wall blocks that were part of the ancient Roman colony's town wall are visible from the country road that retraces the ancient Via Appia, which are also abandoned and lack any toponymic indications (Fig. 4).

3.2 Remains of the Via Appia in the tourist village of Baia Azzurra

In the area of ancient *Sinuessa*, in the 1970s, there were allotments for an urban and tourist development of the coastline leading in the 1980s to heavy squatting with considerable damage to the urban structures and necropolis of the ancient city that were destroyed. Recent excavations are bringing to light remains of urban neighborhoods and suburban villas, such as the villa of San Limato. Recall that before the tourist settlement of the village of Baia Azzurra in the area investigated the Neapolitan archaeologist Waner Johannowsky.

Fig. 5: *Section 3.* The Via Appia in the tourist village of Baia Azzurra. (Qgis software). Left: digital survey applications, digital elevation model. Right: georeferenced photo.

Walking along the route of the ancient Via Appia, which crossed as the main cardo *Sinuessa*, now traced by an unnamed country road, we arrive near a secondary entrance to the village of Baia Azzurra, closed by a gate. The road beyond the gate continues under the name of Via Giulio Cesare, becoming a private path, and adjacent to it, on the east side, a long straight stretch of about 150 meters of well-preserved trachyte lava paving of the ancient Via Appia is visible, limited by square side crevices of limestone blocks [6]. Unfortunately, again, no signage indicates the presence in such an asset. In fact, to see the ancient pavement of the Via Appia, it is necessary to enter the private village and already know the location of the road (Fig. 5).

3.3 The ancient Appia in Mondragone

Passing the village of Baia Azzurra, at the junction with the Domiziana road, the ancient Via Appia continued its course, arriving in an area called *Acque Sinuessane* due to the presence of numerous thermal springs due to the nearby volcano of Roccamonfina. The production of sulfurous waters with therapeutic qualities also extolled by numerous Latin writers, including Plinio il Vecchio, also favored the construction of villas and spa facilities along the Via Appia. It was in this area that the Via Appia turned away from the coast to approach the slopes of Massico and proceed inland, while the *Domitiana*, followed the coastline instead, arriving at Pozzuoli, passing through present-day Mondragone, *Volturnum*, *Liternum* and *Cuma*.
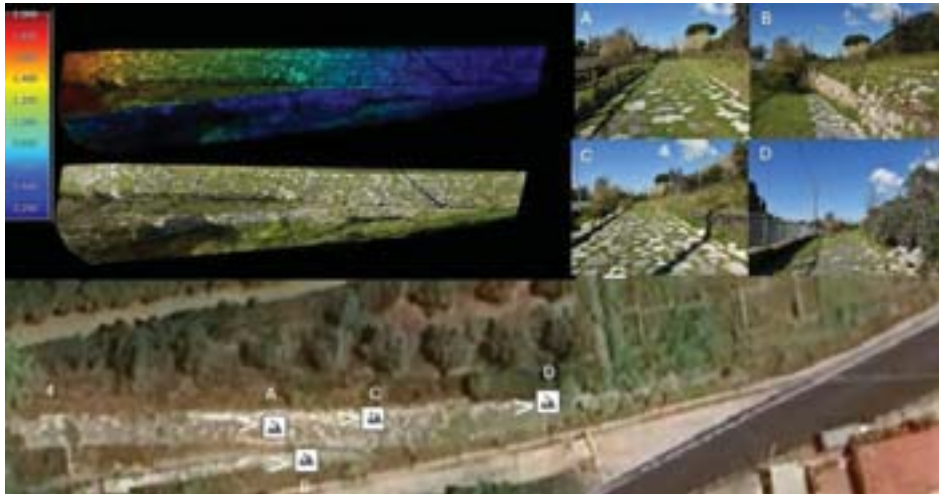
Fig. 6: *Section 4.* The Via Appia in the archaeological area of Mondragone with side branch (photo B). Top, digital survey applications: digital elevation model and textured orthophoto.

A long stretch of paved road of about 40 meters and remains probably of a *mansio* (Fig. 6) were found during excavation campaigns during the 1990s and in 2018 by the Superintendency, near the Mondragone cemetery. After these excavation operations, an Archaeological Park of the Via Appia in Mondragone was established, which together with the Biagio Greco Civic Archaeological Museum represents an opportunity to disseminate and publicize the history of the area while safeguarding culturalresources [5].

4. GIS and digital surveying

The use of a Geographic Information System enabled multi-scalar representations and georeferencing of the acquired photographic and documentary records. Sections of the ancient pavement of the Via Appia, far apart from each other, were, in this way, identified. Representations at a scale of 1: 150,000 (Fig. 1) and 1: 25,000 (Fig. 2) reconstructed the now-lost continuity of the road route in the area by reevaluating the relationship between road fragments and their surroundings.

Within the Geographic Information System, elaborated with the open-source program Qgis, data acquired during the research were poured in, which, related to the digital surveys carried out, allowed comparisons and comparisons between the different findings analyzed, which will be further investigatedlater in the research.

Specifically, photographs of the two sections of pavement of the Via Appia, located within the village of Baia Azzurra and within the Archaeological Park of Mondragone, were processed within *Structure from Motion software* (3DF Zephyr Aerial). The numerical models obtained led to the development of high- resolution orthophotos that made possible spatial and urban framing and the taking of some measurements. A color DEM visualization enabled the representation of the elevation densities of the pavement by highlighting the most worn parts of the cobblestones, shown in blue coloring (Figs. 5 and 6). Photographic shots taken with reflex cameras of the other two sections found in ancient *Sinuessa* will be processed later.

The processed data demonstrate a *summum dorsum* consisting of a cobblestone pavement layer, the so-called *galeratum* for the two sections of the ancient Via Appia. This means that the road is suburban, like the Via Appia between Formia and Itri, in the Aurunci Park (Fig. 7) [9]. The size of the paving stones varies from 80 to 70-60 cm. As for the stone material, in the Baia Azzurra section there is lava stone, while in Mondragone there is also limestone [10].

As for *Sinuessa*, the suburban section found immediately outside the town wall is a cobblestone, while the surviving section of the *decumanus* consists of mainly polygonal-shaped *basoli* since it is an urbansection of a Roman road (Fig. 8).

Fig. 7: *Via Appia pavements compared.* Mondragone archaeological area (A and B); Baia Azzurra village (C and D); Aurunci Mountains Park between Formia and Itri (E).

Fig. 8: *Sinuessa*. Extra-urban cobblestone pavement outside the town wall (A); urban pavement with polygonal basoli of the decumanus (B and C).

5. Conclusions

The objective of the contribution is, therefore, to disseminate knowledge, through the tools of survey and representation, of fragments of the Roman road system between *Sinuessa* and Mondragone. These archaeological assets are not adequately valued and could represent a resource for a sustainable development of an area unfortunately marked by wild building increase that has brought irreparable damage, tampering and destruction.

Considering the land in its unity, as a common good, it is necessary to consider even the individual archaeological street find at the center of a comprehensive urban landscape preservation strategy for sustainable land governance.

We hope that new digital surveying and representation techniques and technologies can increase formal and dimensional knowledge of the cultural asset and be useful in planning strategies for protection and preservation and for projecting the testimony of ancient civilizations into the future.

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An italian place to discover in Shaoguan

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Abstract

Based on the textual descriptions reported in the testimonies of the most famous Italian missionary in China, the Jesuit Matteo Ricci, the conformation of what his residence in the Chinese city of Shaoguan could have been like is analyzed. Having built his first home on Chinese soil in the city of Zhaoqing, which was taken from him by the local Governor as it was a unique and representative work, Ricci built his second Chinese home in a local style so as not to see it also taken away this second home. The study focuses both on the possible location and on the form taken by the house built by Ricci for himself and for the other missionary who accompanies him, as well as to establish a school there. The result of the study offers useful indications for understanding the forms of adaptation to the local culture also from an architectural perspective. These values were taken up again a few centuries later when the Apostolic Delegate for China Celso Costantini indicated the use of a local architectural style when works were to be carried out at the service of the Catholic religion. Thus, through the work of Matteo Ricci, we understand how architecture also plays an important role in communication between peoples.

Keywords: Drawing, Ancient architecture, Architectural Style, Communication, China

1.   The arrival of Ricci in Shaoguan

When the italian Jesuit missionary Matteo Ricci was told to leave the city of Zhàoqìng (肇庆) were proposed two alternatives to choose the place where to move. He remains in the same Province but move towards north closer the capital of kingdom, which was Beijing, where He want to arrive to convert the Emperor. The two cities that the Governor had indicated as His new residence are Sháozhōu (韶州), now called Sháoguān (韶关), or Nánhuá (南华). Matteo Ricci (利玛窦), together with Antonio De Almeida (麦安东) on day 15 August 1589 left Zhaoqing and headed on River pointing toward the northern provinces of Guǎngdōng (广东).

Went to Guangzhou (广州) up to Sānshuǐ (三水) where the Xījiāng River (西江), which comes from the West, meets the Běijiāng (北江) coming in from the North. Then, after the Xījiāng River (西江) in the direction of the river flow, he found himself instead to go up the river Běijiāng (北江) which passed right from the city of Sháoguān.

From the town of Zhàoqìng up to Sānshuǐ, the confluence of two rivers, are about 47 kilometers. Arrived at Sānshuǐ changed boat and transfer their luggage on other vessels more suited to go up the river with a keel taller. Because Ricci had to carry many things not enough only one boat. We do not know what types of boats that then sailed along the Běijiāng but we think that Ricci had with it everything had been at his home in Zhàoqìng. At that point of intersection of the two rivers there had to be a real accessory. Ricci indicates that gave to the captain of the small fleet, referring then to the group of vessels which had come from Zhàoqìng, a letter to be sent to Macao (Àomén 澳门) at Valignano. After eight days of sailing (about 230

kilometres) arrived at the point of Běijiāng River where being deflected to the Buddhist temple of Nánhuá (Nánhuásì 南华寺). The diversion was not to be insignificant because the Nánhuá Buddhist temple is located approximately 15 kilometers far from the Běijiāng River and can be reached along the opposite direction of the current, a minor tributary named Mǎbàhé (马坝河).

At the confluence of two rivers, Běijiāng and Mǎbàhé, which should be corresponding to the opposite shore of the river flow Báitǔzhèn (白土镇), to wait Ricci was an official envoy from the Shaoguan's lieutenant. Shaoguan's lieutenant had given directions to welcome foreign religious and to accompany them to the Buddhist temple of Nánhuá where they could reside. But Ricci did not want at all to dwell in that place and then said it would be dropped to the floor just to visit the temple but that to decide where to live would have wanted to do so after meeting the Lieutenant of Shaoguan. So, they headed towards the Nánhuá Buddhist temple (Nánhuásì 南华寺). From one side Ricci didn't want to reside in that place and the same Buddhist monks did not relish his presence being a foreigner could compromise their situation which was under the control of the magistrate's citizens. For this the monks, made a hospitable reception while they visit the worse places for a possible residence. And the same Ricci agreed with this thing not willing at all reside in the temple.

Ricci, and De Almeida, stay one day in the monastery. Most likely returned to the boat to sleep. The second day they could go and visit the mummy of Huineng (慧能). After this visit the De Almeida came back on the boat and then headed to Sháoguān on the river. Instead, Matteo Ricci rest a night to sleep in the monastery and the next day, accompanied by the official of the Lieutenant of Shaoguan and the prior of the Nánhuá Buddhist temple, set off on horseback to Sháoguān. Arrived in town around noon.

Arrived at Sháoguān was received by magistrate Chen, Mandarin who had known in Zhàoqìng and to which, reporting that before deciding where to stay talking wanted to discuss with him, explained the reasons for his not wanting to reside in the Nánhuá Buddhist temple. This meeting was of course also the prior of the Buddhist temple of Nánhuá that was favorable to that Ricci was among them. At the end of the meeting, the Lieutenant of Sháoguān (韶关) granted permission to reside in this city.

The city of Sháoguān is in the confluence point of the two rivers Wǔshuǐ (武水) from the West, and Zhēnjiāng (浈江) which coming from the East, that joining give rise to Běijiāng River that flows south[1].

2.   Matteo Ricci house in Shaoguan

Ricci decides not to continue the journey to Nánxióng (南雄), the second possible cities where reside, which was at least two- or three-day's journey to the Northeast and remains at Sháoguān taking accommodation in the monastery of Guāngxiàosì (光孝寺), outside the city walls, over the river Wǔshuǐ[2].

Ricci, following the advice of officials of Lieutenant of Sháoguān asked to be given a piece of empty land located in front of the monastery of Guāngxiàosì which was owned by monks. The monks did not relish this thing having these foreigners too close to their home and besides having to cede they own of the land.

Then the Lieutenant sent to Liú Jiézhāi (刘节斋), Governor of Guangdong Province, a memorial with the authorization request. The answer came in October 1589 and granted the permission to Matteo Ricci to fulfill its construction.

At the beginning of November 1589 Ricci began the construction of the House and the Church. The elements that he shows for the home and the Church are as follows:

Both buildings were in bricks.

The House had an octagonal shape.

The Church was just one floor.

There was a well.

There was a garden.

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[1] The Wu River from the northwest and the Zhen River from the northeast join up to create the North River (Bei Jiang) which flows south to Guangzhou.

[2] The monastery of Guāngxiàosì was destroyed and today is untraceable its location.

The total area was twice that had to Zhàoqìng.

They were building with Chinese style and adopted local architectural style and not Western mindful of the fact that they house in Zhaoqing was confiscated because it represented a unique specimen and for that desired as its Governor.

As for the surface of the House and Church of Zhàoqìng it, excluding the grounds and referring only to the area of construction plan, it was about 12 x 4 = 48 square meters. Therefore, wanting to report the value double to single home and church you might get about 100 square meters. We did not evaluate how could be great garden and orchard in Zhàoqìng. Don't think it could exceed two times the size of House in Zhaoqing so in total could be something on overall 150 square meters. Therefore, in Sháoguān you would think for a total area between area covered and uncovered area around 300 square meters.

Macau, having had knowledge of the fact that Ricci had found new stable residence, were sent to help two young Chinese who were trained at the College of Macau: Zhong Mingren (Paulo Fernandes) and Huang Mingsha (Francisco Martines) which arrived in Shaoguan while Matteo Ricci was starting to build the new House. In less than a year, in 1590, house and church were finished.

At winter of 1590, due to serious health problems, De Almeida was accompanied in Macao from one of the two Chinese priest and Ricci remained in her home alone with a Chinese father and some servants.

For the Chinese New Year of the 25 January 1591 Ricci expounded in church a painting of the Lady with a Child with St John the Baptist in adoration. It was an oil painting, that maybe came from Spain by the way of New Mexico. What aroused a great deal of interest and hit very many Chinese who went to see this picture. The interest aroused even an opposite reaction whereby one-night thugs began throwing rocks on the roof tiles of the House, breaking them apart. The servants of the House went out to deal with the thugs but being fewer than they had, however, the worst being beaten and stripped. Ricci did not want to give too much importance to this episode because expected however the authorization for entering China another brother who replaced De Almeida. Instead, He wanted to inform the Governor Qu Taisu happened and was able to promote both in favor of Ricci.

In October, De Almeida was in Sháoguān but the 11th day of the same month he fell ill again. Ricci and Zhong Mingren assisted him. Unfortunately, on October 17th, 1591 De Almeida died.

In April 1595 Ricci has an opportunity to make a journey northward with the great Mandarin Shi Lou. He brought with him two catechists in proof Joao Barros and Domingo Fernandez, two servants very faithful, leaving at the house of Sháoguān Lazzaro Cattaneo, arrived in August of 1594, along with Zhong Mingren, which served as an interpreter to Cattaneo and Huang Mingsha who was seriously ill.

Ricci in April 1595, leaving Sháoguān to land, after some controversy, to Nánchāng, no more return to that city.

After the departure of fathers, the "Borgo d'Hosi" was flooded because of the overflowing of the river. At that point was also a bridge (seventy) barges that could be used to cross the river. The strength of the swollen River broke its banks and ruined bridge chains.

3.   Considerations

Ricci sure brought with himself in Sháoguān everything he had in his home in Zhàoqìng. We can say it's because he doesn't say to leave valuable things that miss, which does not declare it has been confiscated some object if not the house. When he will be set to Sháoguān mentions some things that does not say that there have been brought following example from two Chinese coadjutors or De Almeida, De Petris or De Sande. It could also be that they have conducted if objects or books directly from Macao but are not mentioned. And Ricci in his new home of Sháoguān continues to use the same things they had in Zhàoqìng. During the first period in which is building his new home will have stowed his instruments, objects and books in any room of the monastery of Guāngxiàosì.

About the specific shape of the house remains in awe of the fact that his form was octagonal. He expressly declares that his new home should not be done following a Western style because he didn't want to incur the same mistake made in Zhàoqìng where because of the exceptionality of the stylistic features of his Western-style house she was confiscated by Governor Liu JieZhai. But the "octagonal" shape there appears to be a form normally used in

homes in the local style which she always preferred a regularity of plant like the rectangle. Certain it is that eight-sided octagonal indicates that he was not necessarily an octagon be inscribed in a circle.

Among the books that he had in the house were present the sphere of Sacrobosco's work and commented on by Christopher Clavius and the first book of Euclid's Geometry. He also definitely an astrolabe. This books and the astrolabe are mentioned have been used as study tools from Qu Taisu that Ricci was a master.

In the House there were generally four residents, in fact, with Ricci, lived his Jesuits companions who took turns and perhaps never happened that were more than one, so at most two Ricci foreigners included. Then there were the two Chinese coadjutors. Do you not then mention of House staff indicating the number and we can assume to be at least (but perhaps not more) two units. So, the assessment on the number of people who could live in his house is around six units. For distribution in rooms if we assign a room to every Jesuit priest present and one dormitory room for Chinese coadjutors and one for the house staff, we have at least four bedrooms. On 1593 De Petris died and Ricci remained only foreigner to live in that House until August of 1594 when came to Sháoguān the 34-year-old Italian missionary Lazzaro Cattaneo.

But not only the house was large enough to accommodate these people but for other guests. Also, in 1595 attended two catechists - Joao Barros and Domingo Fernandez - from Macao who were on probation before being admitted into the society of Jesus.

A few information about the shape of the house of Ricci in Sháoguān is given by Ricci himself when commenting on the incident of 1592 when a gang of thugs assails his house. He writes that during this assault "the servants(A) opened the front door, which opened into the corridor (B)". (A) confirms that the servants were more than one and (B) that before they arrived at the door of the house had to walk along a corridor. Should therefore be that the entrance was not directly from the street but there was some sort of aisle that divided the house from the church. The same occurrence also mentions that to get importance is that he retired to his room and bypassing the step in the garden. On that occasion he wrung a foot and rest is lame for the rest of his life. However, Ricci writes that crossed the window and did not write for example I threw it out the window. This is why we can say that her room was on the ground floor. Besides, he had already informed that his house was one floor. His window allowed then to spend in the garden (or maybe looked directly on the vegetable garden). Meanwhile, the action of a student of his home (perhaps referring to one of his coadjutors) went up to the attic to from there beginning to throw tables and wooden planks in the direction of the attackers. This information helps us to determine that the House, being on one floor, had a sloping roof as typical of Chinese houses which was the attic where it's in use stow things.

Referred to in the text of Ricci that the house and the church were built of bricks. Probably bought with the money he received from the Governor of Zhàoqìng or with money he had already received from Macau. The coverage was, as was happened to Zhàoqìng, Ricci revealed when stating that the roof of brick was broken by stones thrown by hooligans.

4.   Today after Ricci in Shaoguan

For many centuries the traces of Ricci's presence in Shaoguan were lost until at the beginning of the 1900s the Italian Salesian fathers established their mission there by creating new buildings such as the church, a seminary, a real monastery, and also other works that serve to the evangelization action in this part of China assigned to them. Many of those "new" buildings have stood the test of time up to the present day, undergoing transformations in use and destination as well as alterations that have not considered the historical value of these buildings. In recent years, however, there has been a certain interest in valorizing these constructions and for this reason the author was invited to visit these places to reconnect the threads of history and study how much it can be traced back to the origins and how much it is a superfetation. The study of Ricci's house is part of this program of re-evaluation of the architectural history of Shaoguan as well as other initiatives, such as a documentary supported by the local administration of which the writer was called to be the protagonist. It is hoped that dealing in a scientifically correct way can help to operate on the architectural heritage of these places with wisdom and respect for the values that these architectures deserve.
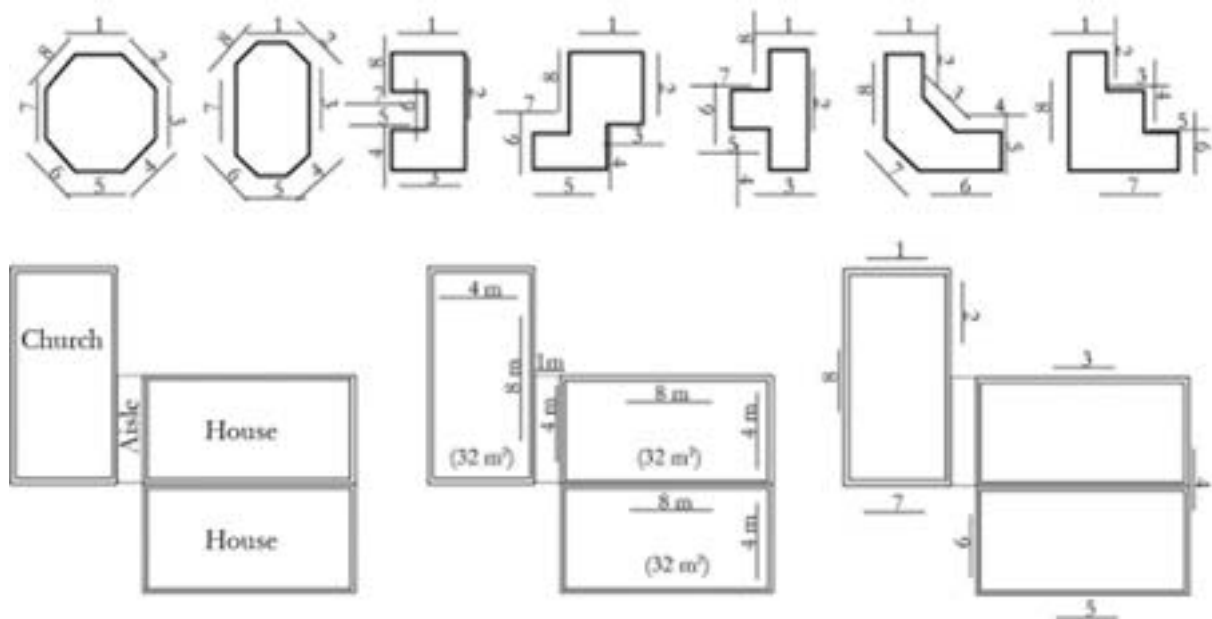
Fig. 1: the various combinations about the shape of the house and church of Ricci.

Fig. 2: Geographic map of the Sānshuǐ (三水) area where the Xījiāng (西江) river, which arrives from the west, meets the Běijiāng (北江) which arrives from the north.

Fig. 3: Confluence of the two rivers, Běijiāng (北江) and Mǎbàhé (马坝河), in a location that should correspond to the opposite bank of the current báitǔzhèn (白土镇).

Fig. 4: The distance from the Buddhist temple of Nánhuá (Nánhuásì 南华寺) to the city of Sháoguān (韶关) by airline is about 17 kilometers.

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Fig. 5: If, currently, we wanted to do the same route on foot, using the actual roads, from the Buddhist temple of Nánhuá (Nánhuásì 南华寺) to the city of Sháoguān (韶关), it would take about 5 hours of walking for a total of about 20 kilometres.

Fig. 6: The three rivers surrounding Sháoguān (韶关). There is currently a location west of the ancient city of Sháoguān (韶关), west of the Wǔshuǐ (武水) river which in toponymy retains the name of Guāngxiào (光孝) and is called Guāngxiàolù (光孝路).

Fig. 7: A building under construction of the Salesiani Mission at Sháoguān (韶关) 20th Century. Archive of Salesiani in Rome.
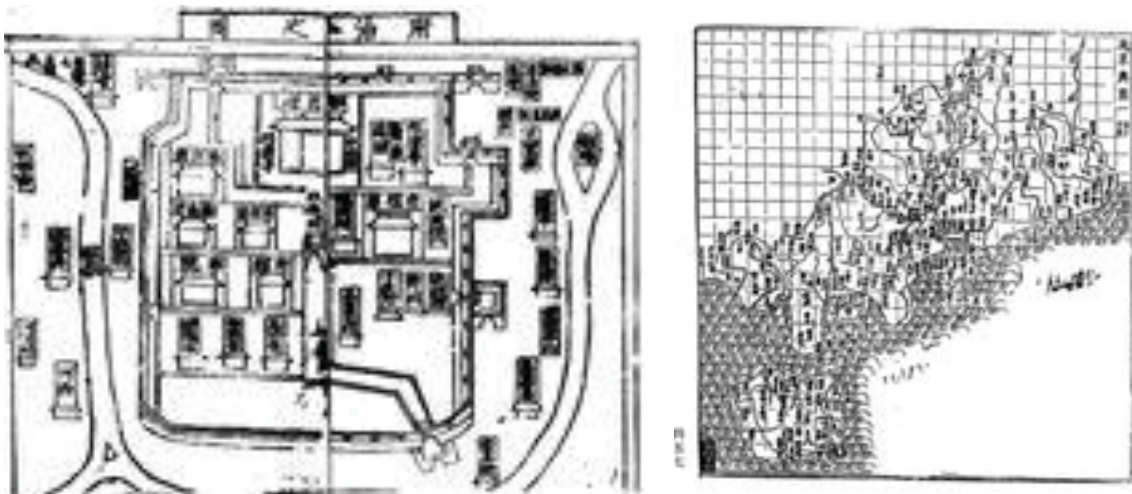
Fig. 8: Ancient map of the city of Sháoguān (韶关).
Fig. 9: Ancient map of Guangdong Province (广东) of China (*Guangyutu* 广舆图, pp.457).

Fig. 10: Remains of ancient missionaries' architecture in Sháoguān (韶关). Photo by the author.

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The social value of *living* historical space

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Abstract
Concerning the very topical issue of cities in emergencies due to several kinds of hazards such as natural disasters or armed conflicts and their related impacts, nowadays, many actions and strategies are being researched, mainly focusing on risk mitigation and assets conservation applied to the built heritage. On the other hand, another kind of emergency – equally crucial – is affecting urban environments and heritage: a social and cultural emergency, related to the loss of identity values and the historical memory of places.
The identity of a place with a rich historical context has great influence on individuals, playing a vital role in developing and maintaining self and community identity, giving the chance to *live* the space in a broader sense.
By recognizing the correlation between the contemporary trends of urbanization, lifestyles, and climate change with psychologically taxing circumstances due to environmental stressors, this study seeks to investigate if living in an environment rich in both natural features and culturally significant artificial elements (e.g., historical architecture, art) is relevant for health and psychophysical well-being of the citizens. As part of the multidisciplinary project iNEST (*Interconnected Nord-Est Innovation Ecosystem*), funded under PNRR Program, this research explores the connection between natural and built historical environment, using new technologies to improve mitigation solutions thanks to the opportunity to collect digital data related to different kinds of features and conditions (urban, territorial, social, cultural).

Keywords: Historical spaces, Cultural Heritage, Social and Cultural emergencies, Identity and well-being, Digital technologies

1.   Introduction

Given the ever-increasing tendency to live in urban spaces, the state of emergency that cities experience cannot be ignored: natural disasters or armed conflicts and their related impacts are just some of the crises that life in urban contexts must continually face [1]. This rapid urbanization trend brings with it a host of challenges, many of which are exacerbated by the dense concentration of people, infrastructure, and resources. One of the most pressing issues faced by cities today is their vulnerability to various forms of emergencies and crises [2]. Certainly, natural disasters represent one of the most immediate and tangible threats to urban centers. As climate change intensifies, the frequency and severity of extreme weather events such as hurricanes, floods, wildfires, and heatwaves are on the rise. These disasters can wreak havoc on urban infrastructure, causing widespread destruction, displacing populations, and disrupting essential services such as power, water, and transportation. In densely populated cities, the impact of such events is often magnified, leading to significant loss of life and economic damage [3].Moreover, the threat of armed conflict looms over many urban areas around the world, putting in serious risks the safety and stability of cities, as seen in recent conflicts. In addition to the immediate humanitarian toll of violence, urban warfare can result in widespread displacement, destruction of vital infrastructure, and long-term socio-economic repercussions [4].

In response to these multifaceted challenges, cities must adopt comprehensive strategies for emergency response and recovery. This includes investing in resilient infrastructure, enhancing early warning systems, improving urban planning and land use management, and fostering community engagement and empowerment. Collaboration between governments, civil society organizations, the private sector, and local communities is essential to build the resilience of cities and mitigate the impact of emergencies [5]. Sustainable development strategies that promote inclusive growth, environmental sustainability, social cohesion, and peacebuilding are crucial for building resilient cities that can withstand and recover from crises.

The context in which this research is developed is the iNEST project, an interconnection network between public and private research entities, an ecosystem for innovation that aims to develop synergies between the multiple vocations of the territory, through digital technologies and the ecological transition. Its areas of intervention are the key sectors of specialization of the Triveneto - i.e. the industrial-manufacturing, agricultural, marine, mountain, construction, tourism, cultural, health and food sectors - systematized in an integrated, interconnected and sustainable way. The climate and environmental emergency linked to the landscape and to architectural historical heritage are certainly areas of interest for the research under development, but it is also equally involved in today's social-cultural crisis. No longer feeling part of a community, the lack of identity in the living place is the topic of the paper, showing some of the research underway in the case study of Piazzola sul Brenta.

2.   Research Framework and Aims

The iNEST project aims at extending the beneficial effects of digitalization to the key specialization areas of "Nord-Est" Italy and it has embraced a sustainability-centric approach, integrating aspects of social, environmental, and economic sustainability within its framework [6].

This study falls under Spoke 4 - *City, Architecture, and Sustainable Design*, specifically aligning with Research Topic 3, analyzing the interaction between natural/built/digital environments and the way in which humans think and act and how places shape people as individuals and communities.

Fig. 1: Villa Contarini-Camerini (Gallery of the Municipality of Piazzola sul Brenta) [7].

The examination of the interaction between individuals and their environment includes a vast and complex domain, encompassing various levels of inquiry and themes such as individual and community well-being, risk factors, climate change, energy, and fragility. Additionally, in the current research endeavor, the environment is not only analyzed in terms of its present urban and physical attributes but also in consideration of its cultural and historical characteristics. The aim of the research is to analyze whether living in a medium-small sized historic centre, surrounded by greenery, can influence people's psycho-physical well-being. Past studies have analyzed these topics and demonstrated the benefit that natural spaces have on people [8 9, 10, 11], but research is still limited regarding the benefits that historic buildings and urban contexts of historical and artistic value have on citizens. Enhancing the well-being of individuals affected by such stressors, including the elderly, migrants, and those with disabilities, requires evidence from various disciplines, such as psychology, architecture, design, and information technology [10]. This is the reason why this research is born in an interdisciplinary field, collaborating in particular with the Department of General Psychology of the University of Padua.

Fig. 2: Porticoed square Camerini (on the left), Cathedral of the Nativity of Santa Maria and San Silvestro (above), country fair (below). (picture of the authors and from the ProLoco Piazzola) [12].

With these principles in mind, this study applies an interdisciplinary approach to investigate the interaction between humans and their environments and explore the effects of both natural and built surroundings on emotions, behaviors, lifestyles, and health. The integration of multiple disciplines is essential, aiming not only to examine spaces from a physical perspective but also to comprehend the emotional responses they evoke in visitors and tourists, as well as the level of connection they foster among citizens and local communities. The concept of place attachment, closely associated with the emotional dimensions of environmental significance [13], highlights the development of an emotional bond or connection between individuals and specific places [14]. This concept emerges from the complex interaction of emotions and feelings, knowledge and beliefs, behaviors, and actions [15]. It materializes when a place is distinctly recognized and holds significant meaning for its users, offering conditions to meet their practical needs and better support their behavioral objectives compared to other known options [16]. As outlined in the study led by Ujang and Zakariya [17], within the framework of place regeneration, indicators such as the sense of belonging, level of attraction, frequency of visits, and degree of familiarity serve as crucial metrics of place attachment. All these factors should certainly be taken into consideration in the analysis of historical space and its effect on people's psychological and physical well-being [18, 19]. The influence exerted by the identity of a place steeped in a rich historical context on individuals, particularly concerning the emotional dimension associated with the notion of belonging, should not be overlooked. Places play a central role in shaping and preserving both individual self-identity and the collective identity of communities. Thus, this aspect is closely intertwined with determining the psychophysical well-being of citizens [20].

3. Methodology

The research began its practical phase with the implementation of the first case study in Piazzola sul Brenta, in the province of Paudua, located in the Veneto region in the north-east of Italy, selected for several reasons: its significant architectural heritage, exemplified by Villa Camerini-Contarini, which has historically been central to the village; the integration of green and blue spaces with the built environment. Each of these factors will be carefully examined and explored as elements with regenerative potential, with a particular focus on understanding the interaction between these elements and how this relationship enhances the quality of life for residents.
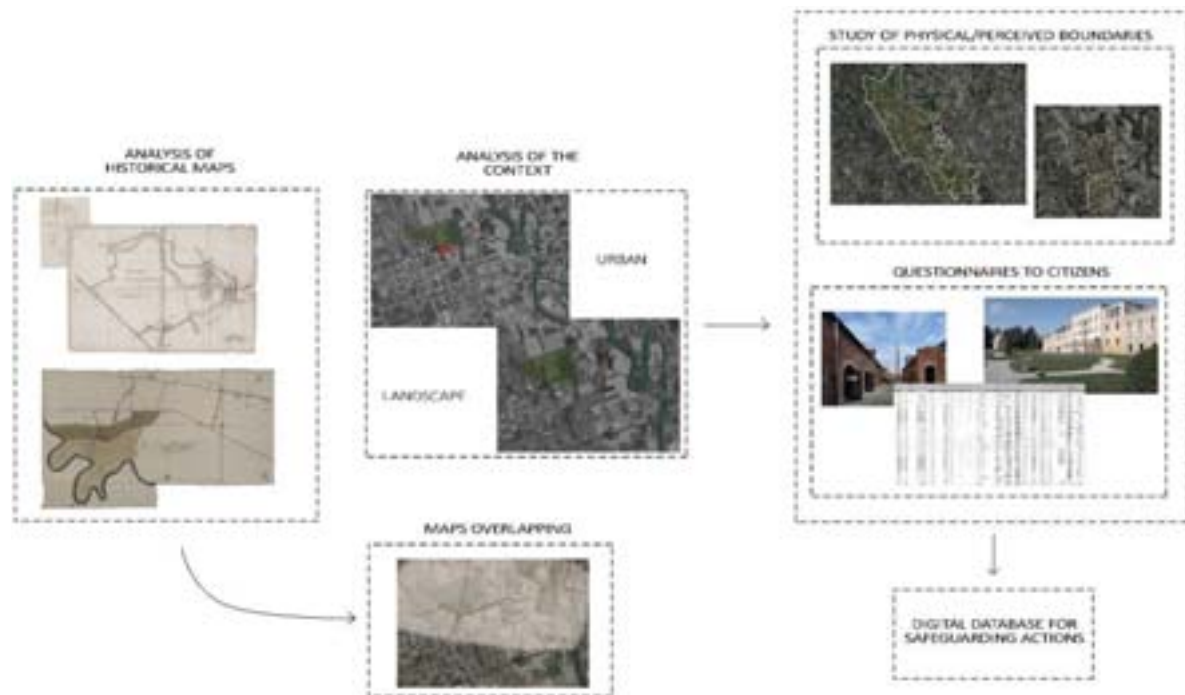

Fig. 3: Research Methodology. Graphic elaboration by the authors.

The initial stage of the investigation involved a comprehensive review of historical maps to gain insights into the evolution of both the built and natural landscapes. The research started by studying maps sourced from the State Archive of Venice, particularly thos representing the Villa and illustrating its relationship with the Brenta River. By closely analyzing primarily two maps and overlaying them onto the present-day terrain, noticeable changes in the Brenta River's path emerged. The analysis revealed a deliberate alteration in the river's trajectory, marked by the construction of a diversion intended to facilitate agricultural irrigation. Exploring the anthropic spaces within the territorial boundaries of Piazzola sul Brenta, prior studies uncovered the presence of Roman axes crossing the village, albeit gradually fading over time. This preliminary investigation has stressed the historical significance of Villa Contarini: it became evident that the village's urban structure has deviated from the Roman axes and instead aligns with a grid influenced by the orientation of Villa Contarini, underlining its important role.

During the comparison between historical maps and the current state of the art, a significant inquiry arose regarding the delineation of borders. Given that Piazzola sul Brenta exists as a small urban enclave nestled within the Venetian countryside, the distinction between urban and rural areas is not always straightforward: but where does the urban landscape end, and the rural landscape begin? This matter holds considerable importance in a study focused on exploring the relationship between humans, their surroundings, and nature.

Borders, as it turns out, can be both natural and man-made, but they can also be perceived boundaries. Kevin Lynch delves into the cognitive processes through which people form mental representations and recollections of a city's layout, encompassing both its tangible and abstract boundaries. Central to his analysis is the concept of "border perception" and the central role that borders play in shaping coherent and comprehensible mental images of the city. Elements as paths, edges, neighborhoods, nodes, and landmarks, collectively contribute to the cognitive mapping of the city. In particular, the notion of "edges" assumes a critical role in how boundaries are perceived within this cognitive mapping process.

3.1 Urban traces and social perceptions

Clearly defined and recognizable boundaries play a crucial role in shaping individuals' orientation⁴⁸⁵

within the city, preventing a sense of disorientation that could otherwise disrupt residents' perception of the urban environment and mine a state of equilibrium towards which individuals subconsciously gravitate *"in all moments of their physical and mental existence"*, as Arnheim notes [21].
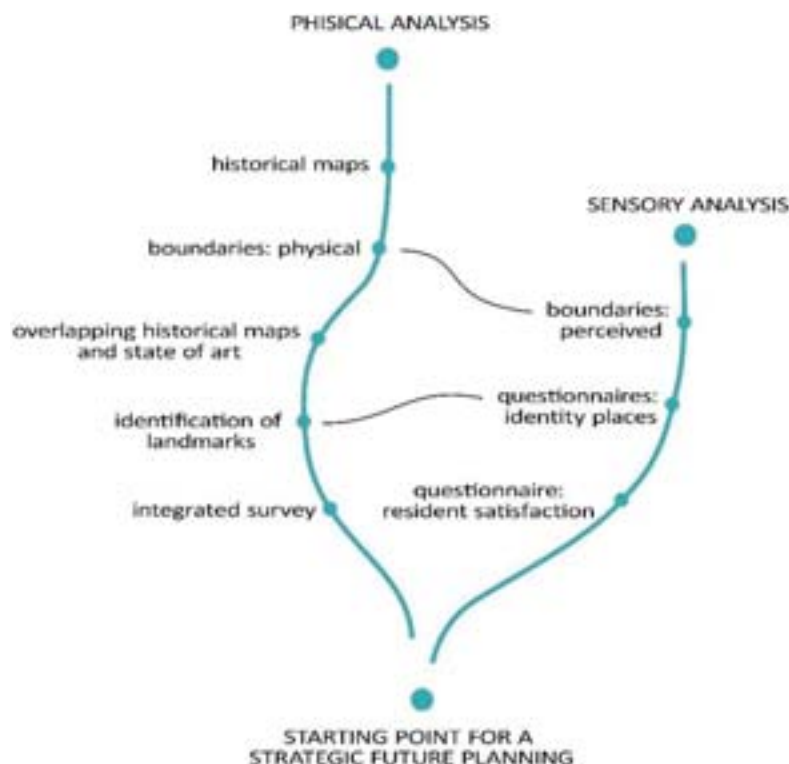
Fig. 4: Integrating the physical analysis of the context with the sensory analysis. Graphic elaboration by the authors.

The recognition of these boundaries, whether tangible or intangible, contributes to the shaping of a cohesive mental representation of the city. This mental map influences individuals' capacity to navigate and engage with their urban surroundings, shaping their behaviors and routines in everyday urban life [21, 22]. Comparing the administrative limits of the city with the landscape ones, it was noted that they did not communicate with each other. In fact, the administrative limits had the sole purpose of delineating the built space and separated it from the natural one without making them interact. To investigate the interplay among humanity, the natural landscape, and the constructed environment, this research has opted to establish an imaginary boundary demarcating the interface between artificial and natural elements. To navigate effectively within a space, recognizable nodes and landmarks are essential, which are easy to remember and deeply ingrained in the historical memory of the city, embodying its characteristic and unique essence.

In line with this perspective, the research endeavors included the administration of a questionnaire aimed at identifying the urban landmarks of Piazzola sul Brenta. Given the city's rich historical layering, participants had no difficulty identifying the city landmarks requested in the questionnaire. In the questionnaire addressing the historical-cultural value of Piazzola sul Brenta, citizens were asked to individuate a place (natural or built) particularly important for the community. The answers identified landscape elements and historical buildings and they were given with no hesitation or contradiction between them, reflecting the deep-seated significance of these landmarks within the community.

Next steps of the research will be focused on a digital survey of the most significant urban spaces, investigating how to use new technologies to represent the city in 3D [23], integrating metric-

morphological data with data obtained through the study of the landscape and the overlaying historical maps, collect digital data related to different kinds of features and conditions, both tangible and intangible [24].

4.   Conclusion

It is essential to highlight the relevance of conceiving risks and emergencies in a broader sense, including to impact of natural disasters and armed conflicts on Cultural Heritage also the "intangible" dimension of the perception of places, identity and well-being in experiencing places, recognizing cultural and social values, sense of belonging and social cohesion. Additionally, the importance of a place's identity deeply rooted in its rich historical background cannot be overstated. It is widely recognized that places play a pivotal role in shaping and preserving both individual self-identity and the collective identity of a community [22]. Consequently, it can be regarded as a closely intertwined factor in influencing the overall mental and physical well-being of its residents.

This research aims to prove the importance of preliminary analysis prior to planning and mitigation actions, an analysis based on different aspects such as integrated survey, study of historical maps, study of habits and socio-cultural patterns of the place, to improve an approach that can integrate "practical" actions of safeguarding and protecting heritage buildings and sites.
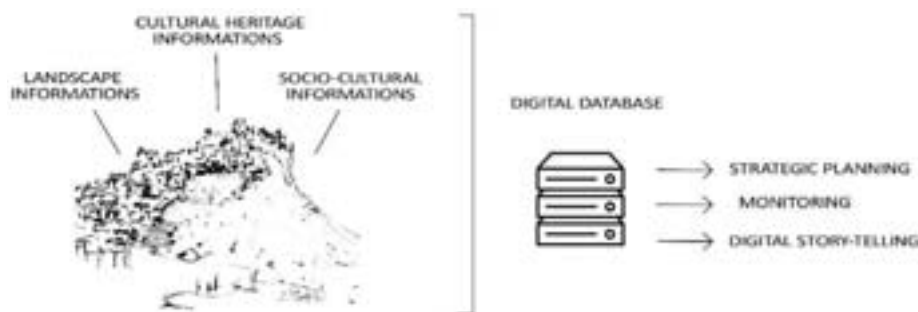
Fig. 5: Digitalizing data for future planning and monitoring. Graphic elaboration by the authors.

In addition to outlining scenarios for the use of new technologies for the knowledge and conservation of Cultural Heritage (considering 3D models as powerful multilevel containers of aggregated data, combining intangible features - such as perceptual aspects - with the digital representation of the urban scene and its buildings), the research is oriented to the promotion of more resilient areas. To do this, the engagement of citizens, local community and civil society is crucial, both for the survey and knowledge phase (analyzing what citizens consider as a source of well-being), and for the possible phase of planning and realization or regeneration strategies, highlighting the impact of research and innovation in people's daily lives.

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From the UN Agenda 2030 to the organisation of a mega sustainable event: the case study of Paris 2024 Olympics.

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Abstract

In 2015, with the publication of the UN Agenda[1], sport has been recognized as instrumental for sustainable development. The Agenda consists of guidelines for the future, **17 goals**, and is in line with the 15 recommendations of the Olympic Agenda 2020+5[2], for instance fostering sustainable Olympic Games and strengthening the role of sport as an important enabler for the UN Sustainable Development Goals. Indeed, the International Olympic Committee[3] (IOC) believes that sports and the Olympics can help develop the majority of the Agenda goals. [**fig.1**] In particular, they contribute to good health and well-being (**n.3**), quality education (**n.4**), gender equality (**n.5**), decent work and economic growth (**n.8**), sustainable cities and communities (**n.11**), responsible consumption and production (**n.12**), climate action (**n.13**).

However, these objectives and recommendations remain fairly vague in that they are not defined by concrete and quantitative criteria. We study how these principles have been translated into the planning of the **next Olympic Games** that will be held in **Paris in 2024** and will be the first organized according to the sustainability objectives set up by the Agenda. For this reason, this case is supposed to mark a turning point in the history of the Olympics.

The method developed here starts from the analysis of the Agenda goals to provide a series of requirements to discretise and evaluate quantitatively the long-term sustainability of the event. This study investigates, with particular focus on the urban and architectural aspects, the relations between the event and the host city, between people and context and between event and environment. Below we will proceed with the analysis goal by goal.

Goal 3_ Good health and well-being

This objective concerns well-being in all its forms and can be read in three directions.

3.1 How many sports are on the program?

The Olympics should **promote sport** as a physical activity and the knowledge of all sports. In Paris there will be **32 sports**, a number that has grown considerably over the years as a sign of a growing quality of the sports offer.

3.2 Is there a Village for Athletes? What is its surface (m²)?
3.3 What is the distance (Km) between the Athletes Village and the Olympic Stadium?

The **well-being of athletes** is guaranteed through the realization of adequate structures that help sports performance. Designed for athletes, the **Athletes Village**[4] is one of the most important project of these Olympics, realized for the event and on which there was a particular focus during the first application phase. With its **520.000 m²** of surface, it offers a wide range of services and the opportunity to easily and quickly reach both the training camps and the most important venues. For instance, the **Stade de France** is just 3 km. It consists of three main areas: the **plaza**, a common open space on the Seine riverbanks, the **residential area**, which is around the *Cité du Cinema*, an ex-industrial area redeveloped, and an **operational area** connected to the most important road junctions, A86 and A1. Moreover, the district is well connected in terms of **public transport**, which will be implemented for the event for a total of 2 RER lines, regional rail transport, and 5 subway lines. The territory, between the municipalities of Saint-Denis and Saint-Ouen, is on the *northern fringe* of *Paris*, not far from the center, an area unfortunately with problems of degradation and social exclusion. Therefore, the redevelopment is a value not only for the event, but also especially for the future at the end of the games. [**fig.2**]
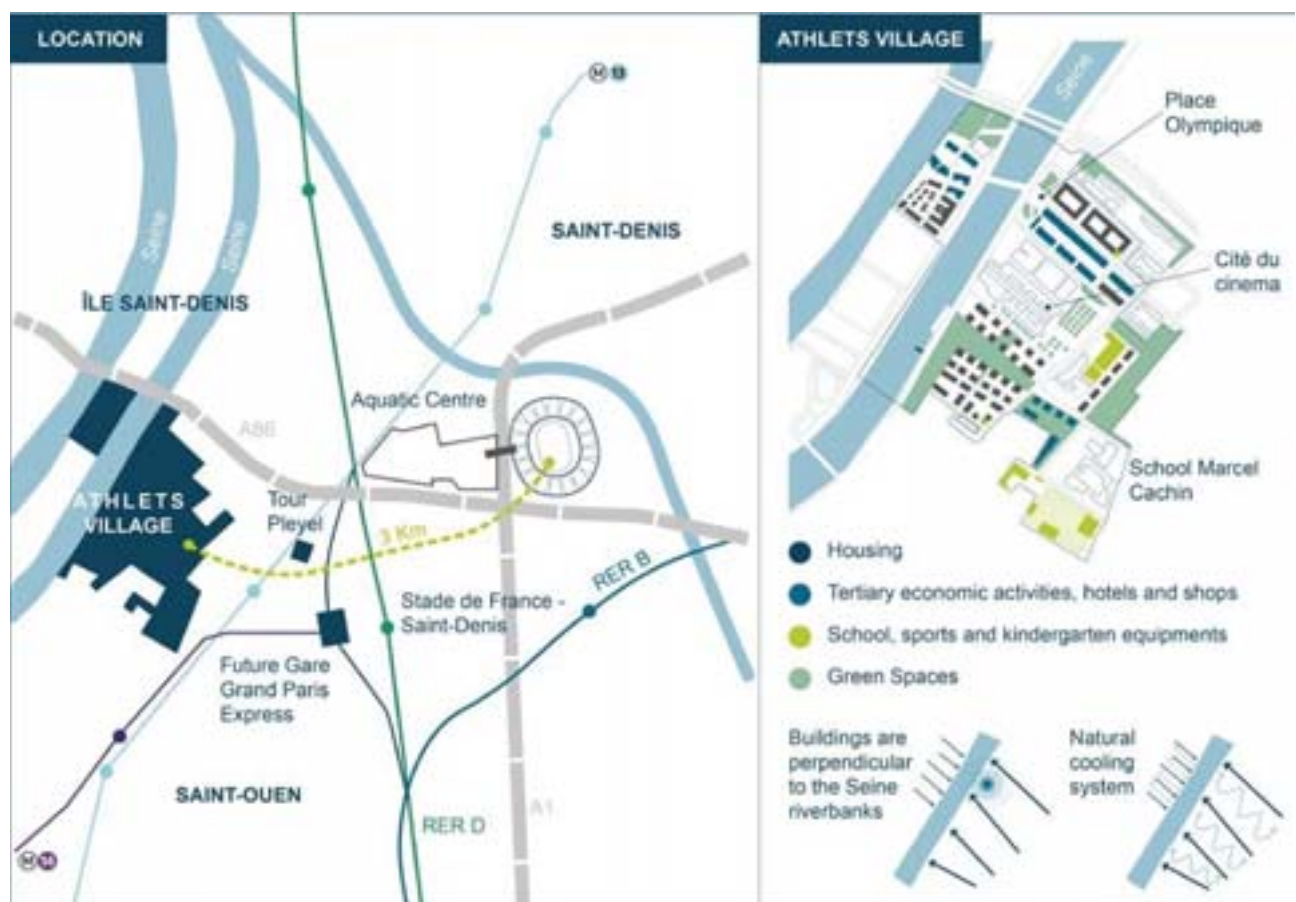
3.4 What is the distance (Km) between the sport venues and the town centre?

The third direction concerns the **well-being of visitors**: they will come to Paris for the event and they surely will have the opportunity to visit the city. If the Olympic venues are close to the city center or well connected to it, the experience for the public is truly all-round and helps citizens feel part of the event too.
[**fig.3**]
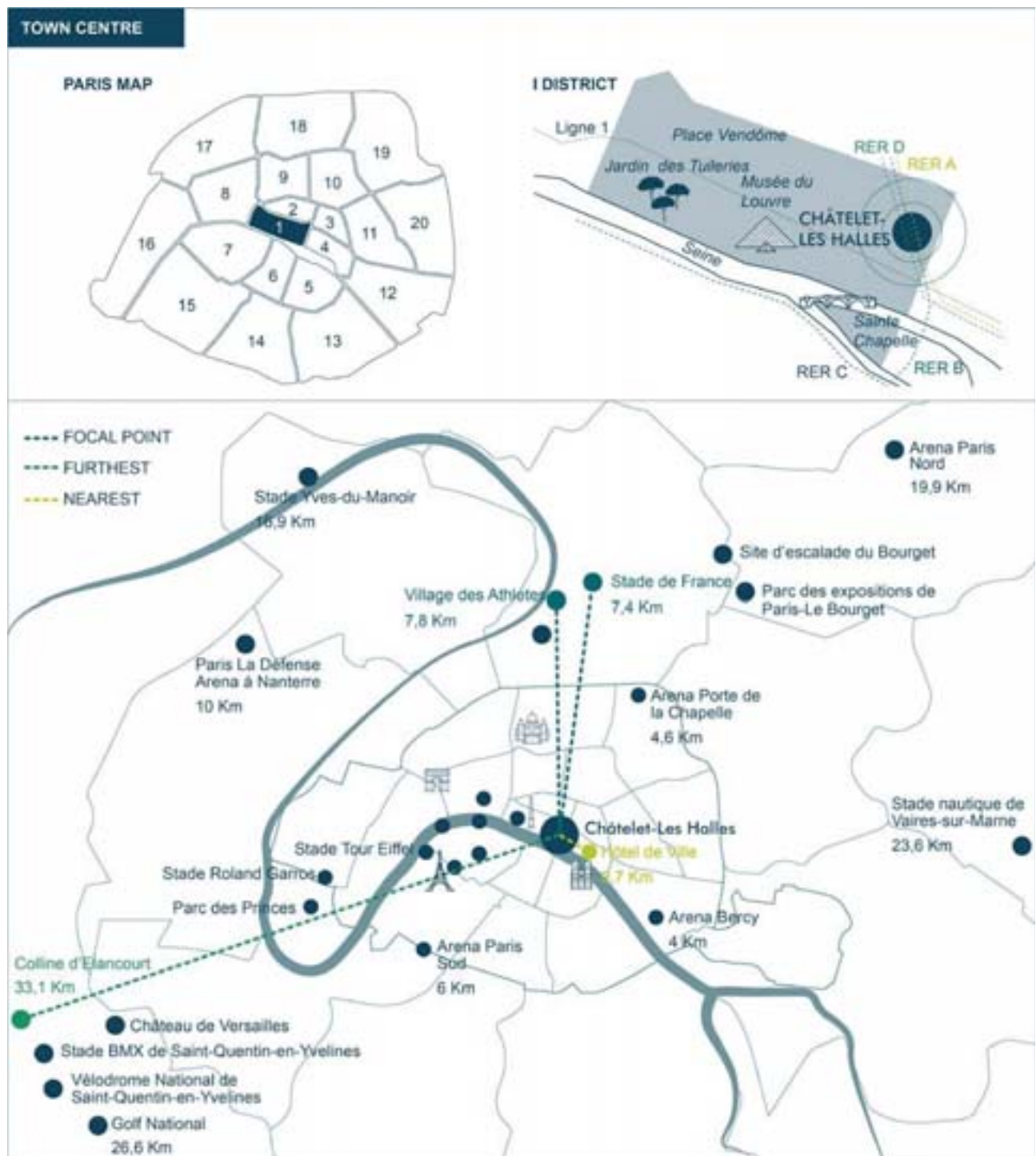
Goals 4 - 5_Quality Education and Gender Equality

4.1 *Are there any educational initiatives for schools at the Olympics?*

Paris wants surely leave a **follow-up** on the territory, strengthening the **culture of sport** to transmit it especially to the new generations. Never before has it really happened in such a constructive and intense way.

The operations start from **schools**: with the **GENERATION 2024 program**[5] campaign has begun to raise awareness of sporting values and social inclusion within the Olympics. The aim is to improve visibility of all sports, including the least popular ones. Furthermore, GENERATION 2024 points at highlighting sport **inclusivity**, in the sense of gender equality, respect for disabilities and fight against racism.

5.1 *How many female athletes are there?*

Gender equality is one of the central points of these Olympics. Based on the estimates published in the reports of the International Olympic Committee[6], in this edition, for the first time in history, the number of female athletes will be **equal** to that of male athletes.

Goal 8_Decent work and economic growth

The city is going to prepare to host the event through a series of projects: sports venues, public spaces, existing buildings redeveloped, new infrastructure and more. [**fig.4**]
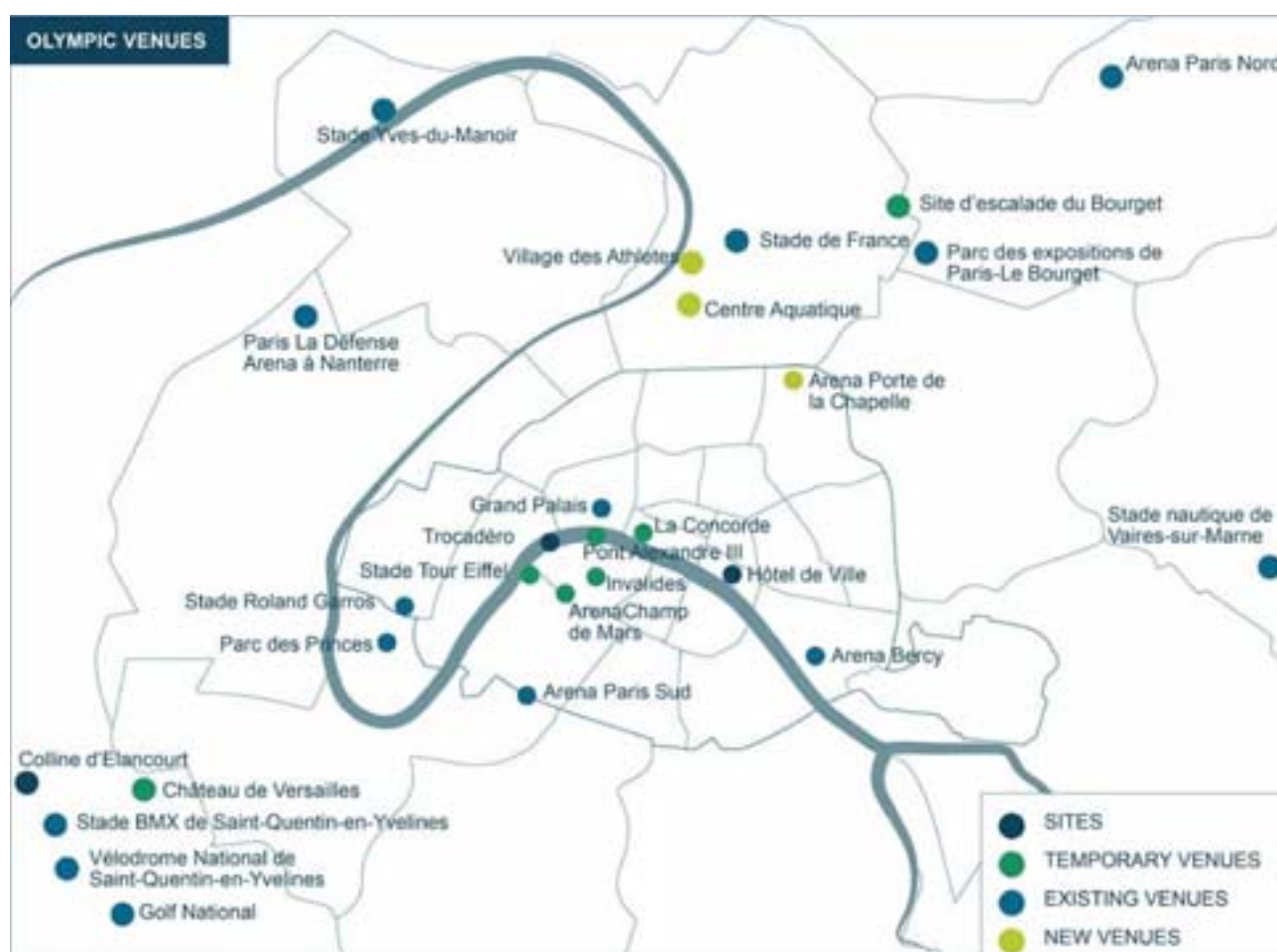
8.1 *How many temporary venues are there?*

In Paris, there has been a lot of investment in **temporary venues** set up mainly in the city centre and along the Seine riverbanks. This helps that relation, well outlined in goal 3, between event and city that allows athletes and visitors to live a unique experience, in terms of sport performance and show. The city is willing to give its best exploiting all its beauty given by its enormous historical and artistic heritage. Those structures where many competitions will take place, especially outdoors, are **7** and scattered throughout the city centre, close to famous landmarks.

8.2 *How many new venues are there?*

There were also **3 new venues**, including the mentioned Olympic Village. They have been designed primarily to remain at the end of the game, adapting to the future needs of the community. Those are the **Arena Porte de la Chapelle**[7] and the **Aquatic Centre**[8] for water sports competitions. The last one is designed for a **flexible use**: in fact it will host 5.000 seats during the Olympics, while at the end of the games its size will be reduced to 2.500 seats to

adapt to a more modest use and suitable for the neighbourhood. The materials used are all low emission and bio-based and the coverage with its 5.000 m^2 of photovoltaic panels makes the structure energy self-sufficient. [**fig.5**]

AQUATIC CENTRE

Photovoltaic Panels **5.000 m2**

Wooden roof

Walkway
Stade de France connection

Green Spaces
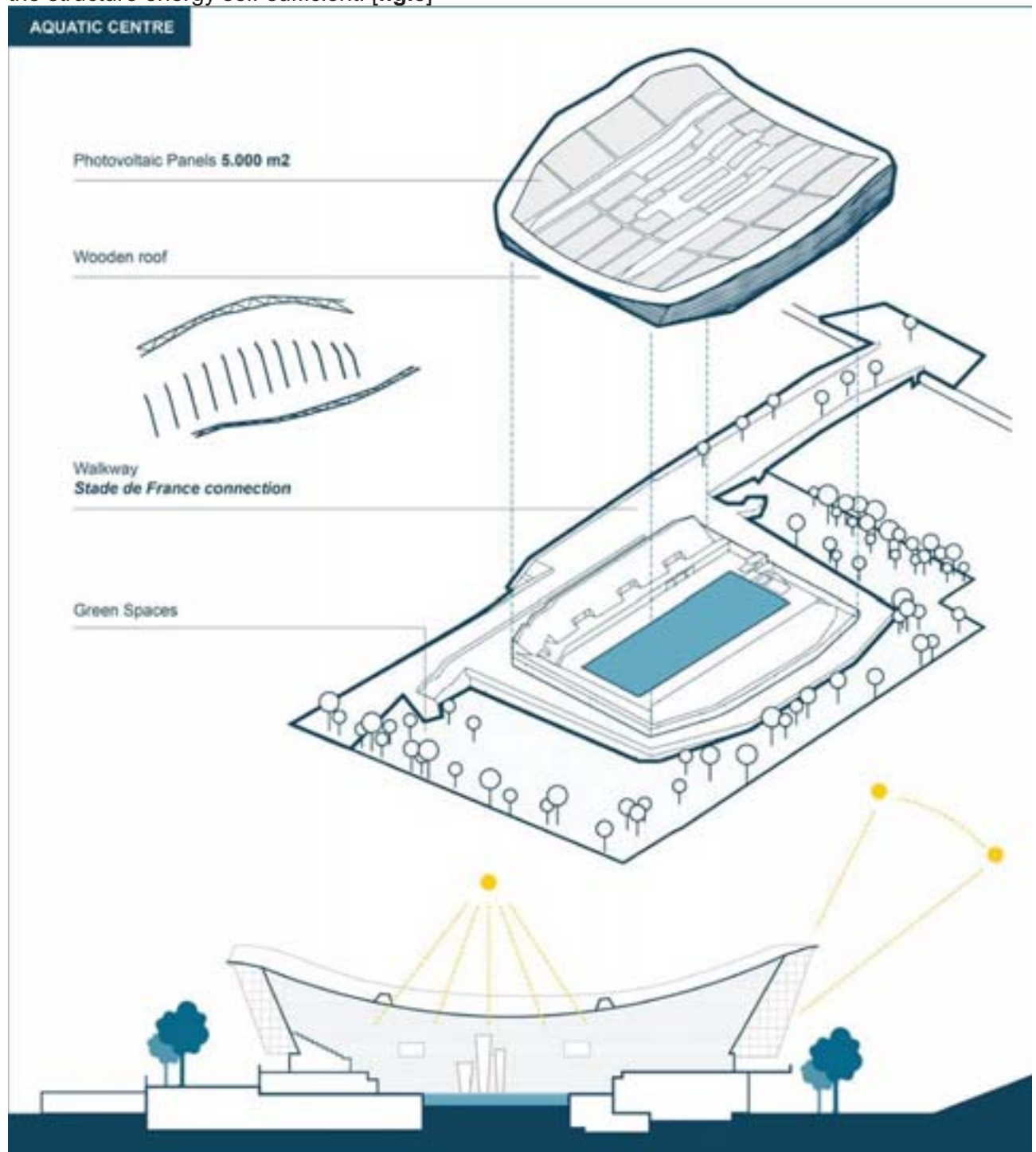
Goal 11_Make cities and human settlements inclusive, safe, resilient and sustainable

11.1 Are the Olympic Games' projects part of a great urban redevelopment?

The event is an important urban accelerator and Paris takes this concept very seriously. Indeed, the projects for the Olympics are part of a wider process of expansion of the city. The **Grand Paris** is an ambitious urban plan that aims to redevelop the suburbs through major projects including the **Grand Paris Express**[9], a branched metro network that, implementing the existing one, will serve the entire territory around Paris, where new polarities are born. [**fig.6**]
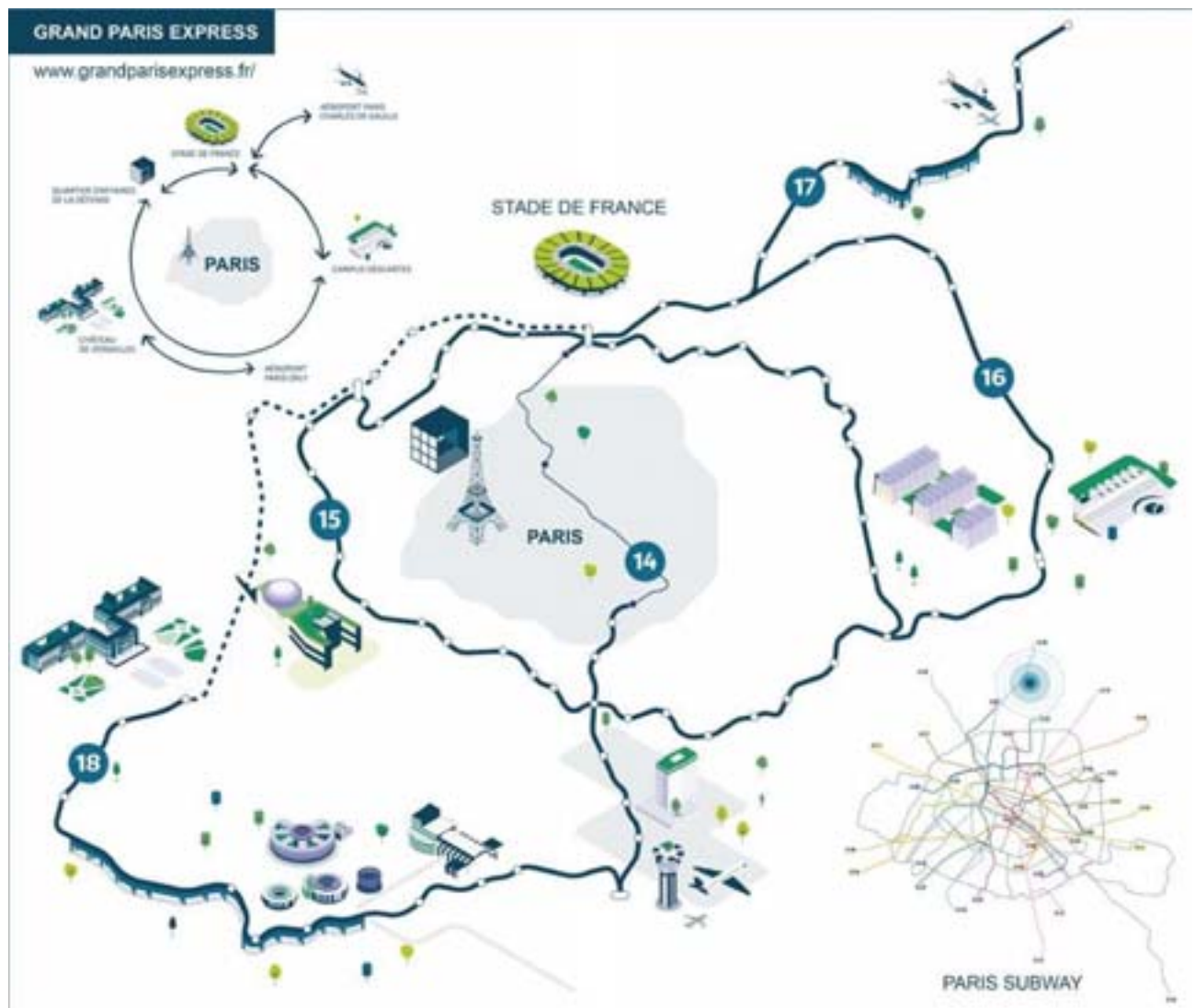
11.2 How many metro and train stations do I find in a radius of 3 Km?
11.3 How many new infrastructures are there?

We measure how much the areas of the event are connected and easy to reach. The spectators to attend the sport competitions must be able to reach those places through public transport and especially through the rail transport, which is more sustainable than car, taxi and bus, since probably it is not an electric vehicle. We have studied that within a radius of 3 km from each venues there should be a rail station. In the centre of Paris the subway is so dense that you can find up to **38 stations**, instead in the cluster Olympic Village-Stade de France we have between **5 and 8 stations**, considering that the area of Saint-Denis has been greatly implemented with also a new rail station of the new metro line (Grand Paris Express).

11.4 How many projects have been designed for a future use after the game?
11.5 How many projects not related to the event have been realised?

The territory of Saint-Denis, as we have already said, is the one most interested by the Olympics and the most important redevelopment projects. Here there is the Olympic Village, which, at the end of the games, will be transformed into a **residential district** well connected to Paris, with shops and tertiary services, a student's housing, cultural places, like the *cité du cinema*, and even schools. The project, therefore, is not limited to the construction of housing, but intends to leave on the territory a **legacy**. As a result a new complete and stratified reality that can re-establish the urban texture, so degraded before this intervention[10]. An action also with great **social value**, which embraces all the values of sustainability.

Goals 12 - 13_ Responsible consumption, production and climate action

12.1 *How many existing venues are there?*
13.1 *Have been strategies put in place to combat climate change?*

Responsible consumption involves optimising existing resources. There are **14 existing venues**, the **60%** of the total. These and the temporary venues, which will be dismantled at the end of the event without affecting the territory (goal 8) represent almost the **90% of the total venues**. Paris, to reduce the carbon footprint to combat **climate change**, has adopted the philosophy of **building less but with quality**. Among these existing venues, there is in particular the **Stade de France**, which will be the main reference point. It was built for the 1998 World Cup and has been recently modernized to host the 2024 Olympics. It represents a **symbol** for Paris, as well as a place where the community recognised itself. [**fig.7**]

In conclusion, observing the case of Paris there is a clear attempt to achieve the objectives of sustainable development in the event planning, but for the rest of considerations we will have to wait the end of the Olympic Games.

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Archetypes of resilient architectures. Primary forms for the protection of the community.

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Abstract.
The recent wars in eastern Ukraine, the even more recent Israeli-Palestinian conflict, or even the consequences of the strong variation of the climate in recent years, especially the case of Andalusia, which has been in drought since last spring, produce damage to spatial and moral configurations.
In this condition of disequilibrium and fragmentation, it is architecture that is present with forms of representation of the community, of union of the parts.
The primary and elementary elements of architecture become the main tools, the constituents of a clear and sometimes allegorical architectural language. The hypostyle is a clear application of this. By representing the singular element-column, within the multiple and repeated, it recalls the image of the singular element-tree within the forest as a whole; a strong image of collectivity and being in union.
The hypostyle is so frequent in architecture because it responds to functional needs such as sustaining. Remember how Greek temples were originally made of wood and this explains how they are, all the more reason why they are perfect examples of the reference to a natural hypostyle, that is, the forest, which is a set of styluses (columns).
Sustaining would therefore be the primary function of the architectural envelope. Most scholars imagine the hypostyle only as an underneath: under something, under ground, or more precisely under column (from Gr. ὑπόστυλος, comp. of ὑπό 'under' and στῦλος 'column'). The column rises below the ground with its roots.

Keywords: hypostyle, column, three, collectivity, figurative, singularity.

1. Forms of inclusion.

Similarly to verbal language, architecture can also be analyzed as a language, a system of signs and symbols that communicate meanings to observers. These meanings are not fixed or universal, but depend on the cultural, historical and social context in which architecture is inserted and interpreted. The fundamental idea defended by the philosopher Ludwig Wittgenstein is that the meaning of a linguistic expression is given by the use we make of that expression in a context regulated by conventional norms, a context that he calls *a linguistic game*.

"Think of the tools that are in a toolbox: there is a hammer, a pincer, ... As different as the functions of these objects are, so different are the functions of words." (*Philosophical Investigations*)[1]

As L. Wittgenstein states about words, even architectural elements such as forms, materials and spaces acquire meaning only within specific "architectural games", i.e. the cultural and social contexts in which they are used.

There is no doubt that the elements that intersect in architecture can have a structural or non-structural character. Manifesting itself punctually in the overall skeleton system, it becomes a pillar or column supporting the entire structure.

When the structural, such as the column or column, has a dependency relationship with both the beam structure and the building envelope, the grid coincides with the volume of the building. In this situation, the structural grid is integrated into the volume of the building itself, influencing the layout and configuration of the interior spaces. The pillar thus becomes the hinge, the meeting of the two different positions of the grid, the point of intersection of the grid, of that skeleton in which it participates in direct contact with the beam element. A "law" dictated by modularity, a step in the grid that the pillar must support.

It is in the definition of the design of a square of today that the point-pillar element repeated in a progressive scan and at *a close pace*, generates strong symbolisms to that conception of multiplicity, of the overall vision, of collectivity, of living or being in an almost identical position.

It is with the square that the urban architect connects the different parts of the city, uniting the distinct and fragmented, compositional characters deriving from the city-whole.

Although it is undeniable that "*Time has no form, it has form only if it is identified with the works of man*"; [2] Today's strong aspiration to an "architecture of discontinuity" leads to a careful analysis of the contemporary urban situation in which we live. The discretized city, to which there is a strong tendency in the planimetric development of the parts, refers to a model of the city that develops mainly in a fractional way, often following a "lattice" [3] of adjacent regions, each with different formal, qualitative and temporal conditions.

Just as Paolo Portoghesi reminded us that "*The square nowadays no longer exists, there are widenings where cars are the masters and not people*", [4]today there is more than ever strong interest in the definition of a possible 'contemporary' square, a place that has the ability to represent the point of maximum union, of plurality, of a group of people.

These reflections on the sense of collectivity lead to the consideration of the importance of putting well-being, human involvement and participation at the center of innovations and urban transformations.

In the context of the fragmented contemporary city and the challenges related to the lack of meaningful public spaces, *technological humanism*[5] could promote the adoption of innovative technologies to create more inclusive and people-oriented urban environments. A rebirth that can be interpreted as an idea that unites humanity and technology in a symbiotic relationship, rather than seeing them as separate entities.

For example, the adoption of technological solutions for urban planning could foster the creation of more welcoming and livable public spaces, such as the redevelopment of squares to make them places of meeting and socializing rather than simple transit areas.

To radically change this way of thinking, it would be necessary to make people see the city and the territory as raw resources and materials *("... hardware to be discretized and traversed with thought*), to be elaborated and traversed with the mind *("... The only software capable of producing the regenerative humus of places*), [6]integrating and promoting a production based on training and research, working with creativity and art to improve the quality of the environment, of the landscape and therefore, of life itself.

It should be made important to design not only physical structures, but also spaces that facilitate interaction and connection between people. Just as Paolo Soleri is an example of this, who encourages building communities that foster solidarity and mutual support, rather than isolation and division.

"… An architecture that is not only an architecture of public works, but also an architecture of works of human solidarity. The architecture of interaction between human beings, of building bridges between them, not walls." [7]

1.2. The hypostyle square.

The hypostyle, as mentioned above, is a highly recurrent solution in ancient architecture.

The massive presence of columns, a necessary condition for the formation of the hypostyle figurativeness, has the primary purpose of supporting the weight of the roof, typically defined as the place of *shelter*[8]. Sometimes, referring specifically to the buildings of ancient Persia, the hypostyle was often associated with highly symbolic and aesthetic meanings, representing power, grandeur and magnificence, conveying an atmosphere of high sacredness and majesty. Persepolis, the majestic capital of ancient Persia, is a perfect example of this. Commissioned in his image by Darius the Great in 512 B.C., it reached its peak under Xerxes and Artaxerxes with majestic works such as the Apadana and the Hall of the 100 Columns FIG. 0. Here the hypostyle was used to host foreign delegations as a sign of homage to Persian power. Even today, the residual image of the original grandeur of Persepolis, which lasted mostly ephemeral as it was destroyed in 330 BC by Alexander the Great, is well identified in the multiplicity and adoption of the giant order of the dense series of colonnades residing on the site.

A positioning system therefore based on a matrix implant, an intent to articulate the language used in *serial harmonic scanning*. Architecture understood in the interval of voids, voids that are subject to thought.

An erroneous *arrangement*[9] of parts of the city, even if completed and existing starting from an ideal and initial vision of the project, is opposed, bringing back to analysis the project of Antonio Monestiroli for a *square in Ancona*, a clear demonstration and possibility of application of the conjunction of parts of the city.

For the Ancona project FIG. [1-5] (here redesigned with drawings) the three possible alternatives include completing the character of the nineteenth-century city with new constructions and replacement of existing buildings, allocating the area to a garden or constructing a public building in place of a former military bakery.

However, these alternatives have disadvantages such as the compromise of existing constructions, ergo of not implementing any *continuum* with the past, or the fragmentation of greenery, and therefore iterating an already existing process of disintegration.

Therefore, Monestiroli proposes the construction of a covered square that will become a reference point for the entire city. This square would be defined by a roof-shelter supported on a completely open space that would allow it to host various functions such as markets, museums and exhibitions, up to the declination of a simple place of passage and therefore, of the collective meaning par excellence. In the area free of pillars, there are four staircases leading to a basement; Here the same intent of walkable space as the upper floor is resumed, obtained by repeating the identical metric of the elements of the square above, in a room that is closed here. You don't define functions, but a support to the activities that take place in the square.

Its construction would thus be integrated with the surrounding city, taking on the characteristics of the adjacent buildings. This solution would also unify the historic city and the modern city, positioning itself along the axis that connects the port to the Passetto. Being adjacent to this axis, the covered square is proposed to both parts of the city at the same time.

The regular arrangement of the square-meshed pillars, to define a perfect isotropic mesh, suggests a high degree of undifferentiation in the use of the area. This scheme was adopted by modern architects who emphasized its significance beyond its particular functions. Two interesting examples are given. The first is Tessenow's project for a covered but open building, located in the countryside (*Tessenow – Seaside resort in Prora - Kraft-Durch-Freude Bad* FIG.6), with a dense system of supports for a large roof, a bathing complex for twenty thousand people located along the Prora coast, on the Rügen peninsula, Baltic Sea. Here Tessenow imagines an open space instead of a closed one, a forest of columns designed to be a "ballroom" crossed by light, air, rain, and where 'even seagulls could fly'.

The second, Mies van der Rohe's project for a museum (*Neue Nationalgalerie*), in which the mesh of the pillars becomes a visual guide for a differentiated use from point to point.

We could also recall the example of Salvatore Bisogni with the *Mercatino e Centro Sociale di Sant'Anna di Palazzo* (San Ferdinando district) in Naples FIG. 7, a market in the San Ferdinando district that fits into the dense fabric of the metropolitan city, creating a functional large and at the same time a scenic backdrop in the street. This collective building aimed to integrate harmoniously with the historic environment, offering a space that reflected the ideals of civil coexistence. The project is a very small complex, intended partly as a local market and

partly as a social center, with the aim of meeting the need to create a meeting point for the community and to strengthen the identity of the neighborhood. The architecture of the building is characterized by a clear distinction between the different functions: the market area had a light and open structure, while the roof was supported by a solid wall that outlined the adjacent functional space. Bisogni emphasized the value of the built environment with the concept of the "clod", the equivalent of the island in a sea of land, an element that, due to its condition, needs to be distinguished and differentiated from its surroundings by means of a rise, a base here in fact.
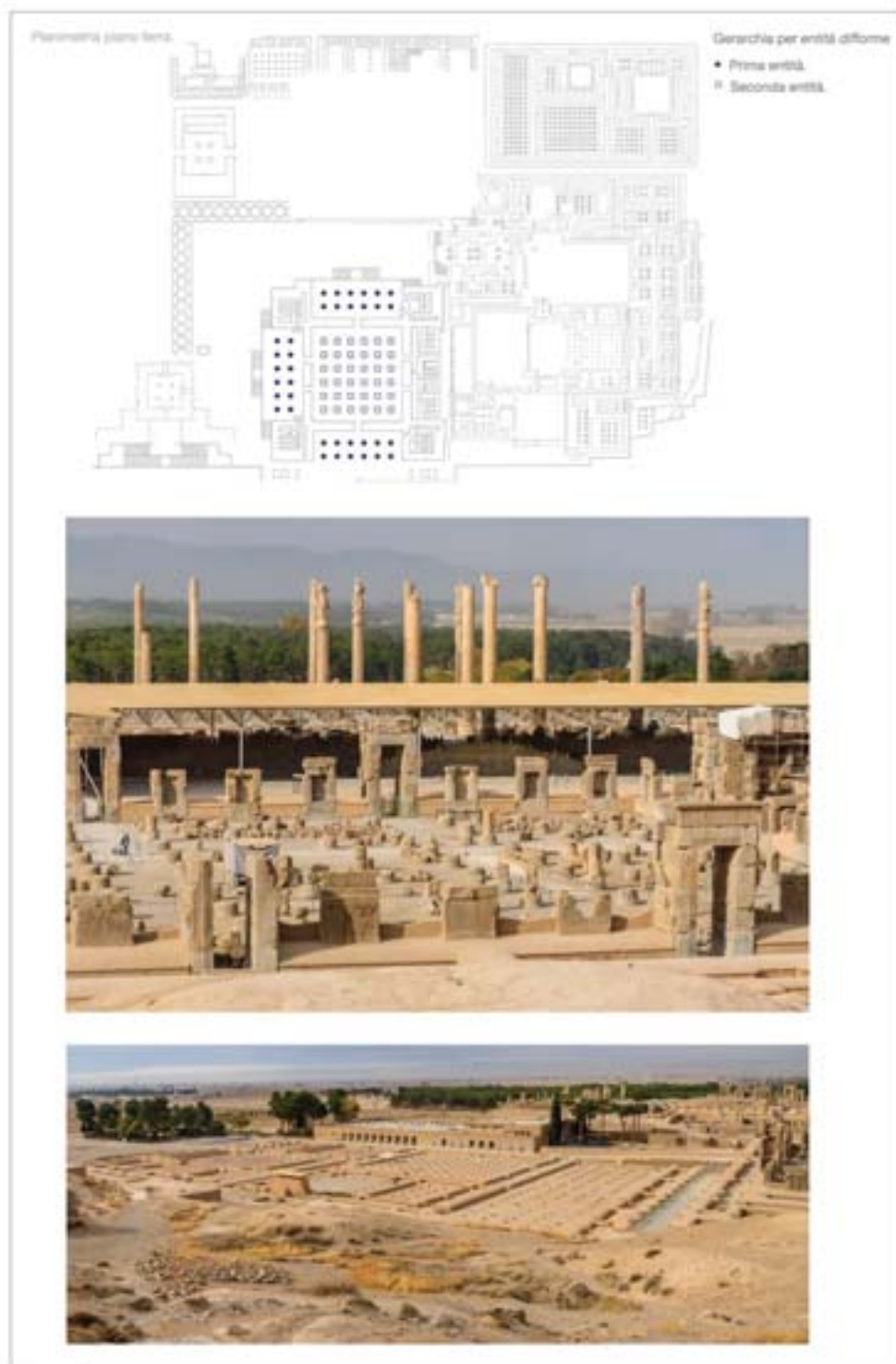
Fig. 0

Superiormente, in ridisegno l'Apadana di Persepoli con evidenzia delle 36 colonne. IRetrostante, un secondo edificio ad impianto ipostilo, il *Palazzo delle 100 colonne/Sala del trono*.
Inferiormente, fotografie dello stato attuale.

Piano terra

Piano interrato

0   160 200 m
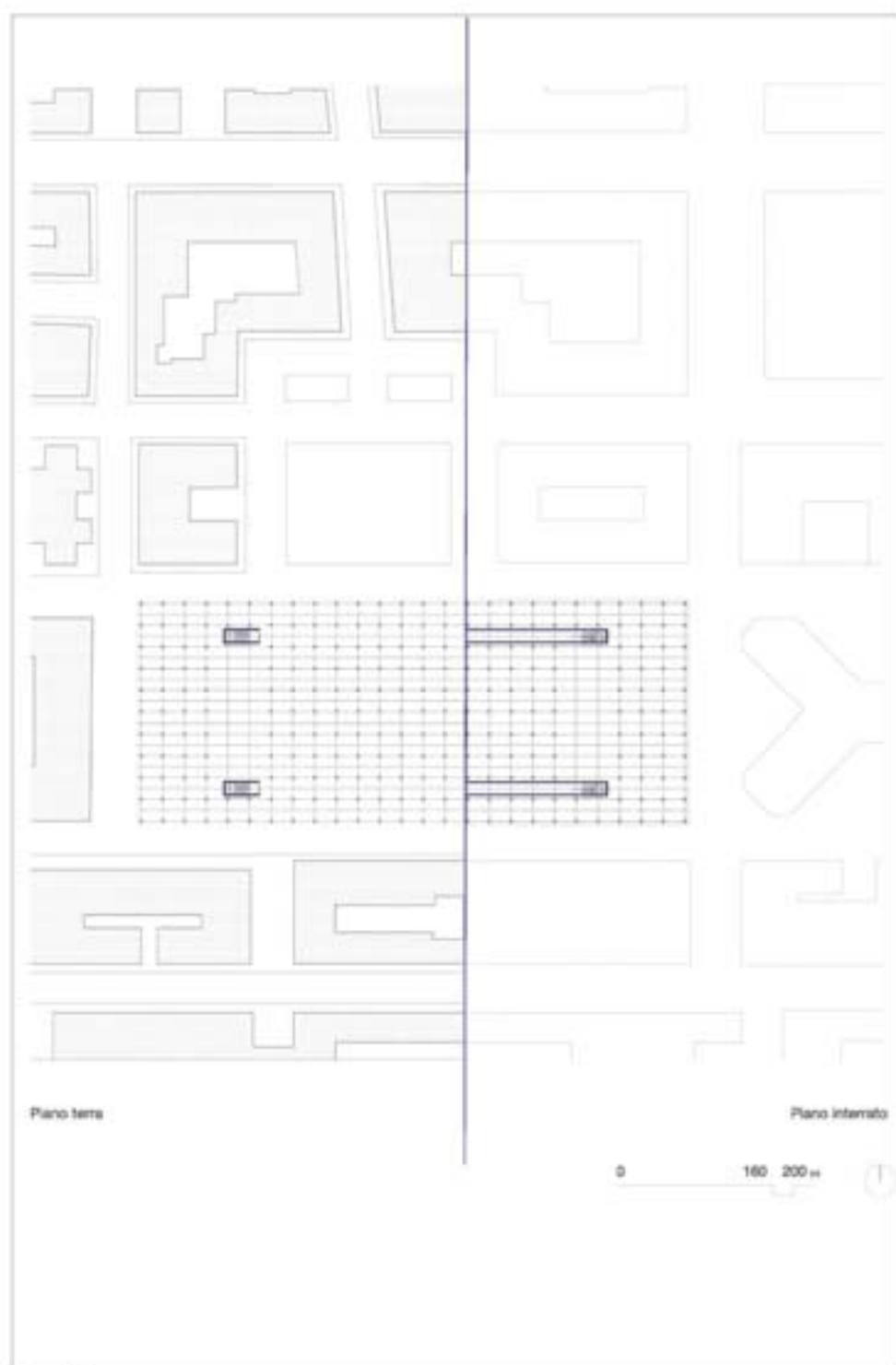
Fig. 1.
Planimetria di progetto del sito ubicato ad Ancona (43.61582929,13.51413338).
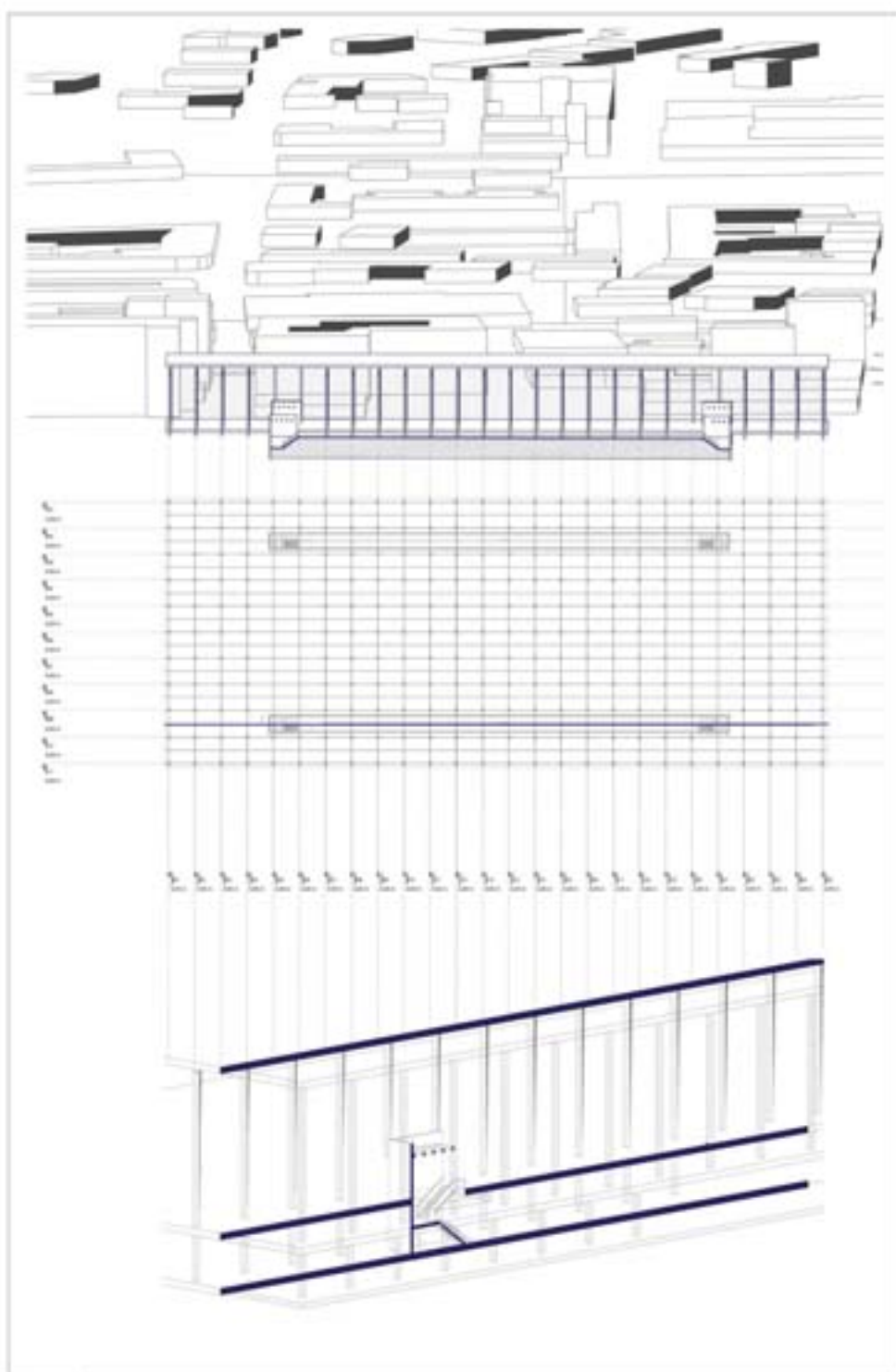
Fig. 2.
Vista prospettica con piano di sezione in corrispondenza della mezzeria dell'edificato; dunque riportati i ritmi dettati dalle battute strutturali. Infine un dettaglio nel piano di sezione.
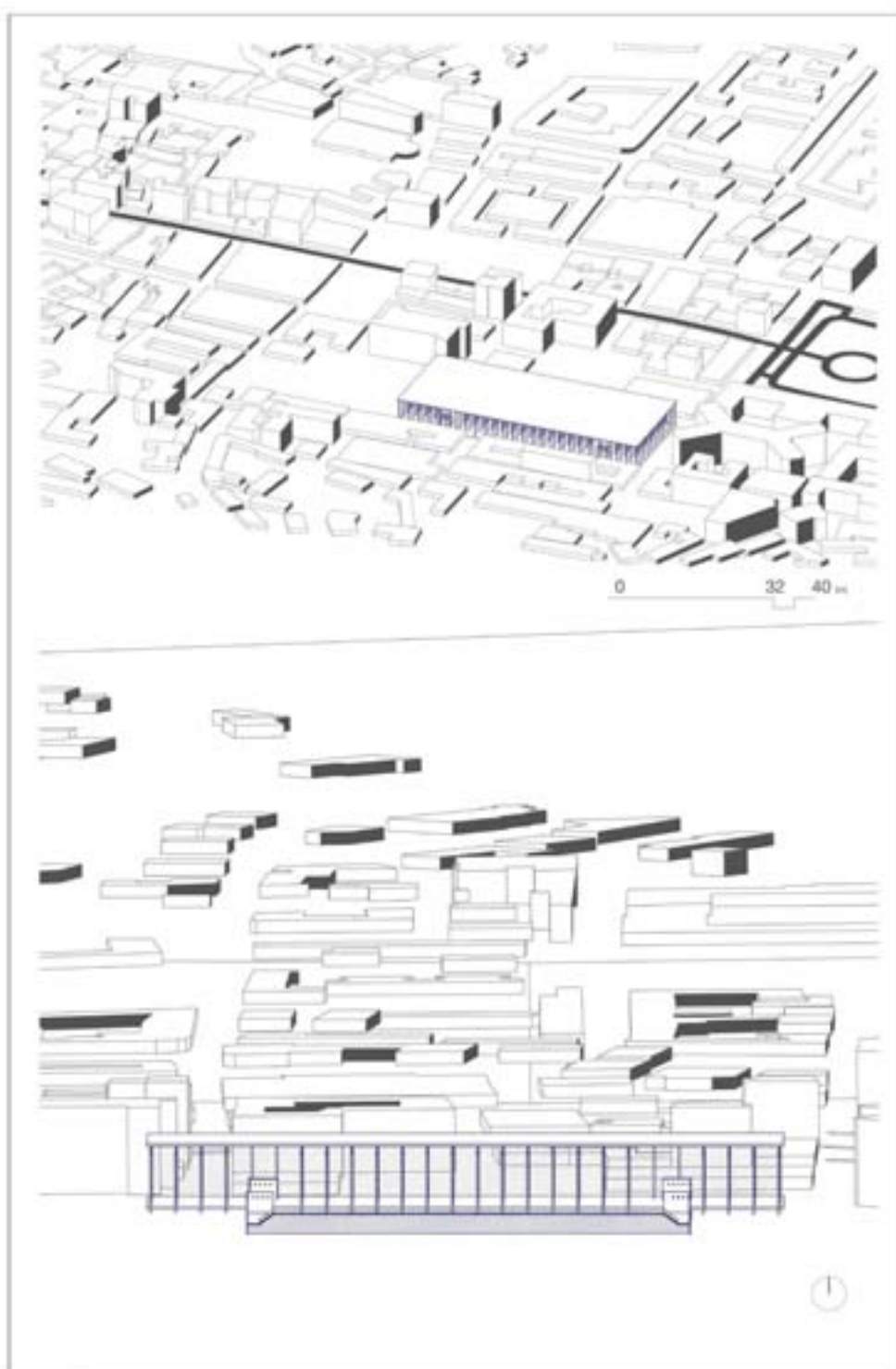
Fig. 3.
Viste prospettiche sul lato SE.
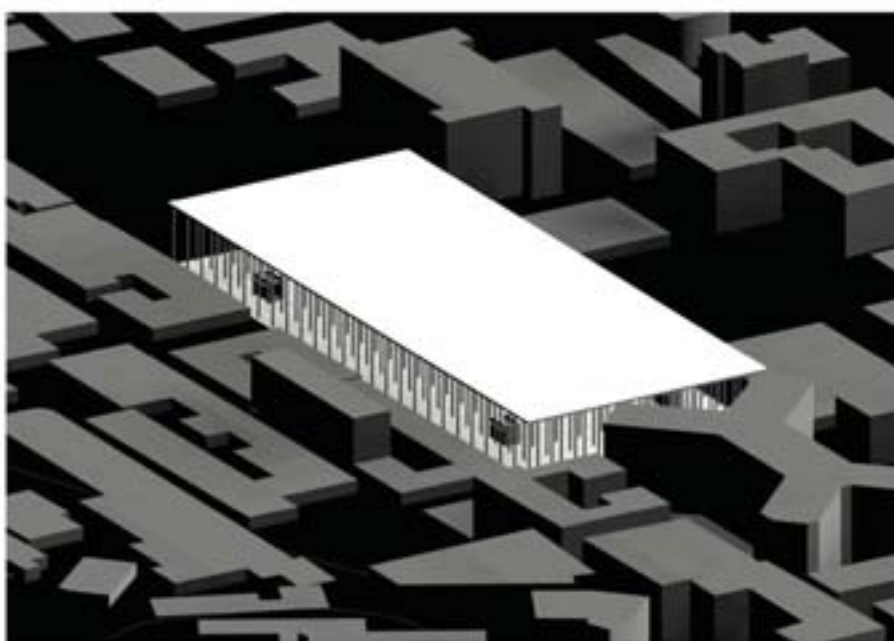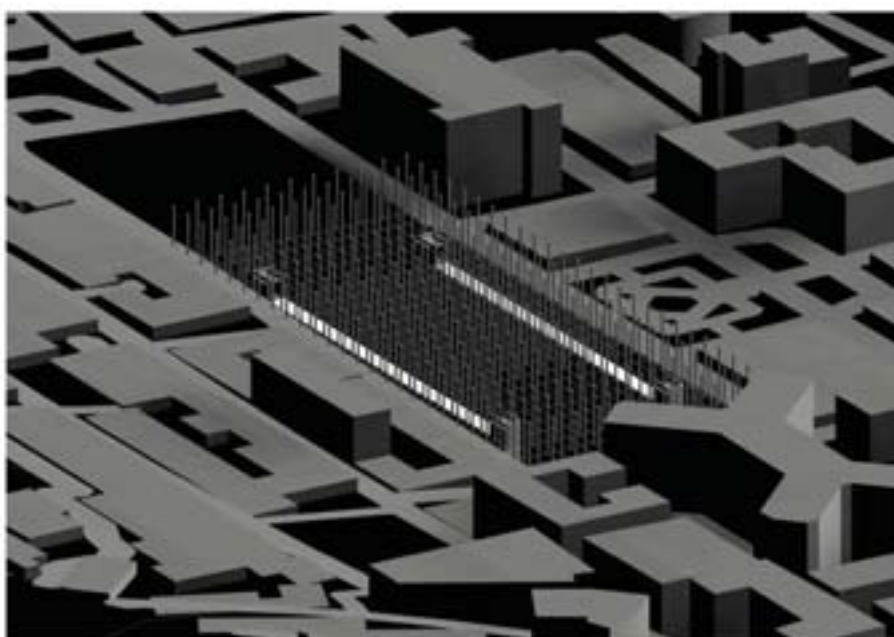
Fig. 4.
Vista interna; in evidenzia la maglia ipostila e i due corpi-pieni sottostanti il livello stradale.
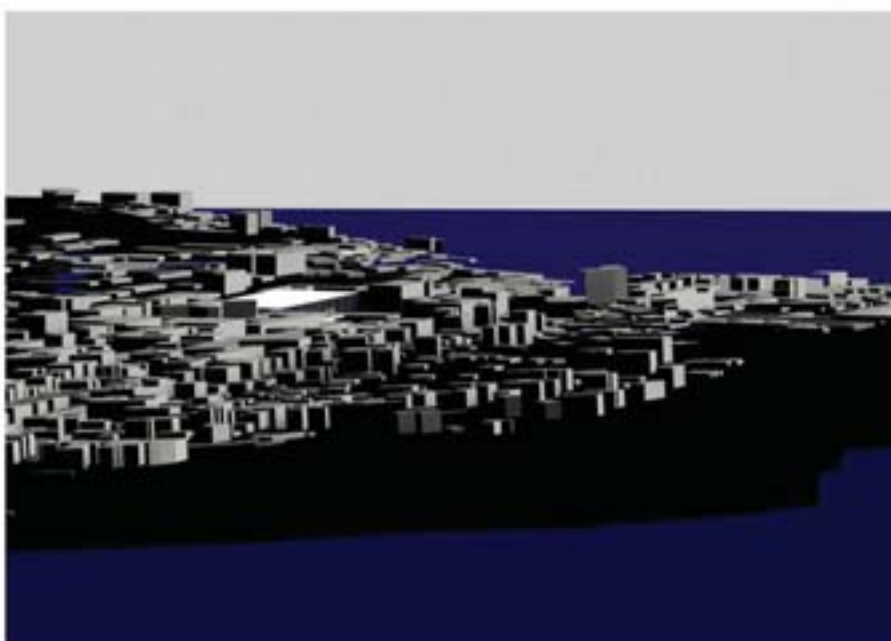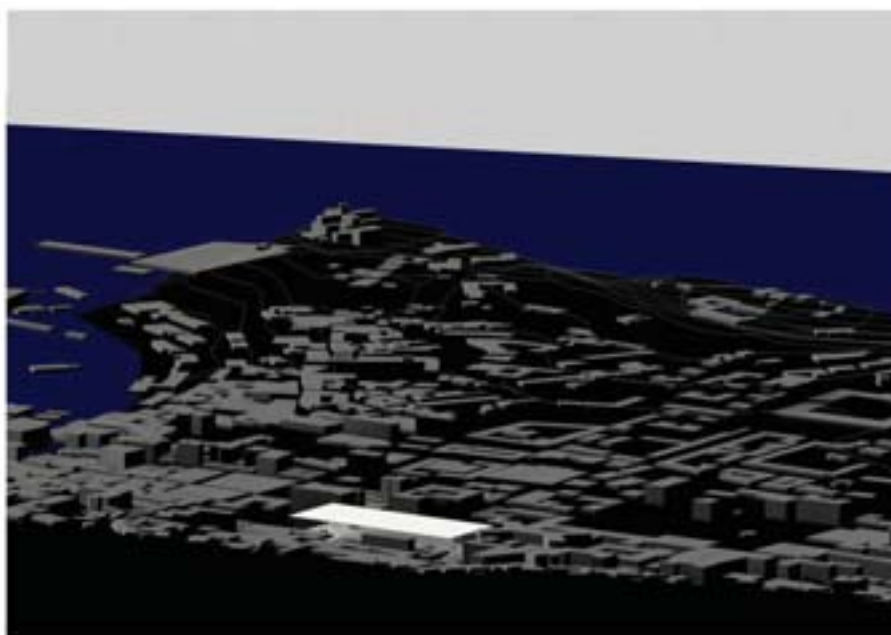
Fig. 5.
Viste prospettiche, rispettivamente lato SE ed E.

Fig. 6
Il progetto di Heinrich Tessenow per il salone delle feste "Kraft durch Freude" sull'isola tedesca di Rügen nel 1936.

Fig. 7

In alto a sx, disegno a china di S. Bisogni 1986, *Architetture immaginarie*, D. Vitale, TECA 2019.
In basso, vista di un modello plastico rappresentativo.

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The absence of colors

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Abstract
The destruction of recent decades, anthropic and natural, has highlighted how precarious is the condition of the elements that make up the world cultural heritage.
The "Beni[1]", movable and/or immovable, have been failed, disappeared, heavily damaged, deprived of their essence, erased.
This lack, of which we are aware, does not, however, exclusively concern only their physical component, but at the same time we lost the chromatic parameter that is specific for places or artworks.
The theme of color in architecture and art has always been at the center of numerous debates, but we never talk about is absence and how that loss compromise unconscienced the way we relate to the world Heritage.
The absence of color could compromise the cultural heritage uniqueness; in this sense we need to reflect on how destruction determinate a sense of emptiness in those places, that would never be fulfilled. So, we can rebuild but we will never be able to get back, because color represents the intangible component that we will never be able to recover.
We live in a word that is made of images, social networks are built over it and the main theme of those images are not places but colors and war, natural events, pollution changes color of heritage and we will never be able to regain it.

Keywords: Color, lost art and architecture, absence, lost memories, photo

1.   Introduction

The last 100 years represent an important cross-section for understanding how ephemera is the world, we seek to protect.
Wars and natural disaster are straining the techniques and the methodologies of culture heritage preservation. The process, that we constantly implement to preserve, as much as possible, architecture and art, appear to be fallible and deeply insufficient.

Since the first ward war, we were able to see cities crumble underneath the power of the fire; we start to understand how fragile architecture, archeology and art are.

2.   Color in World Heritage

"*Life has never undergone such a radical change as during the last hundred years, it has been from top to bottom, in all our ways of expression, not one stone of the old structure being left upon the other. This whole century has been one uninterrupted revolution, restless, pitiless, shameless, gnawing into the very intestines of civilized humanity. Nothing has resisted its devouring violence, nothing, absolutely nothing has remained of the good old times, they have vanished with their customs and manners, their passions, tastes and aspirations, even love has changed, all, everything is new.[2]*"

Since 1893, the theme of color and life changes is at the center of the academic debate. In the last few months, maybe days, we lost an important part of our culture and world cultural heritage, but we still underestimated the extent of that loss.

It's important to start to think about the underlying meaning and what architecture/archeology/art represent for an entire community.

In our line of work, we are focused on the restoration and reconstruction methodology, and we look to them as a starting point for experimenting; we are interested in their physical component and how to recreate it, in an obsessive spiral, sometimes, focused on returning a symbol to the international community.

During those process, we lost to put some focus on an important component of those "beni" and that isthe chromatic parameter, which is specific for places or artworks.

The theme of color in architecture and art, it's always been the focal point of numerous discussions and it was analyzed in numerous thematic areas as history of art and architecture; lighting; psychology; urban space; restoration; culture.

The color is the element which, in its perception, gives the observer a sense of amazement; it is that immaterial place where society reflects existence in all its component like emotion, spirituality, politics, social space, tradition and everyday life.

In every culture, we can find a very specific space dedicated to color; there are places in the word known for their color like Suzhou Classical Gardens or Haeinsa Temple or even the monuments form Abu Simbel to File or the Yellowstone national park or the Alberobello "trulli".

Every single element has an identifying color recognized internationally and it's symbolized by that aspect.

The academic world has, in fact, always recognized the value of this component but the situation completely changes at the moment of its compromise or its disappearance or its destruction.

3.   The absence

It's important to start to think about of what the characteristic element of the World Heritage in every single case is, because that single, ephemeral, immaterial element is always lost, and it can never be restored.

For example, if you think of the city of Jerusalem, the image that anyone connects to the city is the dome of the Qubbat al-Ṣakhra - Kippat ha-Selʻa, not for its appearance but for its chromatic component, for the gold that reflects the rays of light and for the contrast with the colors of the sky.

If we think about the archaeological areas, like Palmyra, and the destruction due to terrorist attacks, we can easily find all the images online and the color of the blue of the sky and the yellow of the destroyed blocks are define how much we lost, because it would be impossible to reconstruct that archeological site in the same color.

The brown of the stone, oxidized over centuries, is impossible to replicate in the same shade but we need to think about the reconstruction after, because it's important to regain the power of that symbol and the historical site.

The same situation occurs for the ancient city of Benghazi in Libya (Fig. 1-4), whose historical architecture, characterized by well-defined chromatic contrasts, has suffered the devastation of the war. We can rebuild but we will never be able to get back full of it, because color represents the intangible component that it's impossible to replicate in the same shade.

Fig. 1: Bengasi Mosque in old town quarter, in 2009 picture of the Author

Fig. 2: Bengasi Mosque in old town quarter, in 2020 picture from Google Maps

Fig. 3: Bengasi Municipal Hall in old town quarter, in 2009 picture of the Author

Fig. 4: Bengasi Municipal Hall in old town quarter, in 2020 picture from Google Maps

The history of color photography shows us how places possess a color that can never be restored with mere reconstruction, we can find some inspiration in Stephen Shore words:

"*It's the bane of my existence that I see photography not as a way of recording personal experience particularly, but as this process of exploring the world and the medium.*" And more in
"*Colour extends the palette of a photograph and adds a new level of descriptive information to the image, increasing its transparency because we focus less on the surface, since we see colours. The description becomes more in-depth because we see the colour of light, the colours of a culture or an era.*" [3]

We are witnessing a slow process of de-recognition of the value of color; its use, therefore, is no longer linked to tradition or the definition of architecture or art but of a new reinterpretation of what we are losing.
In numerous cities, although they are not recognized as world heritage sites, but they represent an important cross-section of local culture, the historicized color is replaced by a contemporary versions that is far from the tradition and identity of the architecture itself (Fig. 5-7).

Fig. 4: An example of XIX Palace in an Italian City in November 2022 picture from Google Maps and in may 2023 picture from the author

Fig. 5: The square reinterpreted by a local artist based on historical photographs.

Fig. 6: The square nowadays (picture of the author).

The pictorial film has always defined specific stylistic currents; from red to yellow to light blue, every single color belonged to a movement, was a symbol of a specific historical moment, was used as political support or devotion, or even as a protest.

Color nowadays has lost its identity, it is no longer a story or statement, or a representation of a tradition or a specific characteristic of a territory.

Every choice in the past respected the definition of the architecture and preserved the perspective unity, today this aspect takes second place, in reconstruction or in searching for what is destroyed. Sometime the color no longer respects the formal scansion but simply the personal and proprietary choice. The analysis of the situation of some of urban centers, following major traumatic events, makes us reflect on the need for a system of good practices that can allow the conservation of the territorial architectural heritage in its differences.

We need to start to recognize that color is one of the founding components of the cultural heritage, it is the element that defines architecture and art in its forms, it is the component that allows our eye to perceive the element materiality, since it is the colored shadow that our eye recognizes the texture, just like the Van Gogh's Vase with Lychnis, in which the master's brushstrokes are defined by the contrast of yellows.

4.   Conclusion

War, natural events, pollution changes color of heritage and we will need to start to think how to preserve it. Now it's important to start to acknowledge the situation and start to store up images of before, duringand after.

Current technology allows us to understand the current situation and photographs, punctually, indiscriminately and precisely how color changes everywhere in the world.

We live in a word that is made of images, social networks are built over it and the main theme of thoseimages are not places itself but the colors of how they appear.

Thanks to the use of system like Google Street it is possible collect images and their color and how much the transformation of the chromatic has changed the relationship with the space and the heritage. We need to be prepared to create an international space where all the images of the world can be stored. Every second an image of a place is published on social media, even remote but no less important places, and in the future each of those images will allow academics or technicians to reconstruct not only the three-dimensional component of what is destroyed or damaged, but at the same time the chromatic value that they possess and how the color changed during time.

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In search of a new urban livability. The case study of Parco Verde neighbourhood

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1. The public housing

The evolution of public housing in Italy landed, in the second half of the 20th century, on a large-scale settlement model, with the construction of actual "macro-structures". Their nature, distant

from the real social needs of the communities they were supposed to serve, led to formal and social distortions within working-class neighborhoods, causing the degradation that is still observed today. Although designed with the intention of improving the quality of life, these large settlements have created alienating and dysfunctional environments, contributing to the fragmentation of the social fabric and the accentuation of urban problems. The paper aims to explore a new approach to public housing that took over from the first implementation phase of the Economic and Popular Housing Plans, as part of the PRIN research project entitled "Places and stories of proximity. A methodology for the regeneration of collective spaces in modern neighbourhoods", founded by Italian Ministry of University and Research. It was from the second half of the 1960s that the first attempts at resizing in the implementation of the new PEEPs began to emerge. The new measures adopted were characterized by a critical review of the scope of interventions, leading to a reconsideration of the considerable expansion experienced in the initial phase of PEEPs. In addition, there is a reduction in the trend toward functional integration of buildings. The latter is replaced by a more conventional arrangement of services, preferably located on ground floors or in specialized cores. The typological complexity of buildings is also reduced, favoring a return to a composition that clearly distinguishes between different building types, such as towers, in-line buildings, and balconies. The direct relationship between the street and building facades implies a rethinking of the role of the street itself, which is no longer just a traffic artery but also a space of interaction and connection between buildings and the community.

The downsizing of urban and architectural interventions aimed to create a more balanced and functional environment, where the distribution of services and spaces better meets the daily needs of the inhabitants. Thus, an attempt is made to promote greater livability and usability of urban spaces through solutions that enhance the specificity and diversity of the various constituent elements of the urban fabric. This approach reflects greater attention to the quality of urban life and sustainability, seeking to harmoniously integrate new buildings with the existing context and to promote better interaction between people and the built environment.

2. The research analysis

Figura 1 Case study location. Parco Verde neighbourhood, Caivano municipality.

The research team carried out a preliminary analysis of urban and metropolitan fabrics with the identification of the most important residential building districts, in particular public housing. The post-earthquake period (1980s-1990s) was explored in depth, both in the city of Naples and in the metropolitan context. In the Naples metropolitan area, the so-called "Parco Verde" public housing district project in Caivano municipality (fig.1) emblematically represents the new approach described above.

The neighbourhood was built in 1981-82 with post-earthquake funds and facilities provided by Law No. 219 of May 14, 1981: it is a particularly problematic neighbourhood in terms of the endowment and usability of public spaces, particularly the 'open' ones, and the lack of equipment. Positive elements include the presence of numerous players in the so-called 'third sector' and the presence of several schools with all basic levels of education and which are a civic and legality supervisory body.

The project, conceived as an amendment to the area plan drawn up by Marcello Vittorini, covers an area of more than 14 hectares north of the urban area. In the aftermath of the November 23 1980 earthquake, the president of the Regional Council, acting as extraordinary government commissioner, identified the area located north of the municipality of Caivano as the place for 750 of the approximately 7,000 housing units to be built as part of the "Oltre Napoli" development program for the settlement of 4,499 people. The intervention, carried out as a variant to the existing area plan, covers an area of more than 141,000 m² north of the built-up area. The neighborhood was connected to the main road system and a new ring road, already contemplated in the PRG, was built. The organization of the residential settlement, characterized by multi storey buildings (*edifici in linea* in italian), includes a main roadway consisting of two north-south axes and a secondary one, reserved exclusively for internal traffic and service to the residential areas. Public and public use areas, mainly arranged along the road system, allow for the definition of collective and social gathering spaces, such as the civic and religious center square, as well as urban-scale facilities for sports and leisure, such as the sports center and auditorium. Public facilities and buildings are numerous and of different kinds (fig.2). Several school facilities have been built, accommodating two kindergartens, two preschools, an elementary school, a middle school and a junior high school. There are craft workshops and stores, a religious complex, a commercial and administrative center, a civic center, a library, a sports center currently in a state of disrepair, and an auditorium. Public outdoor spaces include several squares, a public park and a school park.

Figura 2 Mapping of neighborhood services and land use

3. The research perspectives

One of the problems that have contributed to the degradation of Parco Verde neighbourhood is attributable to the urban planning management of the area. The services envisioned in the initial plan, as described above numerous and diverse, were culpably delayed or never built. Many of these were built in phases, long after the neighborhood was handed over to citizens, such as the Delphinia sports center, which became active in 1999 and closed in 2018 due to its deteriorating condition. This aspect, in conjunction with other and diverse issues, has inevitably led to the onset of profound difficulties in the daily lives of citizens, who have gradually developed a perception of general neglect by institutions at all levels. Added to this is the lack of maintenance and upgrading of common areas, which has further aggravated the area's situation of physical and social degradation. The existing infrastructure, often inadequate and poorly maintained, no longer meets the needs of the resident population, contributing to a deteriorated and unsafe urban environment. The failure to fulfill initial promises has undermined citizens' trust in the relevant authorities, generating a widespread feeling of distrust and resignation. Therefore, an organic and strategic intervention that includes the timely implementation of missing services, the upgrading of existing infrastructure, and the implementation of social and economic support programs through the reappropriation and enhancement of "spaces of proximity" is imperative. Crucial to the success of any redevelopment intervention is the

Figura 3 Sport area. Parco Verde, Caivano (ph. Chiara Bocchino)

Figura 4 Public passages. Parco Verde, Caivano (ph. Chiara Bocchino)

Figura 6 Underused proximity spaces. Parco Verde, Caivano (ph. Chiara Bocchino)

Figura 5 Abandoned neighborhood facilities. Parco Verde, Caivano (ph. Giuseppe Guida)

involvement of the local community in the various stages of transformation: indeed, the reasons behind the malfunctioning of collective spaces in modern neighbourhoods should be deciphered together with those who live in the places, sharing with the subjects interested in their transformation the path that leads from the identification of issues and needs to the intervention hypotheses. This can be implemented through the organization of Living Labs, where co-design processes can be initiated, not only in the dimension of analytical and design sharing, but also in ensuring a connection between the design phase and the implementation-management. These Living Labs would serve as collaborative spaces where stakeholders, including residents, urban planners, local authorities, and other relevant parties, can actively participate in shaping the future of their community. By fostering a sense of ownership and shared responsibility, such initiatives can bridge the gap between planning and execution, ensuring that the designed solutions are practical, sustainable, and truly reflective of the community's needs. This holistic approach will not only enhance the effectiveness of urban

interventions but also promote long-term engagement and empowerment of the local population, ultimately leading to a more resilient and inclusive urban environment.

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The notion of "*Drawing*" as a contribution to the notion of "*Existential Space*".
Architectural graphic representation: user, space and landscape.

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Abstract
The Drawing that anticipates Architectural Space, establishing an *original relationship* (well defined in *L'Oeil et L'Esprit*, by Merleau-Ponty, 1960) with an object yet to be built and yet to be inhabited, is just an image and not the *space that will emerge* from it (or, better, in-function of it); and, much less will this image be able to incorporate the relationships that that will be established between the future user of that space and that space – let's us say it without fear and categorically: the relationships between the user of that space (its inhabitant) and that space (its dwelling) and the landscape, let's call it *Architecture*. The thing is, architecture is not just the architectural object; it is, from this point of view, a relationship – the relationship between inhabitant and housing and landscape.
It deserves to be asked: what can be drawned from this relationship?
On a first observation, the dichotomy between exterior and interior, between the facade that is offered to the contemplative gaze and the existential space from which the act of living can take place, is the matter that Architecture manages as a phenomenon that extends to practically the entire scope of the image.
However, it does not seem clear to us what we mean by *Space*; Therefore, before advancing our reasoning, we must explain what we mean by "space" – therefore, closely related to *Existence*. And, "since then", for example, because: "[…] existence is spatial."; and "You can't separate the man from the space." (Martin HEIDEGGER cited by Christian NORBERG-SCHULZ, *Existencia, Espacio e Arquitectura*, 1975, p. 18.)
A new paradigm for inhabiting *Inhabiting Spaces*?
A paradigm that goes beyond living between *Heaven and Earth*? – as Heidegger told us in 1951 in Darmstadt? (Conference August 5, 1951, «Darmstadt Colloquium II» on «Man and Space»; printed in the publication of this colloquium, Neue Darmstädter Verlagsanstalt, 1952, p. 72ff.)

Keywords: Drawing, architecture, representation, graphics, space, landscape.

Cruzeiro Seixas, 1982, oil on canvas, 50x38cm.

"Architectural space is a special category of free space, phenomenologically created by the architect when he shapes and scales a part of free space."[1].

Architectural space is a special category of free space – born as a consequence of the establishment of a *limit*.[2]

That *limit* is the architectural object. It is the *physical barrier* – a *border* established between the inside and the outside, a membrane. This physical barrier, this border, this membrane is what is drawable.

The erection of the *limit "delimits and shapes the habitable space"*[3] as the antithesis of this disordered freedom, this chaos. The possibility of living in order – as a syncretic attitude towards disorder – is a fundamental condition for architecture. It is from his own body that man *measures* and *orders* free space.

Let us assume, then, that architecture establishes order in free space. But, from this point of view in which we legitimately place ourselves, we can ask ourselves: after all, what is this space of architecture?

By way of antithesis, we could respond that *the space* that architecture deals with is very different, for example, from that of painting, that of mathematics or that of physics – it would even be banal to respond in these terms; but, even so, let us continue with this always vague answer: mathematics and physics have abstracted space – constituting it as an ideal[4]; painting, for its part, established it through representation, disregarding the observer in the outer space of the inner space it simulates; But what about architecture? What space is this? What is this about, anyway?

Architecture, establishing order, concentrates all human dimensions: *"The architectural space can be defined as a 'concretization' of the existential space"*[5] – this is a very enlightening observation. In short, we could say, if we wanted to risk a more radical answer: architecture concentrates all human dimensions, that is, *life* – but *life*, curiously enough, does not have a scientific status, not even in medicine. Therefore, for now, let us use less abusive language, and, instead of life, let us say a *manifestation of human existence*.

From the outset, when we talk about architecture, we must consider the notion of use – of a device that is available for use – and therefore, as a result of this *use*, the immersion of the body in that device.

"Practically everything that man does and is is linked to the experience of space"[6] – seems to be true.

The space understood by architecture is not a space as mathematics or physics understand it, an abstract space, it is, rather, a *structure*[7] where someone can or cannot *manifest their existence*[8] – in such a way that, space comes to mean existence itself.

Let us, then, surpass the notion of *existence* in what concerns us.

On the one hand, existence has repercussions on the being that opposes nothingness (understanding *nothing* as the *absence of meaning*, the *absence of order*, *insignificance* – the disconcerting chaos); on the other hand, existing is never entirely reduced to the *fact of being*. *Being* is when it becomes aware of its own consciousness, when it feels constituted when it constitutes – establishing order in nothingness by attributing meaning. So, in light of this reasoning: to *exist is construct* – being. But, don't we thus enter into an apparent contradiction? For if we said that existing and dwelling were so closely related that we could consider them coincidental? We only apparently contradicted each other. Let's see why.

Manifesting its existence, the subject constitutes the space, attributing meaning to it. Dwelling is, from this point of view, the *construction of a subjective representation in space* – the *"representation of the self"* in space; but this representation does not occur in isolation, that is, this representation arises as a consequence of an infinity of relationships that, in space, the subject can establish with his fellow human beings, within a certain logic, within a, if we want, anthropological logy in space.

Space is subordinate to existence and existence depends on space – both, let's say, define a temporal order; both are coincident in that they coexist at the same time. Both, let's say, in parity and coincidentally, exists *synchronously*. It would therefore be reductive to say that it is space that, ultimately, provides the attribution of meaning carried out by the subject; If we can speak of (architectural) space as a *subjective representation of the self*, it is because we admit that both space and subject are contemporary within a mutual attribution of meaning.

This *subjective representation* of the self in space gives us the entire body and not *just what comes to us through the eyes as in a drawing* – not that we want, with what we have just said, to remove or not recognize the drawing as a possibility unique in the anticipation of architectural space, quite the opposite: it is the drawing that, as a process, configures this space where this *representation of the self* could come to pass; What we want to say, after all, and that is, is that the distance between the representation and the represented cannot be forgotten or annulled, we cannot forget the distance that exists between the drawing of the thing and the thing, the distance that exists between the my relationship with the design of the thing and my relationship with the thing. Because if the design of the thing is experienced with the eyes, the thing is not only experienced with them, but with the entire body and everything that can come from it.

It is with the whole body that space is experienced – it is not just through the eyes that the full realization of man in space occurs. What we have just said seems to be true, however, let it be clear that the *representation of the self in space* is not only, we believe, of a perceptual order. Gorjão Jorge uses the example of the house: "The house thus becomes a kind of frame

for my territory. I have to be able and I must want to identify with it, as it becomes an expression of me. In fact, my social image is deposited in it. In fact, it signifies me through two simultaneous and contradictory actions: it shows me and, at the same time, it hides me. Within it, for me and for those close to me, such domesticity takes place. Outside of it, for me and for others, non-domesticity, my non-territory, is realized, a space that is fundamentally and to different degrees *hostile to me*.

But, what I want to show about myself – even to those close to me and to others – must be welcomed by my home. It allows me to build a representation of my private being and, at the same time, my public being. It is, therefore, my identity that is, in this way, exposed and that, through the different daily practices, finds in the image of the house a suitable setting to represent itself.

The house will therefore, in a certain sense, be the main document of my personal history and, at the same time, its archive – an image that portrays me and whose representative status I recognize, in fact, whose representative status I explore in different ways."[9] Can the drawing represent this? Or, instead, represent only the limit, the border or the membrane that *delimits and shapes it*?[10]

Continuing with the example of the "house", Gorjão Jorge says: *"The house becomes, therefore, the form in which housing takes place (as an act of dwelling) for those who use it in accordance with their respective statuses within the group, family or other, to which they belong."* [11]

The drawing, as an anticipation of architecture, can only represent the limit of certain materialities, it is the simple figure of the scenes of the different actions carried out by its inhabitants, even though it is not capable of representing these *different actions*. Why?

Because, architecture – as an inhabitant/housing relationship – is not representable; because architecture is a relationship, it is not an object. The architectural form is not designable, it is fruitable, it is livable.

The subject sensitizes the space and, in doing so, elevates it to the condition of a sign, of a thing that remains instead of something else: the space remains instead of its identity. In other words, as space does not exist in itself, and space is sensitized by the subject, it is significant – therefore, bearer of meaning –, therefore, it is with the entire body, finite and heterogeneous (as Norberg.Schulz says), that space is experienced, because it is through the entire body that it exists as a representation, because it is through the entire body that, effectively, the full realization of man in space can occur. The space simulated by the drawing can only be experienced with vision. The space (which intends *to become architectural*) simulated by the drawing is a visual space only; which describes, we do not deny, a certain narrative, in fact, painting knows this well, however, a very different narrative from that which will happen when life is expressed in the space delimited and shaped by the architectural object that this drawing anticipate.

But, let's return to the point where we left off and which, we believe, deserves to be worked on further: *"The architectural space can be defined as a 'concretization' of the existential space"*[12]; and, Norberg-Schulz also tells us, that existential space is a *"psychic structure"*[13] Norberg-Schulz, establishing some considerations about existential space, understanding it according to levels, clarifies: *"[…] existential space [is] a relatively stable system of perceptual schemes or 'images' of the surrounding environment."*[14]

However, it seems vague as an answer. What could *"psychic structure"* mean in this context? It seems to us that we were already very close to a possible answer while, precisely, we were talking about drawing: we said, a little further back, that drawing was *a kind of rationalization of an intuition of an object and/or space (architectural(s)), a kind of ordering, regular arrangement, the expression of a cosmology*; Now, perhaps it is from this point of view that we can understand what Norberg-Schulz says when he talks about the concretization of existential space, when, in short, he says that *architectural space* can be defined as a concretization of a psychic structure. Drawing, in fact, is the first approach to this structure; That's why we were able to "situate" it, as a process, between the *hand and the imagination*; the drawing is, let's say, the first symptom of reality of this structure.

But, we can also try to answer within a broader scope of the image: architectural space can be defined as the realization of a psychic image. But aren't they all psychic images?

In a way we can say that they are – after all, we have already seen it, it is only through images that the subject can feel things, it is through them that he comes to exist in things and those same things in him. The set of these things, the relationships that the subject establishes between these things, he calls reality. This reality is constituted by the subject, it is not pre-existence to the existence of the subject (even if it is interpreted as such).

So, when from the world of all things we intend, as is our case, to approach spatial things, architectural space, we have to ask ourselves: what psychic image is this that, when realized, is at the origin of architectural space?

In order to answer this question, let us remember some considerations: the image, as we have seen – resulting from the representation that the subject constructs constituting his world – is our way of arriving at things, all things. It is with the image that we feel this world, a subjective world – or sensitive world, as we observed in the words of Merleau-Ponty –, a world that strives to be common to everyone, but that in any case fails in this intention. The perspective that the subject has of the world will always be individual, even when trying, through language, to reach reciprocity, because it is from different points of view that the subjects constitute and that is why they each inhabit their world, their spaces of existence. Precisely because it is individual and private, we find our response difficult.

Still: *"the house is one of the greatest (forces) of integration for man's thoughts, memories and dreams. […] In a man's life, the house removes contingencies, multiplies its advice for continuity. Without it, man would be a scattered being. It holds man through the storms of heaven and the storms of life. It's body and it's soul. It's the human being's first world."*[15]

The house is recognized as the original topos: *"Because the house is our corner of the world. It is, as is often said, our first universe. It is a true cosmos. A cosmos in every sense of the term.", continues Bachelard. Because, "In the house, it coexists with the everyday and rational dimension, a metaphysical and symbolic dimension, different versions of the world that overlap."*[16]

But why is "the house" recurrent in our discourse? The house is always our reference: everything else, all the relationships we maintain with other spaces – whatever they may be, even public ones – are structured by analogy with "the house". But how so?

Understood from a phenomenological point of view, existential space, this "psychic structure" as Norberg-Schulz calls it, is the one where all man's efforts converge in the search for the initial shell in all the spatial devices that are offered when inhabiting: *"The geographer and the ethnographer can describe the most varied types of housing. Regarding this variety, the phenomenologist makes the necessary effort to understand the germ of central, safe, immediate happiness. Finding the initial shell throughout the house, in the castle itself – this is the basic task of the phenomenologist."*[17]

It is the house, it is the original topos, this is the model – ultimately, the sacred place, the "foci". Let's say it another way: architectural space is a kind of approximation to that, let's take a risk, mythical scenario that is "the house" – the "house" as the first, using a term from Torrijos, *"mythical geography"*[18] .

Let us not get lost in considerations about the myth, let us just say that associated with the myth is the rite – the rite as the way of putting the myth into action in the life of Man. This is because, as we will see later, the architectural object ends up serving as a "scenario" where these rites, or rituals – as we will call them later –, may or may not happen, whether or not they materialize the myth that it is at their origin; or, using another terminology: the architectural object ends up serving as a scenario where human actions, gestures (an expression we will use later) can or cannot happen, materializing or not materializing the "existential space". of its user(s), in short, whether or not this "psychic structure" materializes, depending on which the space can be architectural.

Like a dream.

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World Heritage and Dwelling on Space
World Heritage and Cities in Emergencies

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Le Vie dei Mercanti

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The memory of the protection of the Italian historical-artistic heritage among the wounds of the last war

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The ongoing conflict in Europe brings to mind the devastating madness of war which manifests itself in the atrocity of death and in the destruction or looting of the historical and artistic heritage, with the intention of erasing the cultural heritage of the attacked populations. During the Second World War there were many examples of individuals or groups of people who, risking their lives or arrest, saved numerous works of art from destruction and looting. This contribution intends to recall two of these events aimed at safeguarding and protecting the Italian artistic heritage. The first, that of the monastic community of Montecassino which managed, with a concerted effort, to save many works kept in the Abbey. The second featured a young woman who with great courage, at the risk of her own life, managed to save many works belonging to the Pinacoteca di Brera which she directed.

Keywords: Protecting Culture, Emergencies and Conflict, Cultural Heritage, cultural and artistic heritage, Cities Emergencies.

1. The war is against culture

Fénelon, pseudonym of François de Salignac de La Mothe-Fénelon, archbishop, theologian and writer in 17th century France, in his work entitled "Dialogues des Morts et Fables" written in 1700, defined war as "an evil that dishonors the genre human". War is therefore the greatest aberration of the human race, as an instrument with which man destroys his own species, for economic, religious reasons or just to assert his power over his fellow men. An aberration that a large part of humanity condemns, but which in some historical moments has been tolerated or even exalted. This is what Filippo Tommaso Marinetti's futurists did at the beginning of the 20th century, who, speaking of war, defined it as "the only hygiene in the world", on the eve of the First World War and the birth of the fascist, national socialist and communist regimes. The atrocities suffered by the European peoples in the years of the Second World War led them to achieve a social and national balance that excluded the use of armed conflicts as a tool for resolving political disputes for around eighty years. Period of peace interrupted in 2022, when Russia attacked Ukraine, raising over Europe and the entire world the specter of a new world conflict that will be more devastating than previous ones, given the use of increasingly destructive offensive weapons. In an armed conflict there is not only the suppression of the adversary as a physical subject, but there is also the desire to suppress that people from the

history of the world, erasing their memory. This objective is achieved by the aggressing armies through the looting or destruction of all those artistic manifestations that constitute the cultural heritage of that people. There are many examples to cite, some dating back to a few years ago such as the destruction of the two statues depicting the Buddhas of Bamiyan, carved into the rock in Afghanistan. The two statues dating back to the 6th century and sculpted in Gandhara style were destroyed by the Taliban in 2001, as they represented the symbols of a religion other than the Islamic one, which they professed. Another example is also the great mosque of Samarra located in Iraq, built in the 9th century, which in 2005 saw its minaret and surrounding walls seriously damaged following an attack on a NATO convoy. Other examples of this kind could be cited, which, overall, testify to a single certainty, namely that we can define war as the enemy of culture. This conclusion was reached globally several years ago with Karima Bennoune's drafting of the report on the destruction of the world's cultural heritage as a violation of human rights. The fundamental concept highlighted in this publication is the significance of cultural heritage in terms of human rights. In this regard we read "Cultural heritage is significant both in the present, both as a message from the past and as a path towards the future. Seen from the perspective of human rights, it is important not only in itself, but also in relation to its human dimension, in particular its meaning for individuals and communities, for their identity and their development."

The cultural heritage of a people, therefore, is the cultural heritage of all humanity. This certainty has pushed many men and women, both individually and in communities, to put their lives in danger and in any case to expose themselves to even serious retaliation to save works of art, paintings, sculptures, jewels, manuscripts and everything that constituted testimony of the cultural level reached by its people, with the aim of preserving them and transmitting them to future generations. This contribution wants to remember two of these episodes that occurred during the Second World War which saw as protagonists in the first case an entire community of Benedictine monks helped by the occupying troops themselves and in the second case a young woman, placed a few years earlier in the direction of one of the museums most important in our country in that period. In both cases numerous works of art were saved which, thanks to the courage of these greats, we can still admire today.

2. The rescue of the works of art kept in the Montecassino Abbey before the Allied bombing

The Abbey of Montecassino, built by San Benedetto da Norcia in 529 AD, located on the top of one of the hills from which it is possible to control the entire Liri valley as well as for its architectural form comparable to a fortress, during the Second World War it became a place to hide numerous works of art from the territories of southern Italy, to protect them both from the looting of the Nazi-fascist troops and from the numerous allied bombings. In it they found refuge, among other things, the treasure of San Gennaro, works from the Museum of Naples, assets of the Prince of Piedmont and objects from the Numismatic Museum of Syracuse. Following the landing in Sicily in July 1943 and the ascent of the Allied troops towards the north of the peninsula, the Abbey found itself, immediately after the summer of 1943, in the theater of military operations, as the German military authorities established a defense line along the Garigliano river, called the "Gustav line", which passed through the city of Cassino, affecting the abbey itself. This circumstance made the sacred building of Montecassino vulnerable and exposed to possible bombings in the area which could have irreparably damaged it with the possible destruction and loss of the historical-cultural heritage preserved in it. By analyzing the historical sources that have come down to us and in particular some war diaries written by some of the Benedictine monks present in the sacred building in those months, it has been possible to reconstruct one of the most important historical pages for our country. A considerable operation, given the size and value of the cultural assets present in the abbey building, of securing and protecting numerous cultural assets, carried out by not only the ecclesiastical community but also by the members of that same army which in many parts of Europe plundered or destroyed artistic testimonies only to erase the culture of the enemy people. This joint operation carried out thanks to some "enlightened" German officers, lovers of works of art and aware of the importance of transmitting them to posterity, who with their

behavior demonstrated that love and respect for art surpasses every circumstance, every disappointment, every different political opinion.

Fig. 1 - Abbot Diamare with Colonel Schlegel and some monks on October 19, 1943 - GROSSETTI, Eusebio. MATRONOLA Martino, The bombing of Montecassino. Cassinese miscellany. 1st ed. Isola del Liri (Fr): Tipografia Editrice M. Pisani, 1980.

This operation today takes the form of a true teaching (lesson of civility). From reading the war diary kept, initially by Don Eusebio Grossetti and then when he was no longer able to write it due to illness, by Don Martino Matronola who, as we read in his introduction to the document, took care of it himself. In particular, it is appropriate to focus on what happened in the month of October 1943, when towards the middle of that same month two officers of the Hermann Goering Division, located in the Montecassino area, Lieutenant Colonel Schlegel and Captain Doctor Becker, informed the then Father Abbot Gregorio Diamare that the Germanic authorities had established the line of defense in the places where the abbey was located and hence the need to save the heritage of manuscripts, parchments and works of art present in the sacred building, so as to preserve them from the destruction that could occur following bombings and war actions. To allow the rapid evacuation of what was contained in the abbey, they made motorized vehicles available to the Benedictine community to transport the goods to Rome, in a protected location. If initially the monks of Montecassino were perplexed by that request made by the Germans and did not trust the real intentions of the latter on the real desire to save the art treasures present in the Abbey, subsequently and under the guidance of Father Abbot Gregory Diamare, they responded with great enthusiasm and in a few weeks they managed to arrange the transfer of most of the works in the building. The clearance operations began a few days after the visit of the two German officers and continued day and night, until the evacuation of all the assets considered most valuable. Twenty-six crates were used to transport the archive documents, while two hundred and forty crates were prepared for the transfer of the library. Several paintings, numerous relics present in the monastery, as well as sacred vestments were also transported and saved.

Since it was not possible to save everything contained in the monastery, some monks prepared secret cabinets in which to hide precious objects. The monastery silver, majolica and processional crosses from Abruzzo were placed in them. To make the transport of everything present in the abbey more efficient, there was a division between the assets belonging to the Italian State, of which Father Abbate was conservator, and the assets owned by the Abbey. With this system, on 19 October Abbot Diamare, in delivering a suitcase containing the relics of the Holy Cross and of Saint Benedict and Saint Scholastica to the German soldiers in charge

of transporting it to Rome, had three crates containing objects belonging to the treasure loaded onto the same truck. of San Gennaro, passing them off as private assets of the monastery.

Fig. 2 - Some images showing the emptying of the archive and German soldiers carrying crates - GROSSETTI, Eusebio. MATRONOLA Martino, The bombing of Montecassino. Cassinese miscellany. 1st ed. Isola del Liri (Fr): Tipografia Editrice M. Pisani, 1980.

Fig. 3 - Arrival in Rome, early January 1944, of some German trucks with crates containing works of art from the museums of Naples- GROSSETTI, Eusebio. MATRONOLA Martino, The bombing of Montecassino. Cassinese miscellany. 1st ed. Isola del Liri (Fr): Tipografia Editrice M. Pisani, 1980.

The crates containing the Archive, the Library and objects from the Museum of Naples were transported to Spoleto and kept in Villa Marignoli. All the assets owned by the monastery of Montecassino were transported to Rome and kept in the Basilica of San Paolo Fuori le Mura. A few months later, on 15 February 1944, the Allied troops carried out a powerful bombardment on the sacred building which largely destroyed it. The reason given by the Allied troops to justify the terrible action was that the Abbey had become an observation point for the German troops, thus becoming a military objective. Historiography in subsequent years has ascertained that the German army, before the bombing, had never used this building as an observation point, vice versa after the bombing the German troops occupied the rubble, making it a stronghold of defense against the allied troops.

The Allied decision to bomb and destroy the Abbey, in addition to being a wicked choice as it destroyed a building with a thousand-year history, was also a decision that proved to be a failure on a military level.

Fig. 4 - Image that portrays the moment of the bombing of the Abbey of Montecassino - GROSSETTI, Eusebio. MATRONOLA Martino, The bombing of Montecassino. Cassinese miscellany. 1st ed. Isola del Liri (Fr): Tipografia Editrice M. Pisani, 1980.

3. The Brera art gallery and Fernanda Wittgens

The Pinacoteca di Brera, located in Milan, is one of the most important Italian museums both nationally and internationally. It houses works of art of great artistic value attributed to painters of high artistic caliber such as Caravaggio, Piero della Francesca, Raphael and others. Established in 1776, by decree of Empress Maria Teresa of Austria, who brought together in a single structure the Academy of Fine Arts, the Lombard Institute of Sciences and Letters, the Braidense National Library, the Astronomical Observatory and the Botanical Garden, developed mainly under the direction of Ettore Modigliani in the 1920s, with the purchase of several works of art. Following Modigliani's transfer to another location because he was anti-fascist, in 1940 Fernanda Wittgens, through competition, became director of the museum, becoming the first woman in Italy to hold such a prestigious museum position. In addition to her activity as an art scholar, she is also remembered for the activity carried out during the period between 1940 and 1945, aimed at preserving the works of art present in the museum she directed, saving them from the Allied bombings. and by the looting of the occupying Nazi army. In fact, Wittgens, aided by a few trusted museum operators, managed to hide all the works of art preserved in the Pinacoteca di Brera and in other museums in various places so as to preserve them. In 2014 you obtained the Righteous Among the Nations recognition for having helped several Jewish families escape, saving them from Nazi concentration camps. For this reason, in July 1944 she was arrested and sentenced to four years in prison, which she partially served. Fernanda Wittgens loved to say about herself "My true nature is that of a woman to whom fate has assigned men's tasks".

4. Conclusions

The actions carried out both by the ecclesiastical community of Monteccassino and by Fernanda Wittgens, but also by the many who offered their lives to save the cultural heritage of a country and the entire world from plunder or destruction during the Second World War, are precursors of concepts which were then, several decades later, affirmed in the "World Heritage Convention" signed at a global level. The objective set with this instrument is the transfer of cultural heritage to future generations, recognizing in them elements necessary for the development of mankind. If today we have the opportunity to enjoy the works exhibited in

the Pinacoteca di Brera, in the Museum of Naples, or see the richness and beauty of the jewels of the Treasure of San Gennaro, it is thanks to these men and this woman. They, in a far-sighted way and with contempt for their own lives, have kept alive works that shape our memory, our identity. and which nourish our roots, with full awareness of both the cultural and artistic value and the moral duties that war translates into challenges. But even this teaching escapes many today.

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Relationships between the Tangible and the Intangible in the insula of Monteoliveto in Naples

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Abstract
The survey is a valuable means of knowledge of the history of a city and its evolutions and provides irreplaceable support for any intervention on the historic building, highlighting the specific peculiarities through qualitative and quantitative investigation. In this area of research, the contribution aimed at investigating, through survey and representation, the relationships between Intangible and Tangible for the case study of the insula of Sant'Anna, architectural evidence of fundamental importance for the city of Naples.

Keywords: cultural heritage, critical knowledge, representation, SLAM survey, valorization

1. Introduction
The preservation of cultural heritage is one of the objectives and at the same time one of the most important challenges of our time, because only it can guarantee the preservation of the tangible and intangible values of our civilization. However, the subject of their report is broad and, at the same time, complex.
On the one hand, tangible values can express the image and identity of a place in a simpler and more direct way. On the other hand, they are part of an intangible framework, made up of signs and stories, capable of restoring meaning and significance in a more articulated way.

In this framework of reflections, the research that the paper presents, focused on the insula of Monteoliveto, has matured, as the most interesting testimonies, in the rich cultural heritage of the city, of the early Renaissance.

Specifically, the paper aims to investigate, through survey and representation, the relationships between the Intangible and the Tangible that the architectural asset as well as its insula underlie their material form (fig.01). Therefore, the study aims to make visible what is hidden today by using the poietic power of the articulated survey in the combined and integrated use of traditional techniques and more innovative technologies. To this end, the focus is not only on the architectural factory but also extends to the urban fabric in which it originates and evolves, pursuing the still current principles of the International Charter of Restoration of Venice [1].

Fig. 01. The monastic complex of Monteoliveto and related insula in Naples.

2. Memory on stage. The transformations of the insula of Sant'Anna over time

The survey of the architectural heritage represents a valuable means for the knowledge of the history of the city and its evolutions and provides an irreplaceable support for any intervention on the historic building, highlighting the specific peculiarities through the qualitative and quantitative investigation that allow to recompose the progressive evolution of history (Ugo, 2008).

In this field of research, the insula of Sant'Anna dei Lombardi in Naples with its monastic complex and adjoining church, the subject of the present research, constitutes an architectural testimony of fundamental importance for the Neapolitan city. Tracing the history, in general, of the construction of the Olivetan insula implies a careful examination of the most significant historical and architectural events and of the relationships between the tangible and intangible values that have marked the urban fabric. Located in the heart of the San Giuseppe district, nowadays the insula looks like an articulated architectural aggregate, enclosed to the west by Via Toledo, to the east by Via Monteoliveto and to the south by Via Cesare Battisti and Piazza Giacomo Matteotti, densely built and composed of different building units built in different periods, transformed and modified according to the specific functions of the time.

In the reinterpretation of the past, particular attention must be paid to the historical cartography of the city of Naples in which the various architectural and urban transformations of the complex are identified, witness to centuries of history, which can be broadly divided into three main phases: i) the first phase that goes from the years of the foundation of the complex in 1411 until the sixteenth century; ii) the second phase identified in the following years, until the suppression of the monastic orders, which took place in 1799; iii) the third and final phase from suppression to the present day (Cundari, 1999; Cundari and Venditti, 2010). Indeed, in comparison with the present state, the first significant view for the aforementioned study is that

of Antoine Lafrèry of 1565 which shows an entirely new urban configuration. The large agrarian landscape, incorporated into the new city walls, appears delimited to form a monastic insula marked at the edges by buildings, denser and more articulated to the south and consisting of simple wings to the north (Russo Krauss, 2013). In addition, in addition to being recognizable the entire insula, already largely built compared to the Strozzi Table of the second half of the fifteenth century or the view by Jan Van Stinemolen of 1582 (fig.02), a flight of steps is clearly represented from Via Monteoliveto, also visible in the subsequent views by Nicolò Van Aelst of 1590 and Alessandro Baratta of 1629 (fig.03).

Fig. 02. Cartographic views with a focus on the insula of Sant'Anna. View from the Strozzi Table (second half of the fifteenth century, left) and the view by Jan van Stinemolen from 1582.

The map of Duke of Noja (1775) on the other hand, shows a different planimetric situation. It distinguishes the buildings along the perimeter, trapezoidal in shape, with entrance halls with access to the street, the four cloisters (the Cloister of the Porteria, the Cloister of the Columns, the Cloister of the Well and the Cloister of the Major) and the Botanical Garden. In this cartographic *excursus* it is also necessary to include the cartography by Federico Schiavoni made for the municipality of Naples between 1872 and 1880 which illustrates, before the 1884 Rehabilitation Plan, the internal and external routes and the different walking heights (fig.04). Particularly interesting is the fate of the three- and three-level portico, now located in Via Del Chiostro/Via Monteoliveto, which was once present on the southern side of the courtyard of one of the buildings overlooking Via Monteoliveto (fig.05) (Carughi, 2006). Today, few traces of the historical memory of the insula remain due to the transformations of the fascist era and the bombings due to the Second World War (Belfiore and Gravagnuolo, 1994; Pane and Russo Krauss, 2016).

Fig. 03. Cartographic views with a focus on the steps of the insula of Sant'Anna. Above: view by Antoine Lafrèry from 1565, below: view by Nicolò Van Aelst from 1590 and Alessandro Baratta from 1629.

Fig. 04. Map of the Duke of Noja, 1775 (detail on the insula of Sant'Anna).
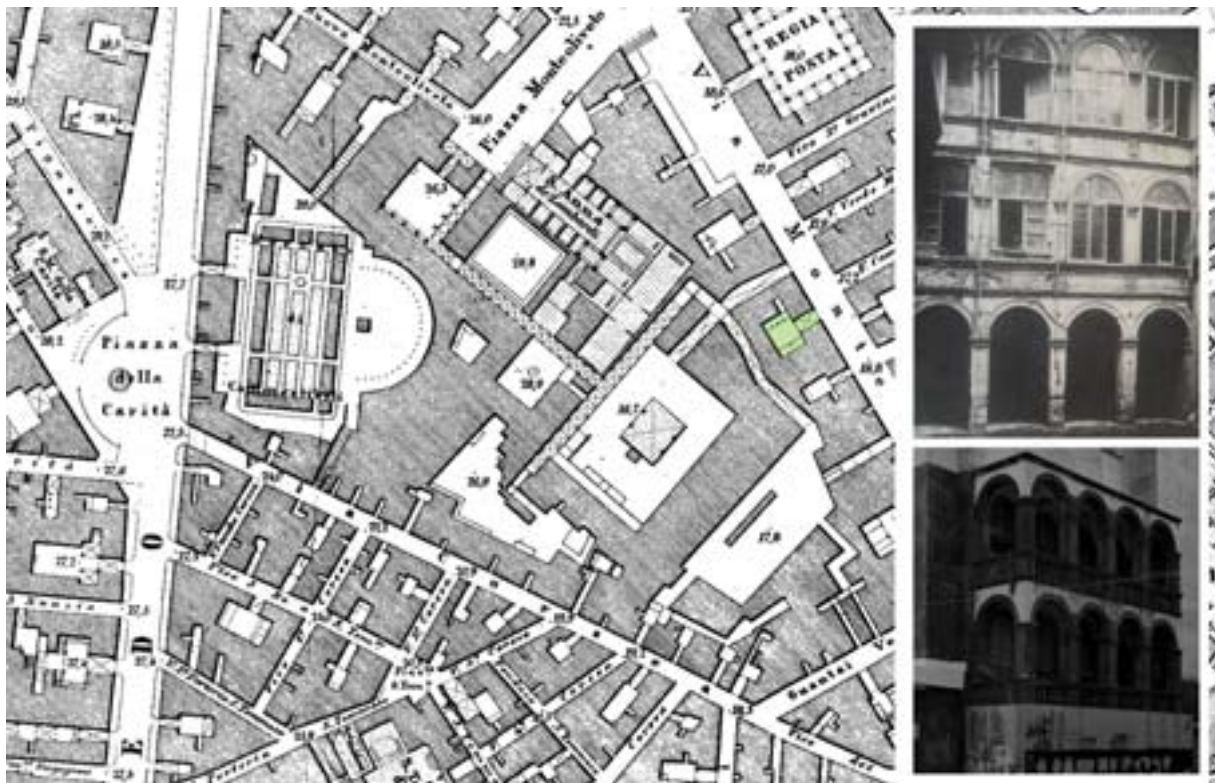
Fig. 05. Map by Federico Schiavoni, 1872-1880 (detail on the insula of Sant'Anna). Detail of the three-level portico now located at the corner of the Palazzo delle Poste.

3. The survey for a measure of the tangible and the intangible

The heuristic power of drawing, understood as a trace of graphic signs to which precise semantics are attributed, is now widely recognized. The action, then, ordering the phenomenal reality that in the stroke is made explicit and takes shape, is even more evident in the operation of graphic repolishing that is usually carried out as the result of a critical analysis of the data

acquired through processes of architectural survey. The process of gathering information and its systematization in an ordered framework of semantically connoted signs, is substantiated within a complex interweaving of tangible and intangible values, intimately linked to the architectural expressions of the historical built heritage. The visible aspects of the image of a place as well as, and even more, the immaterial elements underlying the plasticity of forms, find in the architectural relief and its informative restitution, the privileged way to express themselves and restore a more articulated and profound meaning to architecture.

In the light of these considerations, for a study that aims to be in-depth of the insula of Sant'Anna dei Lombardi and capable of grasping the intimate relationships that exist between the individual artefacts that make up the urban fabric and the city dimension that aggregates them, a careful survey campaign has been prepared, structured according to multi-scalar approaches that aim to include in the collection of data all the elements proper to the urban scale. as well as those of the architectural scale of detail.

Due to the specific context of the Olivetan sector, dynamic digitization systems have been used that integrate active optical sensors such as LIDAR, mapping algorithms and simultaneous localization of the SLAM type. The choice of this methodology clearly responds to the need to cover in a short time particularly large areas characterized by significantly challenging environmental and boundary conditions, being, in fact, urban sectors. Using a solid-state lidar - hybrid - the LixelKity K1 of XGRIDS, an acquisition trajectory was followed according to an almost circular and closed pattern, with the beginning and end at the same point, identified near the pronaos of access to the church of Sant'Anna (fig. 06). The collected data, recorded in a single loop and processed to refine the cleanliness of the acquired points and the recording of geometric features, were subsequently analyzed for significant areas (fig.07).

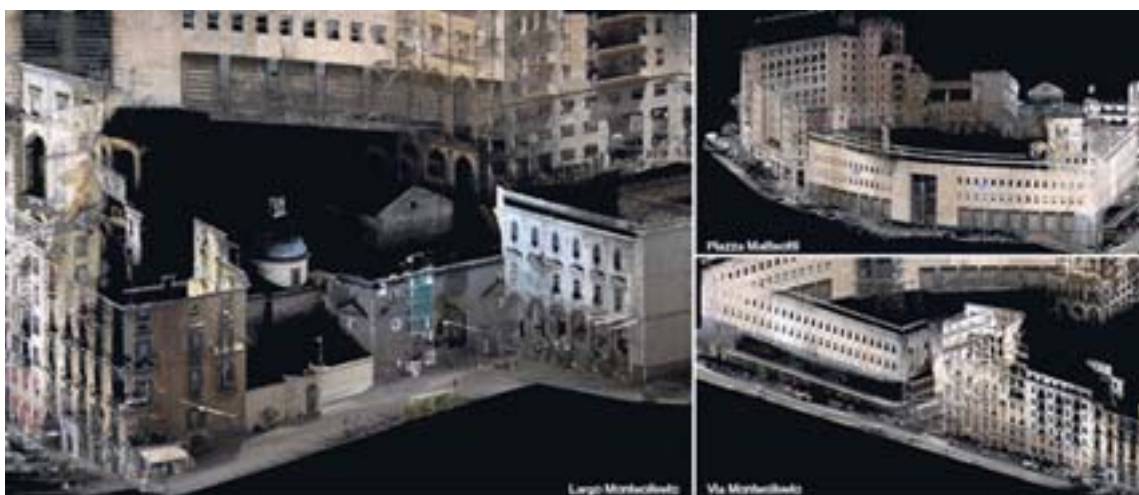Fig. 06. Digitization of the Insula di Sant'Anna using LixelKity K1 by XGRIDS.

Fig. 07. Axonometric views of the point cloud, from Largo Monteoliveto, Piazza Matteotti and Via Monteoliveto.

By way of example, the section relating to Largo Monteoliveto defines, in quantitative terms, characteristic elements of this portion of the insula, characterized since the past by an important difference in altitude between the axis of Via Toledo and Via Monteoliveto, which the square historically rambles with its steep slope but which the distracted eye is unable to grasp in all its historical value. Specifically, the point cloud shows a difference in elevation between the upstream and downstream parts of the widening of about 4.50m, with a slope of 7.5%. The attribution of measurement to the slope, through the survey, makes it possible to retrace an important historical datum, namely the steps that once strongly configured the space of the square and have now disappeared. According to the metric data acquired, the steps, depicted in the historical views divided into three ramps that develop from the end of the church to just before the corner with Via Monteoliveto, could actually develop in three branches, for a total of 20 steps, estimating a rise - of about 10cm - suitable for a curb (fig. 08).
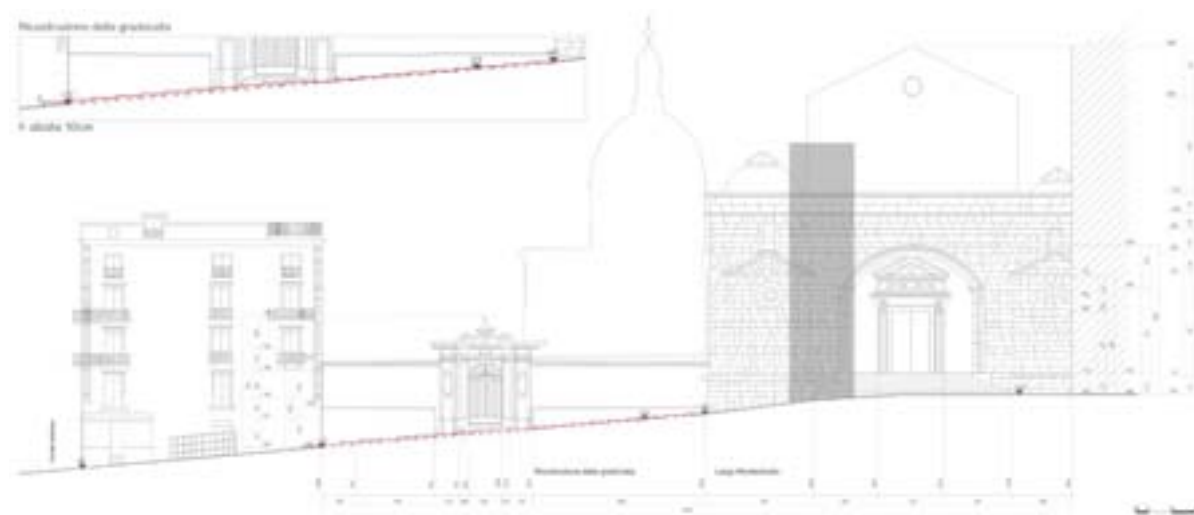
Fig. 08. Section relating to Largo Monteoliveto. Reconstruction of the steps depicted in the historical views.

4. Conclusions

The analysis of the data and the unveiling of the complex intertwining of the tangible and intangible values that substantiate the insula of Sant'Anna dei Lombardi is an articulated operation that is still in progress. The very first considerations presented here denounce the indisputable role that relief and drawing play in the recognition of the deepest values underlying the architectural material, to which they contribute to give meaning, form and measure.

Notes

[1] Although this contribution is the result of a shared work, M. Falcone is the author of paragraph 1, V. Cera is the author of paragraph 2, introduction and conclusions are by M. Campi.
The images are elaborated by the authors.

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FAR.Enough
Housing moments of uncertainty.Adaptive reuse_

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Abstract
This article investigates adaptive reuse as a solution to the complex challenges associated with abandoned public buildings, focusing specifically on the Fascist-era Houses and, in particular, the "Nicola Bonservizi" Regional Fascist House located in Sturla, Genoa. Initiated in 2021, the research aims to develop a replicable model, offering an innovative strategy for managing and enhancing these architectural assets, currently left unused. Through a detailed analysis, intricate connections emerge between physical measures, human needs, and urban context, highlighting the importance of both measurable and immeasurable values.

The examined work proposes an innovative approach to the refunctionalization of abandoned buildings, emphasizing spatial flexibility and adaptability as crucial tools for addressing periods of fluctuation and emergency situations. Founded on a strategic vision and a replicable model, the project aspires to transform these buildings into attractive centers, contributing to urban growth, territorial reorganization, and socio-economic development. The proposed methodology aims to reconcile concepts and techniques, providing an adaptable solution to future circumstances and events, intending to offer an innovative response to contemporary living challenges.

Keywords: Representative model of social and architectural valorization, Design for dynamic

reconfiguration, Representation of rationalist architecture, Schematized decision process, Scalability of modular systems

1.   Introduction

This research aims to examine the presence of Fascist-era Houses in Italy in the first half of the 20th century, providing an in-depth overview of this significant architectural typology. Focusing on a vast construction production distributed over a short period, the analysis of these structures constitutes a significant chapter in Italian history. With over eleven thousand Fascist Combatant buildings scattered throughout the country, their central role in the regime's ideology is evident, akin to ancient basilicas for political, religious, and social affairs. Despite the 1932 competition attempting to standardize these buildings by promoting rationalist solutions, architectural fragmentation persisted, highlighting the complexity of defining a unique typology. (fig.1)
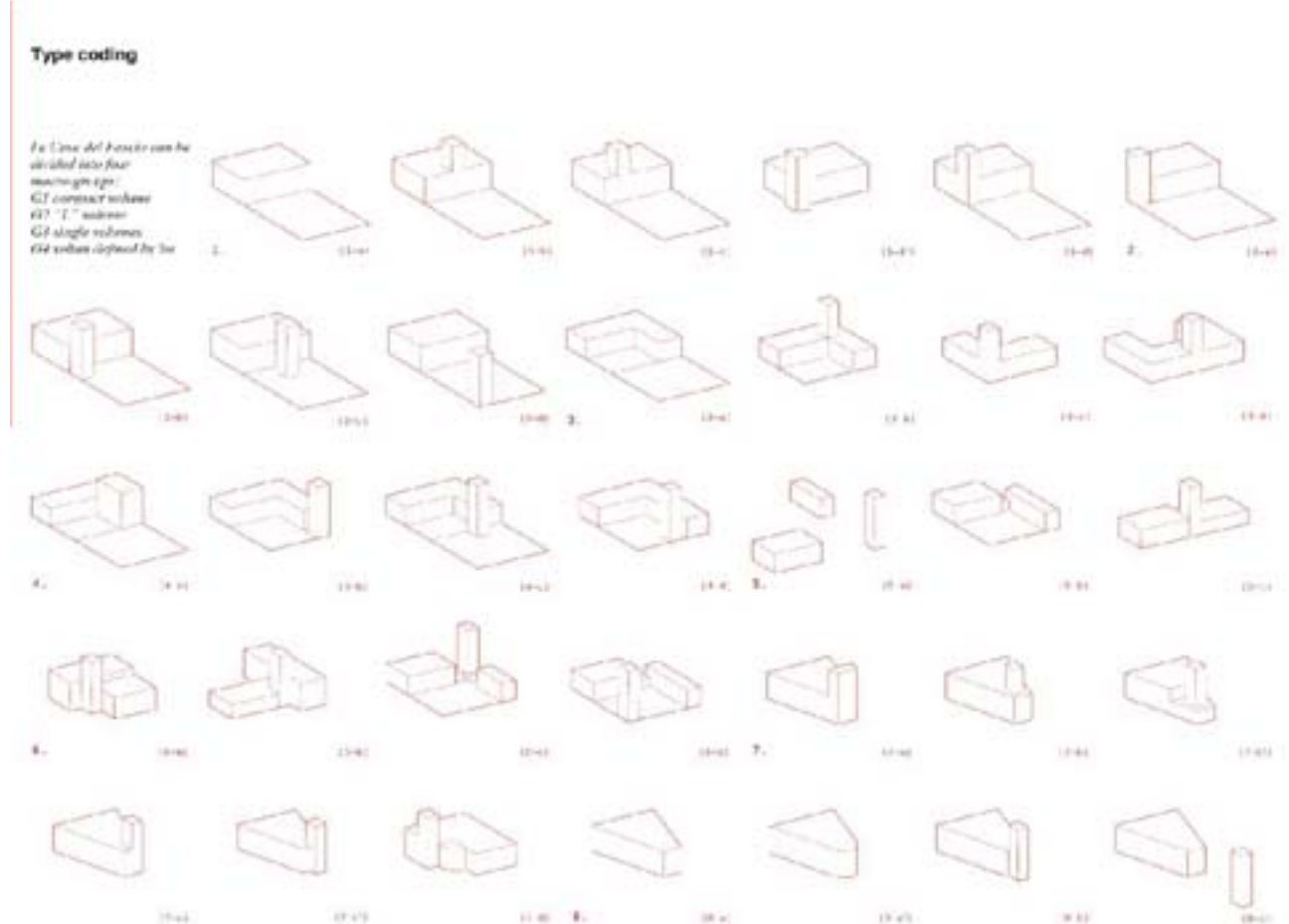
Fig. 1: Typological representation of the Case del Fascio houses.
Each building was to bear pivotal punctual elements of the political party itself. The piazza-agora, facing the building, which was to serve as a place for gatherings, the arengario from which to harangue the crowd during rallies, and finally, the Torre Littoria containing the war memorial, which was usually represented as a punctual monolith towering over the city skyline. (Image produced by the author)

The attention then shifts to the recovery of the Fascist Regional Houses, aiming to confer economic and social value to currently abandoned public structures. The crucial challenge manifests in the dichotomy between the stringent architectural measures of the past and the various scenic possibilities of the future. (fig. 2) The crucial question naturally emerges:

why preserve these structures without giving them a meaningful purpose?

Fig. 2: Press report and image related to the Installation for the Performing Arts Festival "Short Theatre". Image taken from Dire_National Press Agency on Sept. 10, 2019, © Annalisa Ramundo (Collage produced by the author)

Therefore, through a detailed analysis of the context and the development of architectural principles during the Fascist era, specific attention is given to the Littoria House in Genoa. The goal is to promote the reiteration of the analyzed module, contributing to the future evolution and adaptation of similar buildings.

2. Methodological Proposal – Casa Littoria Rionale di Genova

The Nicola Bonservizi Regional House, once a symbol of political power, now stands as a testament to the ongoing challenge of rehabilitating historical buildings. The narrative unfolds with the presentation of a visionary project called "far.e = far enough_ distant enough." The project seeks to study which idea can best adapt to the building, considering its strong architectural and historical value that one wishes to preserve, avoiding radical changes to the existing structure.

Firstly, a case study analysis was conducted on the former Fascist Regional House located in Genoa, Sturla. Originally known as the "Nicola Bonservizi Littoria House" designed by architect Luigi Carlo Daneri between 1936 and 1938, the building represents an intriguing example of regime architecture. From a Soldier's House post-war, the building has been abandoned since 2009. Situated in the main square of Sturla, in the residential district of Genoese Levante, the building played a prominent role as an organ of the fascist party. Its strategic position made it an attraction point, providing assistance and associative services to the community. (fig.3)

Casa Littoria Rionale, Genova

far.e

Fig. 3: Graphic restitution of the major differences reported before and after the inclusion of the Far.e start-up within the building analyzed, both in terms of architectural values and in terms of added social values. (Image produced by the author)

The architect's original approach was based on innovative rationalist forms, with solid lines alternating with sinuous elements, especially in the interiors, characterized by the absence of heavy partitions between spaces. The skillful use of natural light from ribbon windows dominated the spaces. This construction, located on a plot with significant slopes, spans multiple levels, most of which are below the street level of Piazza Sturla. The suspended floor on pilotis emphasizes the surrounding landscape, emerging as a reference to Le Corbusier's "Villa Savoye."

The main features of the House are identified in both the square footage, marked by almost residential expansiveness due to social and administrative activities within, and the aesthetic attention of the Littoria House. Architectural properties are mainly linked to Italian rationalism.

The concept was then developed for the building to become a kind of vertical city, addressing the situation when the project was conceived, in a pandemic and post-emergency period. This counters the abandonment of historically and architecturally significant buildings in favor of new construction, increasing the use of land for concrete and against the natural expansion of nature on it.

This is accomplished by envisioning a start-up called "far.e," functioning as a city hub that collects all actions typical of a city -work, relationships, culture- while maintaining enough distance. The concept of codistance, coworking, coliving, cocreating, and cosupporting identified the users of this building: collaborators, supporters, and customers.
The first are citizens or small local businesses that decide to provide a service but no longer have a place to do so. The second are small, medium, or large enterprises that can also be

local businesses providing a product or considered as sponsor companies. Finally, the last category is represented by citizens themselves living in the vertical city. (fig.4)

Fig. 4: Spatial diagrams of project uses.
Graphic analysis reported through the use of indeformed plan axonometry in which the colored levels identify the floors located above street level and the orange parallelepiped represents the new elevator insertion to ensure an uniform in favor of compliance with architectural barriers. In the center are shown the graphic diagrams that in the thesis work were, conducted from archival floor plans at a scale of 1:100, in which the different interior distribution types are summarized. Lastly, at the far right are shown the analysis data and legends useful for understanding spatial operation. (Image produced by the author)

The building thus becomes a container hosting housing units conceived, given the existing distribution, of small dimensions conceptualizing four types of standard and replicable areas that can respond to the required needs. They have been divided in size into 30, 60, 90 and 120 square meters.

Basementt f loor plan
actual state

units x7

Basementt f loor plan
project status

Xmq x Npersone
0.25 people to mq

Laboratory x1
one-bedroom x1

scale 1:200   N

flows
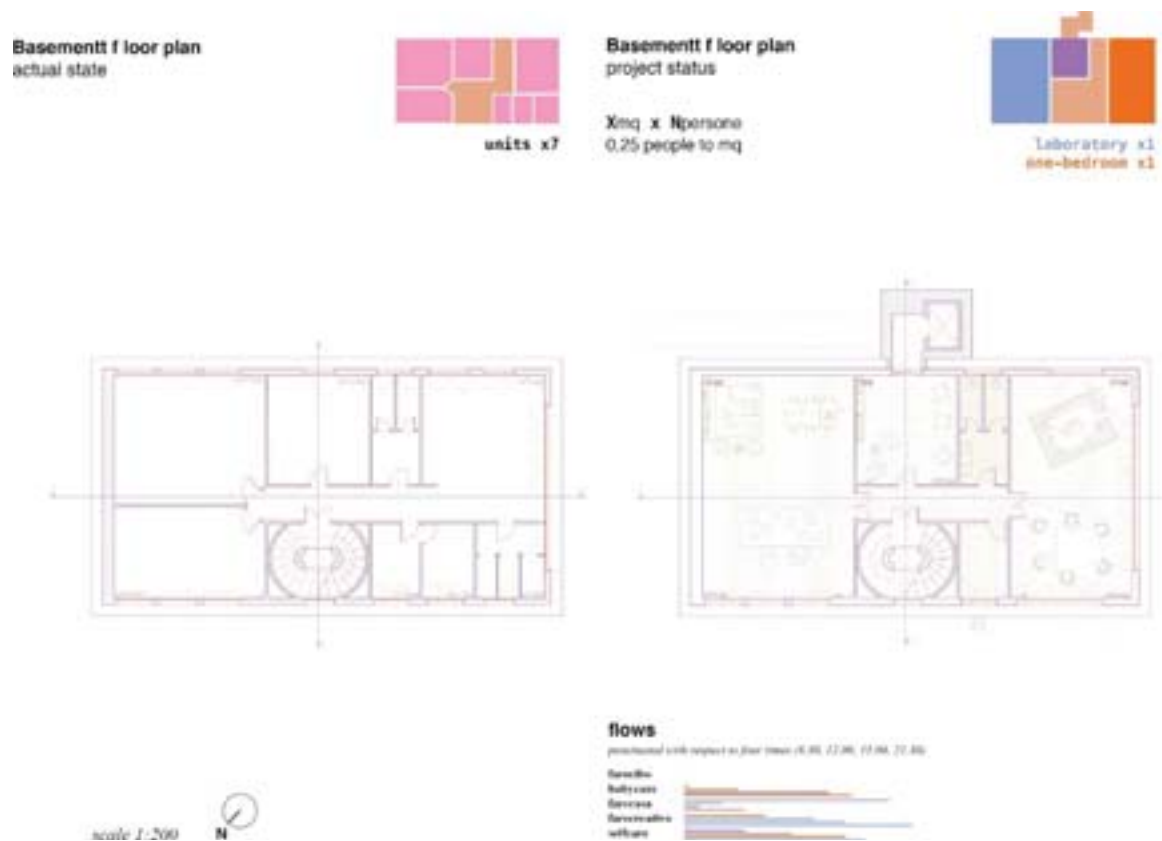
Fig. 5: Comparison structure of spatial solutions, on a scale of 1:200, of a typical plan before and after the adaptive reuse project. (Image produced by the author)

This research also used an analysis of national and international trends functionally to study possible internal distributions, identified in six main functions. These functions shape through different dynamics of this application through space and the building's places.

Regarding trends, the most requested values revolving around four macro-themes were analyzed: cinema, food, childcare, and self-care. This takes into account the post-pandemic emergency and also considers future perspectives, where the continued use of smart working is foreseeable. This study aims to design and idealize a place where professionals and students can coexist while working, and children can be cared for without disturbing the parents' work schedule.

Fig. 6: Bold graphical representation of a useful bar chart outlining the analysis conducted on national and international trends for defining prices and costs that cannot be traced to specific architectural domains. The chart groups modules into four macro-categories: cinema, food, babycare, selfcare. Each category is examined through specific commercial reference sites (see the logos on the left of each group), which are critical to understanding annual statistics and the, dominance or otherwise of their products/services. The goal is to define values and dimensions responsive to citizen demand, creating a base solid to adapt the offer to the needs of the population. (Image produced by the author)

The conception of the vertical city emerges as a bonus, designed to support people and activities in difficulty, both during pandemic emergencies and normal periods. The management plan emphasizes collaboration between the State, the City, and the far.e startup, highlighting adaptability over time as a fundamental element. The ultimate goal of the project is to serve as a replicable model for future initiatives, demonstrating how a single idea can adapt to different abandoned buildings with similar characteristics.

Fig. 7: Analysis of the development model for the management of the building under examination.
From the assumption that the building has already passed from the state property to the ownership of the municipality. The latter decides to launch a competition for the management of the building, which is won by the start-up Far.e with the absorption of the costs of its maintenance and refunctionalization. The City also enters the adaptive reuse decision-making process, outlining useful elements for participatory planning. (This is a personal hypothesis of the building's development). (Image produced by the author)

In facing this architectural rebirth journey, the Littoria House is not just a historical relic but also an beacon of innovation, connecting the measured past with the boundless possibilities of the future. A repeatable and applicable project is the key to overcoming the challenges of abandoned buildings, offering them a new culturally, socially, and economically meaningful life. The initiative aims to provide a strategic vision, equipping the urban fabric with the necessary tools to flexibly embrace periods of change.

At the heart of this proposal is the creation of a spatial model that can adapt agilely to changing needs, presenting an easily replicable solution. The project develops through the conception of a dynamic organism capable of adapting to the rhythms and needs of the city. The adopted approach focuses on the internal flexibility of spaces and uses, promoting transformation as a key element to remain competitive nationally and internationally.

Architectural morphology

Struttura   Unità   Accessibilità
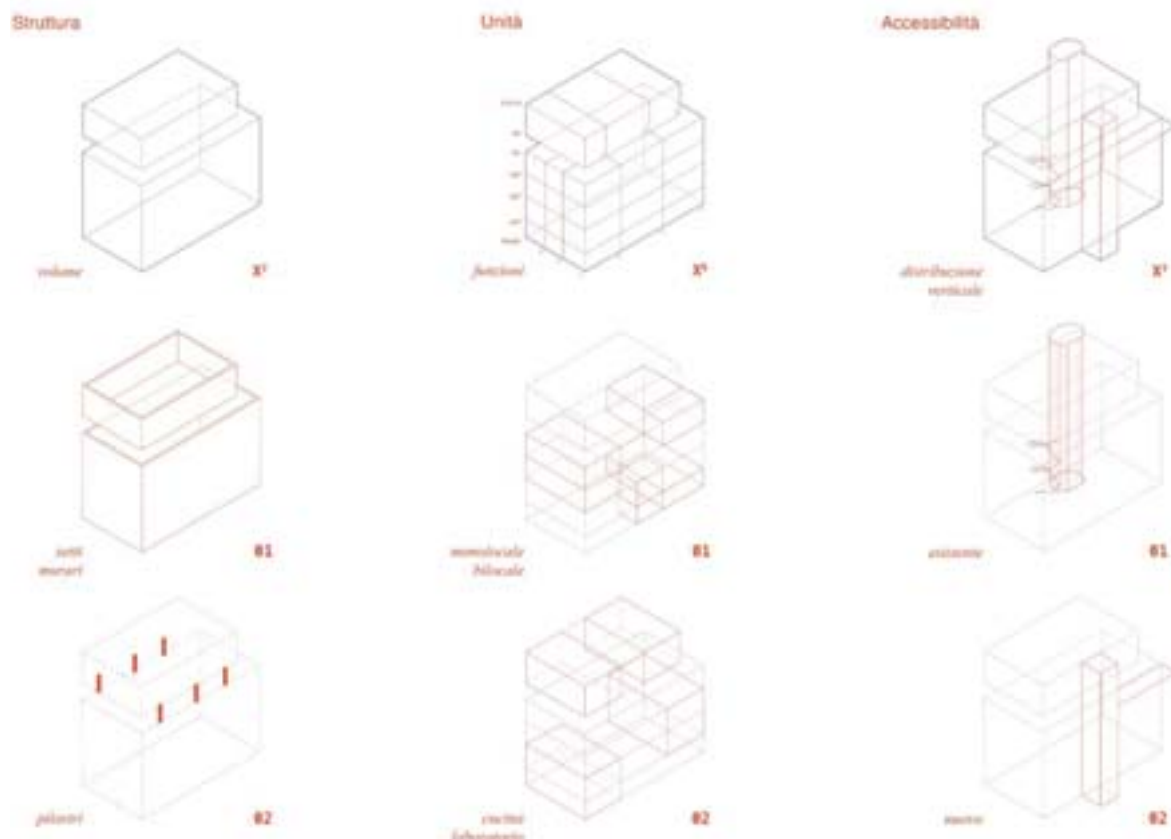
Fig. 8: 1:500 scale axonometric diagrams of Structure, Housing Units, Project Accessibility. (Image produced by the author)

3. Application – Modular Interaction

However, uncertainties about the complex's final destiny and the replicability of the model for other similar buildings present concrete challenges. In fact, at the beginning of drafting this work, two crucial questions were posed:

What will be the fate of the complex?
Can the idea become a reusable model for other similar buildings?

Answering these questions is complex, as the future is inherently unpredictable and uncontrollable. The scholar Lauria argues that, faced with the indeterminacy of the future, attempts are made to respond with configurations capable of change, seeking to reconcile the conflict between the dynamism of user demand and the rigidity of spatial supply.

Flexibility and adaptability
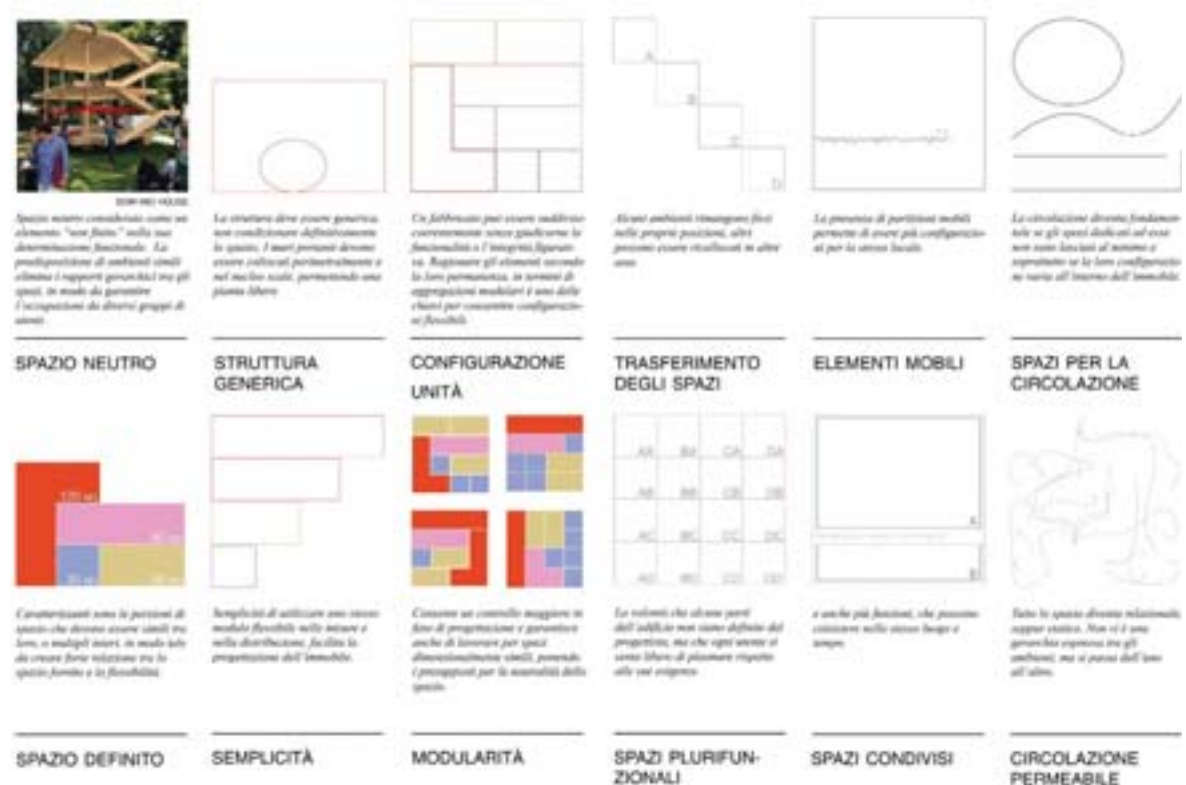
Fig. 9: Parameters for defining the free plan and an adaptive design. (Image produced by the author)

Designing for uncertainty means immersing oneself in a changing society, seeking new ways of living by accommodating in architectural space all intentions and stimuli contributing in this direction. Regarding the second question, the answer seems affirmative: the idea can be considered a reusable model for similar contexts. Reusability emerges as a solution designed to mitigate uncertainties related to the project's success, leading to the enhancement and new functionality of buildings and contributing to a broader vision of urban regeneration.

The origin of this research, emerging within an academic context, initially did not seem oriented towards such concrete and pragmatic decisions. Initially, the lack of in-depth preparation on the subject generated uncertainty about the project's real purpose. However, it is now possible to assert that the main purpose was, and perhaps still is, the search for a pilot project. A project characterized by implementation and distribution modalities that could transform into incremental work in different contexts.
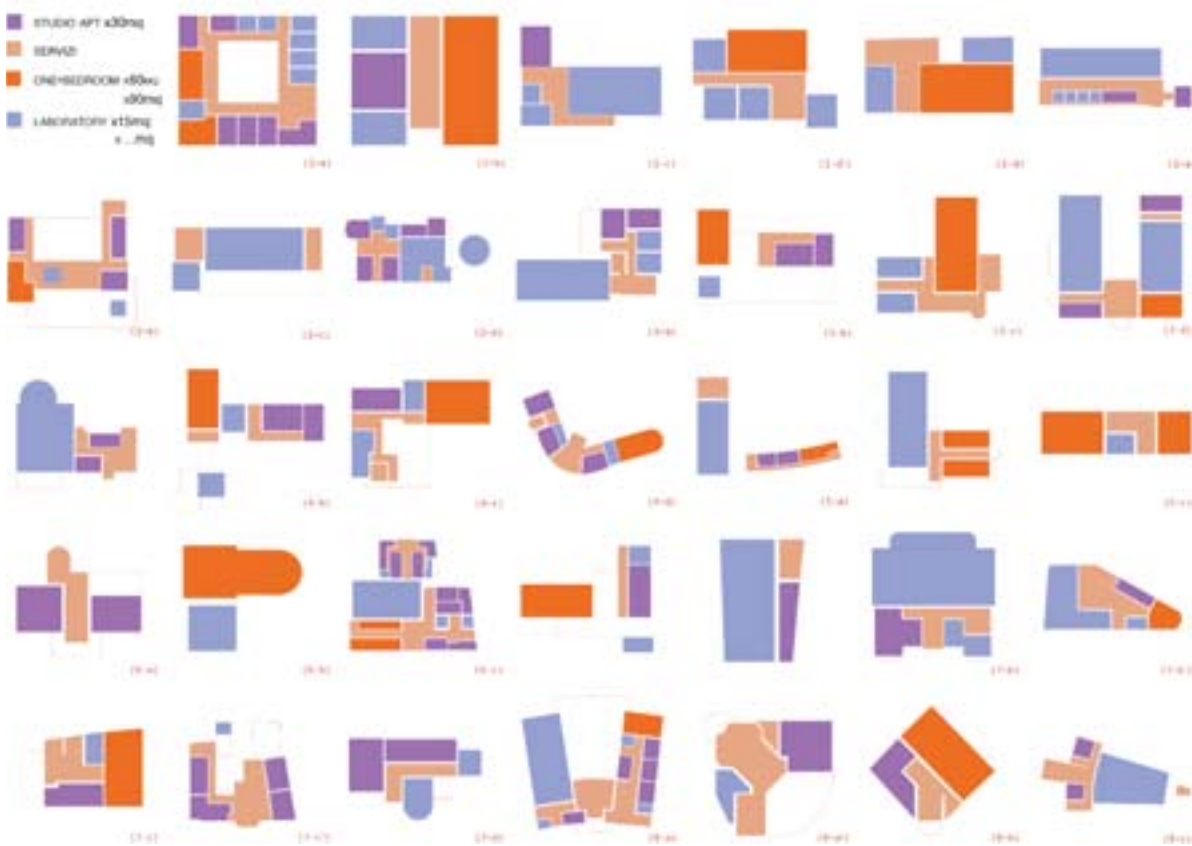
Fig. 10: Schemes of reiteration of the project on other plans of abandoned Case del Fascio houses on the national territory. (It should be noted that attached to the thesis project are historical plans, with their drawing scales, of the buildings under examination and their respective area fills for defining possible ideas for adaptive reuse of them). (Image produced by the author)

4. Conclusion

The intriguing relationship between "reuse and emergency" emerges as a common thread running through various facets of human life, from architecture to social behavior. Reuse, with its adaptability and regeneration capacity, presents itself as the pursuit of innovative and sustainable solutions in times of emergency, encouraging the requalification of disused spaces to face contemporary challenges. On the other hand, emergency represents the need for rapid and flexible responses, emphasizing the importance of adaptive strategies in managing critical situations. The confluence of reuse and emergency thus becomes fertile ground for innovation and creativity, where the tension between these two dimensions generates resilient solutions capable of facing sudden changes. This ongoing dialogue offers new perspectives and stimulates critical reflection, paving the way for extraordinary results and the evolution of approaches and practices in managing and enhancing public real estate heritage in times of uncertainty. Ultimately, in the delicate balance between reuse and emergency, the possibility of significant progress and enrichment of our understanding of how to address emerging challenges becomes apparent.

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Abstract

The paper aims to present the work carried out for a three-dimensional model of the Mausoleum of Emperor Hadrian.

The starting point was the architectural survey done by prof. arch. Cesare Cundari using different survey techniques together, with a considerable photographic documentation, so as to make the mausoleum a true teaching and research laboratory. It was a challenge very complex due to the scarcity of archival documents and their interpretative uncertainty. The research carried out by prof. Arch. Cesare Cundari took into account the dimensional aspects of the architectural complex and the different existing representation referring to the part above the original mound and the part that includes the square bastion wall. The model of Hadrian's Mausoleum, created in this rereading, was therefore able to benefit from rich and rigorous documentation of the entire monumental complex, which covered both the internal and external spaces.

The reconstruction operation, under the supervision of Dr. De Franceschini, who carried out a careful rereading of the complexity of the building, was mainly the removal of all the added elements which, over the centuries, had altered the appearance, so as to recover the information still present relating to the nucleus of the imperial mausoleum. At the same time it was possible to hypothesize a plausible configuration for the temple area, congruent with the actual formal and dimensional data detectable.

Keywords: Cultural Heritage; documentation; survey; digital 3D reconstruction.

1.   Introduction

Castel Sant'Angelo is a very complex monument in which the history of the city of Rome is best represented; in its current configuration it is in fact the result of the bi-millennial transformations from Roman times to the present day. The paper aims to present the work carried out for the creation of the three-dimensional model of the Mausoleum of Emperor Hadrian to rediscover the appearance of the ancient monument without the structures added over the centuries. The starting point was the survey of the building carried out between the end of the 90s and the beginning of the 21st century, as part of a systematic study by prof. arch. Cesare Cundari; the new 3D model, based on an in-depth analysis of the monument itself, is essential to better understand this innovative reconstruction of the appearance of the Mausoleum at the time of Emperor Hadrian and in late antiquity.

2.   Some historical information

The nineteen centuries of history of this extraordinary monument are inextricably intertwined with the historical events of Rome and with the history of art and military architecture from the Middle Ages to the present day. In 130 AD Emperor Hadrian built a new dynastic Mausoleum because there was no longer room in Augustus' Mausoleum. He chose a strategic location on the banks of the Tiber to give it maximum visibility, as had always happened for the tombs of aristocratic families. He chose the Horti Domitiae on the right bank of the Tiber, and then built the Helios Bridge to connect the Mausoleum with the Campus Martius and the rest of the city. In medieval times the cylindrical building of the Mausoleum was transformed into an impregnable fortress because it was a ready-made watchtower; the same thinghad happened for the Mausoleum of Cecilia Metella on the Appian Way.

Fig. 1: Aerial view of the National Museum area of Castel Sant'Angelo.

Over the centuries, Castel Sant'Angelo withstood countless sieges and was never conquered; each pope helped strengthen its defenses, calling on some of the greatest Renaissance architects and artists to design fortifications and papal apartments, which

profoundly altered Roman structures. At the end of the fourteenth century, Pope Boniface IX had a ditch dug around the cylindrical building, demolishing the substructures and the square Basement square that surrounded it. Then he walled up the original entrance with the lower vestibule and the helical ramp, because they were indefensible; they were forgotten for centuries, until their accidental rediscovery in 1825. He opened a new fortified access higher up, equipping it with a drawbridge and corridors with right angles, more defensible. The burial hall was even transformed into a casemate, defended by guns. The perimeter walls of the Basement became a city wall with patrol walkways, and over the centuries they were surrounded by a concentric series of fortified bastions and external moats, connected to the Leonine Walls. The Passetto, which connects St. Peter's Basilica with the Castle, was used as an escape route by the Popes on exceptional occasions such as the Sack of Rome by the Landsknechts in 1527. The ancient Mausoleum was covered with a Renaissance shell made of stone and bricks. In practice, to bring out the original Roman structures we had to identify and "subtract" the medieval, Renaissance, baroque, neoclassical and nineteenth-century stratifications and additions. Our research has also revealed previously unpublished aspects of the extraordinary construction technique of the Helium Bridge. We have reconstructed the forgotten history of the discovery of the Roman access ramps to the bridge, still intact, of its paving with sidewalks and of the road along the river with the original entrance to the Mausoleum. They were demolished at the end of the nineteenth century to build the new banks of the Lungotevere.

Fig. 2: J. R. Luciani, "Forma Urbis Romae", the Vatican area. (Taken from: Adriano e il suo Mausoleo, Studi, Indagini e Interpretazioni, Roma, 1998).

3.   From the survey of 90s to the 3D model

The study made by prof. Arch. Cesare Cundari at the end of 90s was a challenge very complex: the architectural reconstruction of the monument is in fact still difficult, due to the

scarcity of archival documents and their interpretative uncertainty. The research took into account of the dimensional aspects of the architectural complex and the different needs of existing representation and documentation, referring to the part above the original mound and to the part that includes the square bastion wall. To meet this varied set of needs it was necessary to use different survey techniques together - direct, topographic and photogrammetric survey; at the time, laser detection did not yet exist- which was accompanied by considerable photographic documentation, so as to make the mausoleum a true teaching and research laboratory. The survey made use of three hundred metric and semimetric images and photographic documentation, two mensory techniques in continuous conversation and comparison with each other, finally arriving at the processing of refunds graphics. The latter were fundamental and necessary to better understand the complex articulation of the architectural artefact; just remember that for processing only plano-altimetric plans it was necessary to draw up fifteen plans corresponding to as many levels, identified with the criterion of documentation of all the spaces of the castle in their reciprocal positions. The result of the study was a folder of two-dimensional drawings that provide detailed information on shapes, sizes, spatial relationships between the architectural elements. Professor Cundari had already hoped at the time for the desire to return to studying the monument using the new instruments available. He was in fact aware that, from a popular perspective, three-dimensional models are more intuitive and easier to understand for everyone, even for those who are not familiar with the graphic conventions for the representation of architecture, becoming a fundamental, more immediate and, in most cases, much more effective. Especially nowadays when virtual reality is becoming more and more popular part of our everyday life, three-dimensional models can in fact also be used to create dynamic and engaging presentations, possibly immersive, that help to capture public attention by arousing interest in historic architecture.
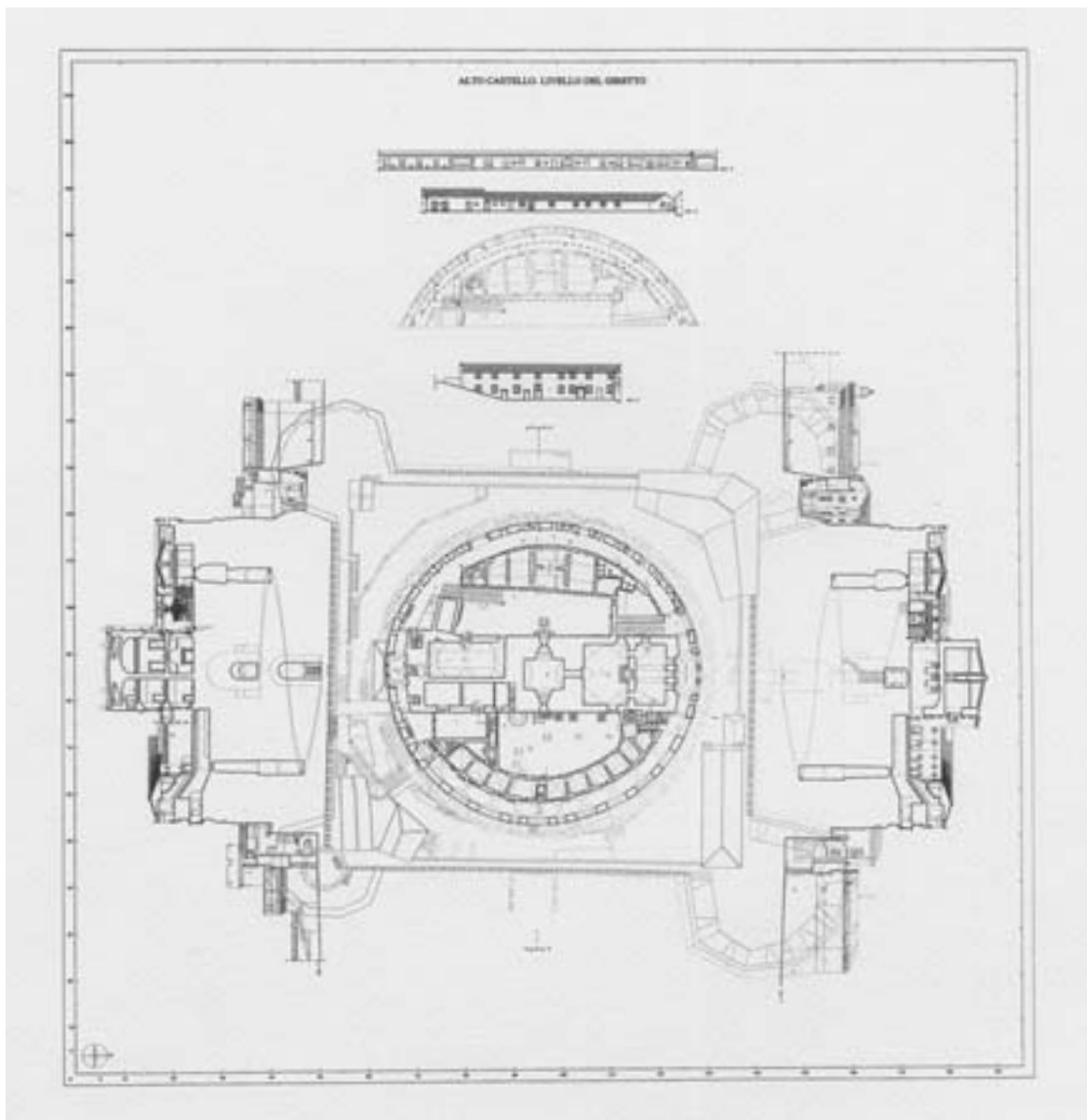
Fig. 3: Curated by Cesare Cundari, panel XXXII - Rilievi, Alto Castello livello del Giretto. (Taken from: Cundari C. *Castel Sant'Angelo. Immagini Rilievi*, Roma, Ed. Kappa, 2000).

4.   A new model for a new building?

The 3D model of Hadrian's Mausoleum, created in this rereading, was therefore able to benefit from rich and rigorous documentation of the entire monumental complex, which covered both the internal and external spaces. The reconstruction operation, under the supervision of Dr. De Franceschini, who carried out a careful rereading of the complexity of the building, was mainly the removal of all the added elements which, over the centuries, had altered the appearance, so as to recover the information still present relating to the nucleus of the imperial mausoleum. For outsiders it has been seen as historical information and from the archives are perfectly compatible with the walls still present; the two main parts of the square base and the cylindrical body are still readable and, for example, some projections of the masonry of the cylindrical body are compatible with the presence of a colonnaded portico as proposed in the sixteenth century by Sallustio Peruzzi. For the interior it was possible to restore the image of environments, such as the Hall of Urns, which housed the porphyry sarcophagus of Emperor Hadrian. This Hall, the most important of the ancient monument, is currently experienced by visitors in a hasty and confused manner, because its original conformation is crossed by a path that completely overturns the spatial perception. At the same time it was possible to hypothesize a plausible configuration for the temple area, congruent with the actual formal and dimensional data detectable. The temple was circular and stood on a high

square-shaped podium located in the center of a terrace onto which the burial chambers for the members of the imperial family must have opened. The Roman walls of the podium, of the temple and, in part, of the burial chambers, are still present and incorporated into the expansions
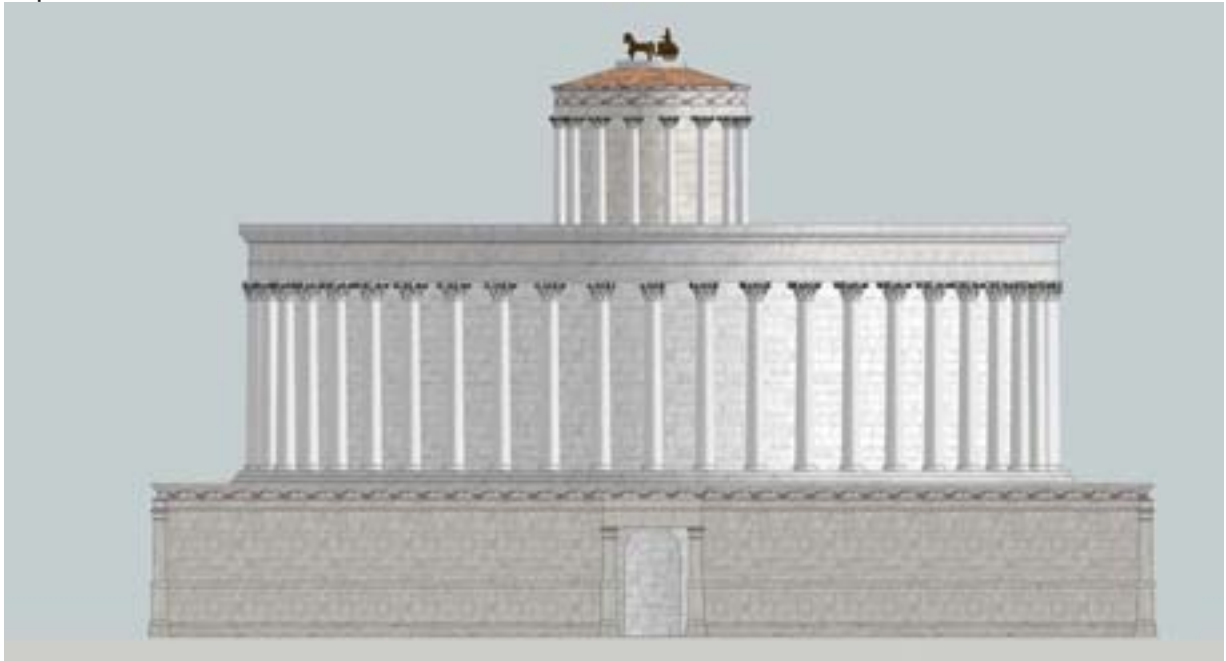

Fig. 4: Reconstruction of Hadrian's Mausoleum, view from the three-dimensional model.

Fig. 5: Reconstruction of Hadrian's Mausoleum, view from the three-dimensional model.
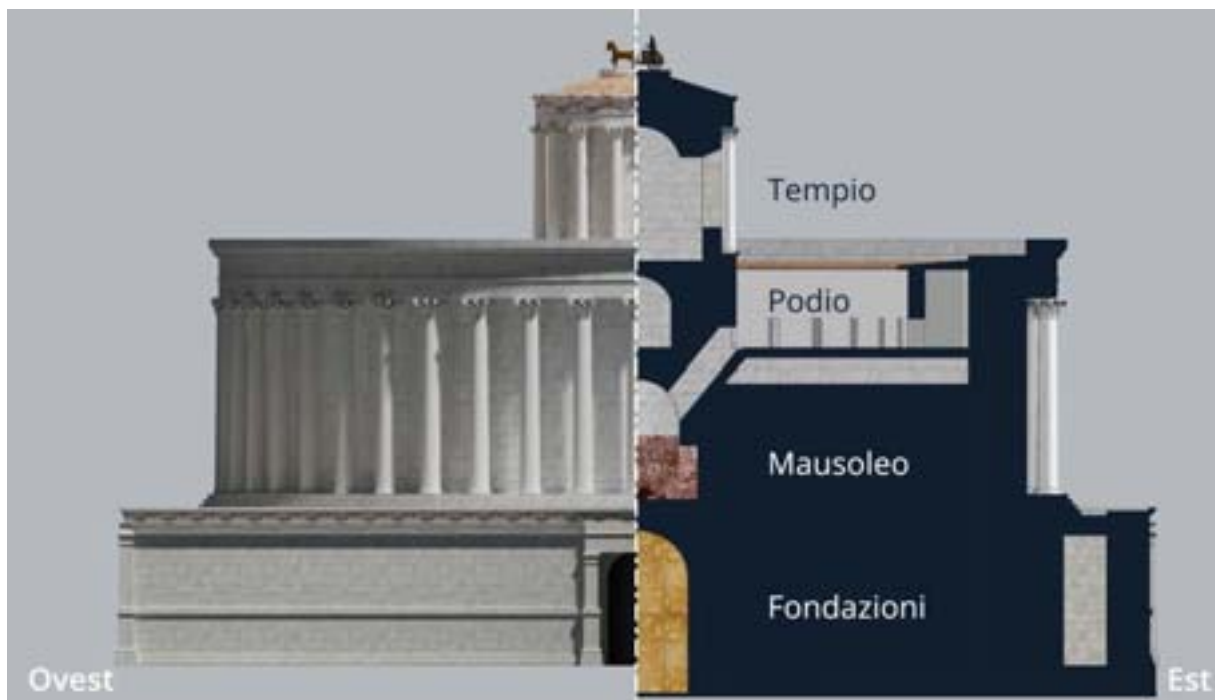
Fig. 6: Confrontation of exterior and interior based on reconstruction of Hadrian's Mausoleum, view from three-dimensional model and section.

of the following centuries. The architectural elements still present were then completed with decorations in accordance with the information relating to Hadrian's mausoleum and with the style of the time.

5.   Conclusions

The opportunity that arose from the collaboration with Dr. De Franceschini has therefore allowed a fruitful comparison with the metric survey already carried out by prof. Arch. Cesare Cundari, of which the present graphic elaborations are considered the natural continuation. The 3D model created has not only confirmed the complementarity of applied methodologies, but also highlighted the potential for in- depth and integrated knowledge of the historical-architectural heritage.

6.   Acknowledgments

This article is the result of joint research work by the authors, as part of a research project started by Dr. De Franceschini in which the research work carried out by Professor Cesare Cundari was involved. Marina De Franceschini is the author of the paragraph "Some historical information"; Maria Rosaria Cundari is the author of the paragraph "From the survey of 90s to the 3D model"; Giovanni Maria Bagordo is the author of the paragraph "A new model for a new building?"; finally, Gian Carlo Cundari is the author of the paragraph "Introduction" and "Conclusions". The authors would like to thank Dr. Arch. Jr. Elisa L'Angiocola for her collaboration during the 3D modelling activities.

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Degenerate Art Posters

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Abstract

"*Painting is not meant to decorate flats. It is an instrument of offensive and defensive warfare againstthe enemy*"

Pablo Picasso

History is a cycle that alternates phases of growth, prosperity and peace with moments of terrible bewilderment, despondency and conflict for both the collective and the individual.

Art, as a mirror of the present and a memory of the future, has always been an instrument of denunciation that raises reflections and stirs the soul. In the past, high-calibre artists have been actively engaged in bringing different social issues to light: Artemisia Gentileschi in the 17th century denounced the violence suffered; Francisco Goya in the 19th century put the emphasis on the Madrid rebellion; Pablo Picasso with 'Guernica' denounced the horrors of Franco's war; Salvador Dali in 1940 the Spanish Civil War and the Second World War; Keith Haring, again, in the late 1960s the battle against the scourge of crack cocaine and finally Banksy fought the horrors of war through contrasting images on city walls.

Artists are not the only ones to use art as a social manifesto; in recent years, in fact, many activists have exploited its media power to denounce, through questionable acts of protest, issues such as food waste,illegal arms trafficking, environmental problems, etc.

Art thus becomes a manifesto and vehicle for conflicting feelings and reactions that raise awareness and generate debate. The aim of this research is to identify the communicative methods related to visual language, tracing a historical - national and international - course and investigating the compositional and perceptive spaces inherent in the drafting of a message, including a social one.

Keywords: Degenerate Art Posters; painters; messages;

1.   Introduction

Drawing, representation and art in general are creative processes that favour the transposition of human feelings and states of mind; they are, in fact, the place where the unconscious and the mind meet, allowing for the free expression of those who engage in them. In a combination of creativity, emotion and context, art becomes an empathic narrator, a denunciation tool and a social manifesto describing slices of everyday life and historical events. History, understood as the memory of a people and a mirror of the present, stands as food for thought revealing a complex interweaving of events and creativity. Throughout the centuries, artists have depicted the reality, present and past, not only of major catastrophic events but also of small anecdotes from the local chronicle that leave room for social and ethical denunciations. Among the artists presented in this research are examples that have transformed the way we enjoy art and raised awareness of different issues in distinct social cutaways and historical periods.

2. The artists
2.1 The ransom

In the 17th century, in a period of important political, cultural, scientific and social changes, the figure of the painter Artemisia Gentileschi emerged, recognised in the Roman area and by the Florentine and Neapolitan courts. Her paintings in the style of Caravaggio are appreciated for their power and emotional charge interpreted by models of everyday life from low social backgrounds and not by allegories or idealisations as per tradition. Her notoriety was preceded by the violence she suffered; she was the first woman to face and win a trial for rape. Despite her humiliation, Gentileschi wins the trial and her feelings spill over into her canvases; she then begins a series of representations that perhaps conceal the theme of gender violence reinterpreted in a mythological and biblical key. He produced several paintings with one of the most represented biblical subjects in the history of art, namely Judith and Holofernes. He painted four canvases of it: two versions of *"Judith with her handmaiden"*, one of 1618-19 and one of 1625-27 in which the scenes are depicted in the moment after the act of murder and the perceived tension is of imminent flight; while in the canvases *"Judith beheading Holofernes"*, of 1617 and 1620- 21, the dramatic and bloody act of beheading the Assyrian general is depicted. Critics have often read in these canvases the transposition of Artemisia into the Judith who by cunning overcomes the oppressor Holofernes. Recent studies have relocated Artemisia during her historical period and while certainly acknowledging her battles against her tormentor, her paintings are interpreted more as a redemption and economic and social independence that few women in the 17th century were able to enjoy.

Fig. 1: "Judith with her handmaiden", Artemisia Gentileschi. On the right that of 1618-19 (today kept in the Palazzo Pitti, Florence. The canvas is 114x93.5 cm) and on the left that of 1625-27 (Today kept at the Detroit Institute of Arts, Detroit. The canvas is 182.2x142.2cm).

2.2 The rebellion

Two centuries later, in a Europe shaken by revolutionary and resurgent battles and turmoil, artists in turn fought to recount the horrors of war.

The Spanish Romantic painter Francisco Goya was recognised as one of the most important painters in late 18th century Spain as a result of his Italian Grand Tour and his engagement in the service of prestigious positions. He was particularly affected by the tragedy of his nation's geopolitical instability, which led him to focus on the revolt of the Madrileños against the invasion of Napoleon's troops. The consequences of this conflict were traumatic and in the huge 1814 painting *"El tres de mayo de 1808 en Madrid"* he fixes with his brushstrokes a

moment of maximum tension and great human tragedy. The canvas depicts a group of Madrilenian rebels just before their death sentence; the simultaneously tragic and dignified scene is rendered so by the setting bathed in darkness except for the beam of light that illuminates the condemned. *"I feel a strong desire to perpetuate, through my brushes, the most heroic and remarkable actions and scenes of our glorious insurrection against the tyrant of Europe"* is how Goya comments on this canvas, alluding to others closely related to the theme. Despite the reporting of such a topical event, Goya's canvas went almost unnoticed at the time and was only inventoried in the 1970s when it became part of the Prado Museum's collection, becoming one of the greatest pictorial masterpieces preserved in the museum.

Fig. 2: "*El tres de mayo de 1808 en Madrid*", also known by the titles of "Los fusilamientos de la montaña del Príncipe Pío" or "Los fusilamientos del tres de mayo" (today kept in the Museo del Padro, Madrid. The canvas is 266x345cm) Francisco Goya, 1814. Goya also produced a twin of this painting "El 2 de Mayo 1808" in the same year, depicting the clash between the Spanish and the French in Puerta de Solsquare in Madrid.

2.3 The Horror

Returning once again to a Spain divided and torn by civil war and already breathing the air of World War II, in 1937, Pablo Picasso exhibited his *"Guernica"* at the Universal Exhibition in Paris. The event that inspired and shocked him was the terrible bombing in the Basque town of Guernica at the behest of Franco. The canvas, defined as 'horror', describes in a crude and touching way through symbolic elements and transfigured features, such as the agonising horse and the mother with her dead child in her arms, the barbarity of the war, making the cruelty and horrors of the Spanish fratricidal struggle famous to the world. In the same period, his friend and colleague Salvador Dali produced several paintings that allude to and recall the tension in Europe and Spain due to the Second World War. He, with surrealist vision, expresses the anguish and inhumanity of war, leading the viewer to reflect on the disastrous consequences. The depiction that is most explicit is "*Le visage de la guerre (The Face of War)"* where in the foreground is a face deformed by pain and despair, with disturbing features made such by the presence of skulls placed inside the eyes and mouth

that, in turn, house others in a sort of endless loop of destruction and death. Both Dali and Picasso sought to represent and denounce the complexity of events that Spain, first and foremost, and Europe were facing in the 1930s-40s.

Fig. 3: "*Guerinica*" (Today kept at the Museo Nacional Centro de Arte Reina Sofia, Madrid. The canvas is 349.3x776.6cm) Pablo Picasso, 1937.
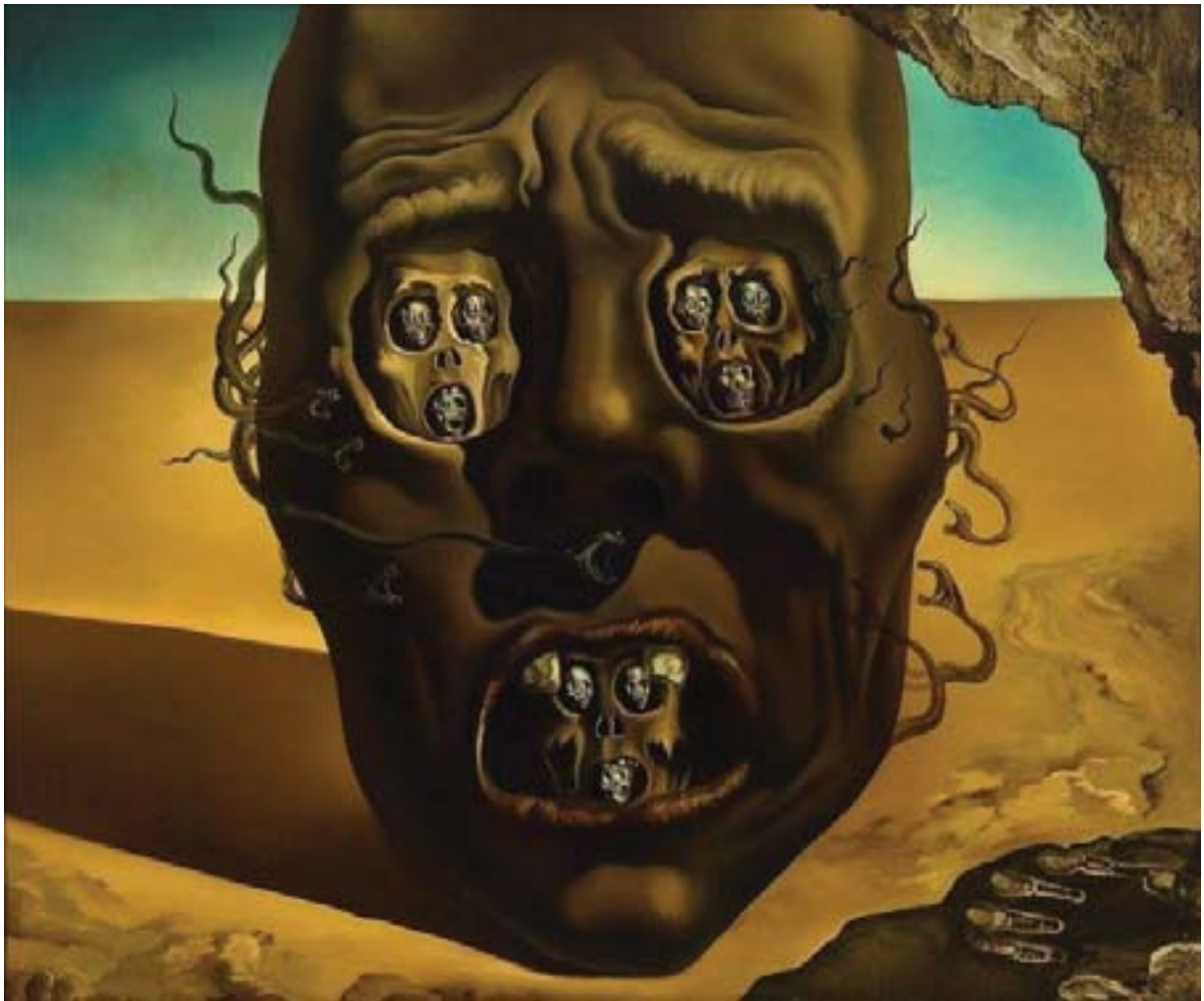

Fig. 4: "*Le Visage de la Guerre*" (today kept at the Museum Boijmans Van Beuningen, Rotterdam. The canvas is 76x64cm) Salvador Dalì, 1940.

2.4 The Awareness-raising

In the America of the 1980s, the figure of Keith Haring emerged, an artist committed to raising awareness of issues such as the fight against Crack, cocaine, AIDS, social inclusion and discrimination. One of his most famous phrases was *"Art is not an elitist activity reserved for the appreciation of a few. Art is for everyone and this is the reason to which I strive to work"* a hymn to art as a collective activity democratically appreciated by all. In the city of New York, he started the graffitism that would make him famous for his two-dimensional, stylised, agender little men; he uses these figures to denounce the disinterest, indifference and lack of information that society pours into the fight against the scourge of AIDS and Crack; one of the most famous canvas is "Ignorance=fear" or "Pop Shop III". The USA, in fact, was in a period of extreme crisis and prevention and awareness campaigns were minimal and scarcely effective. Similarly, the mysterious street artist Banksy uses city corners and walls as a canvas to protest against social injustice, war and corrupt politics. His works, such as "*Girl with Balloon*" and *"Love Is In The Air, Flower Thrower",* have become symbols of rebellion and peaceful protest, stimulating public debate and critical reflection.

Fig. 5: On the right "*IGNORANCE = FEAR, SILENCE = DEATH Fight AIDS ACT UP*", on the left "*Pop Shop III*", both created by Keith Haring in 1989.

Fig. 6: On the right "*Girl with Balloon*", (Created in 2002. Stencil, acrylic on paper. London, Shoreditch) on the left "*Love Is In The Air, Flower Thrower*", (Created in 2005, stencil and paint on wall, approximately 5 metres high. Jerusalem, Ash Salon Street) both created by Banksy.

3.   Conclusions

Analysing the visual language of all these artists, what is perceived is that there is no communicative and stereotyped standard of the messages of denunciation contained in the canvases, rather, since art is the fruit of human creativity, there is a personal, subjective declination inserted in the socio-cultural and historical context of the subject matter. There is no conventional similarity in the use of colours, subjects or the perception of the structure of the scene depicted, even if there are, for example, some similarities given, perhaps, mainly by the artistic school and historical context; in artists such as Gentileschi and Goya there is a strong play of light and shadow used to distinguish the positive from the negative; while in two-dimensionalism, characterised by simple lines and limited colouring, such as in Picasso's

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Guernica, Haring's little men and some of Bansky's graffiti, there is a clear communicative charge that is evident in the simplicity that creates impact and reflection in the apparent perceptive muteness.

In conclusion, art, thanks to the strong communicative character of drawing, shapes and colour, and the *"visual"* spatial composition, is not only an aesthetic work, but also a powerful tool for communication and social change. Its way of arousing emotions and stimulating critical thinking alone continues to shape the world and create food for thought that augurs a better future. The analysis of art as a social manifesto reveals an intense intersection between history, creativity and civic engagement. History is a perpetual cycle characterised by alternating phases of growth and prosperity and periods of loss and conflict. In this context, art stands as a mirror of the present and a memory of the future, capable of provoking deep reflection and stirring the soul. The use of art as a means of protest and awareness- raising takes various forms, which can be direct and provocative, as in the case of Picasso's and Goya's depictions of historical events or Banksy's street art or Haring's murals that suddenly appear in cities to surprise and provoke reflection; or in the form of metaphors and symbols, as in the works of Gentileschi and Dali that require a deeper interpretation to grasp their message. Whatever the method, the aim is to counteract indifference and promote constructive dialogue in fostering social change through the involvement of a wide and diverse audience.

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World Heritage and Dwelling on Space
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Le Vie dei Mercanti

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Architecture on the Net: from Analogical Drawing to Social Communication

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Abstract
In social networks, architectural representation evolves through real and virtual space convergence. This hybrid relationship offers fertile ground for exploring new dimensions of architecture and its communication. Social networks serve as dynamic platforms where architects, designers, and enthusiasts can share drawings, ideas, projects, and visions, blurring the boundaries between tangible reality and its digital representation.

Through images, videos, interactive 3D models and virtual tours, users can immerse themselves in architectural spaces, exploring and interacting with them as if they were physically present. This virtual experience enables a deeper understanding of projects and amplifies the potential for community involvement and participation; instant feedback and viral sharing on social networks can directly influence the design process, stimulating dialogue and collaboration between professionals and users.

However, this fusion of real and virtual space also raises ethical and practical questions: Digital representation may distort the perception of architectural reality, presenting challenges related to scale, proportion, and materiality of spaces. Furthermore, issues of privacy, security, and intellectual property require careful handling in the digital environment of social networks.

Keywords: Drawing, representation, image, social network, visual study

1 Introduction (FS)
Photography is immediate action, and drawing is meditation (Henri-Cartier Bresson).
The spread of communication through images in the contemporary world has achieved incredible popularity thanks to the World Wide Web and sharing tools such as social networks. Immediacy, rapidity, and wide distribution are some of the characteristics that have contributed to their affirmation, even to the detriment of traditional means of communication.
We can speak of the effective primacy of the image worldwide as social networks, Instagram and TikTok, communicate through sharing photos and videos, a visual culture that becomes a universal language.
However, the revolutionary change they have brought with them has not been without criticism and negative judgments, mainly linked to the speed with which news is spread without reliable sources capable of orienting the opinions of the masses.
They have also exalted personal attitudes of a temporary nature that were previously only local and circumscribed outbursts while now they are in the global spotlight, paraphrasing a famous

statement by Umberto Eco in 2015.

Social networks are now an integral part of our lives. Born to document and communicate everyday life, they have influenced reality to the point of orienting opinions and setting trends. Often criticised for the negative connotations that this type of super-fast communication brings, they are a privileged place for sharing ideas and passions, a space for open discussion on the entire world, even if virtual. In this article, we want to highlight the aspects that have improved our way of seeing, and in this case also of designing, the world and architecture.

Fig. 1: Luovre Museum and Sistine Chapel: photographing the moment to share it on social media at the expense of enjoying the work of art

2 Research objectives and reflections on the state of the art in the social world (FS)

This article aims to try to answer some questions that have arisen while surfing the web about the relationship between architectural design and social media:

Are social networks addressing and influencing new ways of drawing architecture?

What role does drawing play in the image of the architectural profession in social networks?

Is architectural drawing "Instagrammable"?

Is architectural drawing social?

First, it is necessary to contextualise communication through images on the internet and social networks to define a "state of the art" in the social visual world.

In the 1920s, photography and cinema triggered new mechanisms and meanings for the dissemination of images: the visual experience (seeing a painting, visiting a city, enjoying a landscape, etc.) was linked to the uniqueness of the moment (hic et nunc), but the invention of the seventh art allowed everyone to experience distant spaces, places, and objects.

According to the theories of Visual cultural studies or the Bildwissenschaf of the mid-1990s, cinema and photography triggered a paradigm and perspective shift in the fruition and knowledge of the world: social networks are part of this panorama, accelerating the process already underway and democratising the creation and sharing of content. We can all, in fact, be authors and protagonists.

The image of an object implies, in the observer, the sensation of perceiving the object itself, which accurately represents the object.

A representation is, indeed, something that shows itself to our gaze but also something that ends up inhabiting our thoughts. (Falcinelli 2014)

Considering the centrality and importance of these tools in contemporary life, we must note that these mechanisms are critical factors in understanding the dynamics of the dissemination of content and ideas.

However, representation is simultaneously transparent and opaque: transparent because it operates by mimesis with respect to the object represented and opaque because it imposes a fixed point of view selected by the representative to communicate certain ideas and values (Louis Marin 2014).

Social networks play such a primary role in current communication that advertising and marketing have adapted to a new type of consumer: the social consumer.

"The new beauty today is the ability to socially disseminate an image of a place, of a person. Horrible places, sculptures and street furniture acquire a new beauty thanks to their

recognisability and the fact that people use them as tools for the social diffusion of their image' (Bonami 2019).

The desire to share transforms urban spaces from an architectural element to be experienced into a backdrop for selfies, reducing places of great historical, architectural and landscape interest to mere scenery.

The author speaks explicitly of a profound mutation of the values of our society, going so far as to define our historical period as the civilisation of recognition.

3 New visions and experiences of drawing (MS)

Social networks can be considered something more than a simple communication tool; they are almost a meeting place, albeit a virtual one, where people with the same interests can get in touch and create actual rituals of information and data exchange; social networks allow one to share passions, such as drawing, with people from all over the world.

Often compared to virtual notebooks, the paradigm underlying the notebook-traveller relationship is completely different: we can speak, in fact, of a real narrative in digital communication, images designed for real-time sharing, whereas the grand tour traveller's notebook was a more personal-reflective space, a place of learning.

Drawing is very present in social networks: the possibility of sharing via the web with people with the same passion is a strong incentive for disseminating images and video tutorials on how to learn rules and techniques.

The #drawing tag on Instagram has been used in 297 million posts to date, while on the TikTok platform, it has reached 221.5 billion views, a number that is bound to grow given the success of these social networks in particular.

With particular reference to architecture, we find examples of analogue, digital and post-digital drawings where sketches, renders, three-dimensional models and collages are shared and commented on.

We can go so far as to speak of a veritable iconosphere of architecture, i.e. a specific sphere constituted by the set of images circulating in the cultural environment of architecture, particularly on social media.

Fig. 2: Images taken from KOOZA/RCH's social media profile

In the experiences of KOOZA/RCH and The Archi/biologist, the design of the unbuilt and its developments in the field of architectural research are investigated: in these profiles, drawings of architecture are published with a particular interest in imagined architecture, thus becoming spheres for the experimentation of representation where sharing is a moment to intuit and trace new trends.

The focus on narrative that characterises the social sphere has led drawing to become part of the architectural profession's narrative: drawing is fundamental to describing these design processes.

In addition to photos of completed buildings, images of preparatory drawings of works are expected to be found in the profiles of large architectural firms to satisfy curiosity about the work behind architectural work.

Fig. 3: Figure caption (Arial – 9 pt, Lower case letters – Left aligned – Number style 1, 2, 3).

In this case, the analogical drawing is not only represented to communicate the work conceived but also has a symbolic function. It is not rare to encounter images where groups of architects gather to discuss things around a table with the intent of drawing.

In this case, drawing is used as a metaphor for the art of making architecture: the designer is told from his side as a creative artist, contributing to communicating a precise professional image.
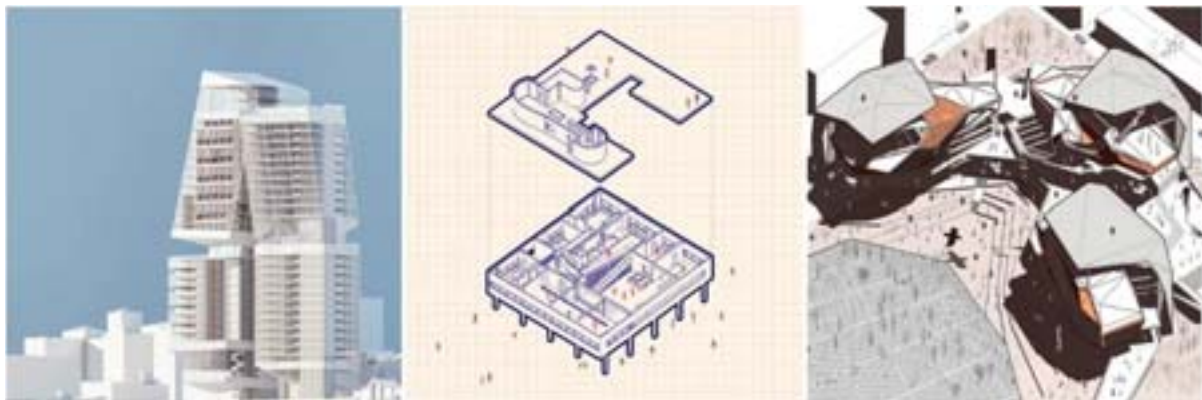

Fig. 4: Images taken from The Archi/ologist's social profile.

HWKN Fire Island project in New York State, on the other hand, was an opportunity to experiment with a type of shared design that addressed public opinion and generated empathy toward certain design choices before the building itself was constructed.

The architecture studio tried to involve the community by spreading the renderings on social networks and gathering opinions and reactions contributing to the project's development.

The drawing on social networks in this case, was the tool to create a dialogue with future users by directing their interest towards the new; the architects actively involved the population in the design process so that, when the building was constructed, it was already part of the society that housed it: a solution that avoided reactions of rejection towards the new architectural languages proposed by the studio.

Social media and the internet have profoundly changed the world's perception, so much so that many areas of communication have adapted to the new needs of social users, who have gone from being a means of communication to a place of change. Drawing has also been influenced by these new means of communication, adapting to this environment, characterised by information that must reach the user faster and faster.

Fig. 5: Images taken from HWKN social profile.

GIFs, for example, are short animations that communicate a fast-paced visual message; their diffusion in the iconosphere of architecture is now a given. Graphic schemes, diagrams, and architectural drawings are enriched with movement, adding new information to the narrative, such as the use of space and perception of time on the project.

Introducing factors such as movement and the perception of time gives drawing a new scope. While analogue drawing is evocative and digital drawing can be persuasive, social drawing is multi-narrative, as it narrates multiple aspects of the same object.

Fig. 5: Compositional scheme made with the Gif technique of the Vidal house of the OOIIO studio

4 Conclusions (MS)

Drawing is actively part of the internet and social networks in many ways: as a protagonist of architectural communication and a metaphor for the profession.

Drawing is social and 'Instagrammable'.

According to Louis Marin, the image presents itself by representing, i.e. it not only gives something to be seen but simultaneously constitutes the observer as a gaze, inscribing the marks of its reception (Marin 2014).

The power of social networks has influenced various aspects of the economy and society. The design has also been modified to adapt to the rhythms and new demands of communication. For some examples given in this article, we can go so far as to speak of hyper-design, an 'augmented design' with new aspects aimed at satisfying society's needs by changing the way content is narrated.

This incessant iconic flow, which is posted online every day, is undoubtedly capable of modifying the collective imagination and creating development scenarios for architectural design and communication.

It will be interesting to understand how this flow of representations will be influenced by the images produced by Artificial Intelligence, which will be able to rapidly produce ever-increasing numbers of drawings, and the ethical-legislative implications that will ensue.

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Protection and valorization of the modern rural heritage: ICT methodologies, rehabilitation projects and reuse of agrarian land reform villages in Basilicata

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Abstract
The topic of rediscovering and systematising the knowledge of historical and testimonial value examples among the rural hamlets of the agrarian land reform in Italy currently acquires particular relevance for the purposes of their protection, possible rehabilitation and compatible reuse of the existing settlement and building heritage. Starting from a preliminary recognition of the particular cases of interest, the proposed contribution focuses mainly on the projects that took place in the land reclamation and transformation area of Basilicata, and in particular in the Middle Bradano Valley sub-region in the province of Matera. In this area of reference, about thirty colonization settlements, including residential-type villages, service centers and scattered-type settlements, were built by the Land Reform Authority sometimes with the UNRRA-CASAS agency.
According to the evaluations carried out on the current state of conservation of this heritage, in many cases abandoned, altered or in an advanced state of decay, possible methodological approaches are proposed, aimed at surveying the existing architectural typologies also through the use of digital tools pertaining to the ICT field (in particular GIS and HBIM technologies), at the basis of possible project proposals for the recovery, reuse and completion of these settlements.
Specifically, a number of case studies, as the result of different research works, will be analysed: the villages of Santa Maria d'Irsi and La Martella.

Keywords: modern rural heritage, ICT methodologies, digital reconstruction, agrarian land reform, rehabilitation and reuse

1. Criteria and regulations for the protection of modern heritage

The importance of 'recognising' the value of Italy's post-World War II architectural heritage, and of rural architecture in particular, calls for protection and valorisation actions aimed at the compatible rehabilitation and re-functionalisation of this significant legacy which, almost seventy years after its realization, often remains in oblivion and neglect. Therefore, there is a

need for a knowledge and study of the villages of the agrarian colonization and a census of them useful for assessing the size of this heritage. A first evaluative element is recognisable in the environmental, landscape and architectural value already established in the scientific literature. The value of this heritage is also linked to the innovation brought about at that time in terms of settlement, urban, typological and technical-constructive aspects. Another added feature is linked to the designers who, in most cases, represent prominent personalities in the historical context analysed.

At the same time, a fundamental role is played by the current regulatory framework, consisting in Italy of the Urbani Code (Legislative Decree 42/2004) [1]: this decree in fact provides for the prior identification and census also of the modern urban and building heritage in relation to the environmental context in which it is located.

Fig.1: Map of the areas affected by agrarian land reform in Italy (left) and rural settlement interventions in the Apulo-Lucano area (right). Source: ASB, Fondo ERSAP.

2. The Middle Bradano Valley sub-region in the province of Matera

Among the areas included within the Apulo-Lucano region, that of the Bradano Valley constitutes one of the areas of greatest territorial extension (almost 110,000 ha) [2,3]. This particular sub-area was affected by major settlement planning and repopulation interventions of the countryside, starting with a general master plan drawn up by Nallo Mazzocchi Alemanni and Enzo Calia between 1948 and 1955 based on the previous planning experience of the US Tennessee Valley Authority (1933-1941) [4,5]. As with the contextual event of the displacement of the Sassi district in Matera, promoted and supported by the *Commissione di Studio sulla città e sull'agro* (1951) set up by Adriano Olivetti, a territorial planning was envisaged based on the villages and service centres destined to accommodate the majority of the peasant population, who had until then lived in hygienically unhealthy hovels [6,7].

In this context, several nationally acclaimed planners - such as Ludovico Quaroni, Federico Gorio, Luigi Piccinato or Plinio and Paolo Marconi - worked on the realisation of about thirty new rural settlements, some of which, however, were never actually built.

Among the most relevant residential-type villages are: Santa Maria d'Irsi (1948), La Martella (1951), Taccone (1952), Venusio (1954), Picciano (1957) and Serramarina (1955).

Within a few years of their construction, many of these villages and agricultural centres were rapidly abandoned, mainly due to the early failure of the agrarian land reform experience in the southern of the country. The unsuccessful outcome of the rural colonisation process, particularly in the Middle Bradano Valley, can be attributed to several contingent factors: incompatibilities between the Reform Authority and the other agencies involved in the planning of the new villages, mainly due to a different vision of settlement planning criteria; late provision of collective services and the redistribution of land plots, which are often small in size. Even

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the sudden migration of peasant families to the main industrial centres in the Northern regions caused the failure of this ambitious project.

These settlements have evolved differently over time: in most cases, the disuse and abandonment of the existing building structures has led to their progressive degradation; in other situations, the often uncontrolled extensions and alterations have led to the loss of the main original type-morphological features of both the urban fabric and the buildings.

Fig.2: The main rural settlements built in the Middle Bradano Valley sub-region in Basilicata.
Source: elaboration by the authors.

Fig.3: Recent views of the original building types in Santa Maria d'Irsi and La Martella villages.
Photos by the authors, 2022.

3. Methodological approaches and ICT tools

The systematisation of rural settlement knowledge by reconstructing digital models and information tools allows the achievement of a double goal: a more in-depth study of individual projects by discovering relations and elements not always known a priori; to carry out a thematic survey at the various scales of investigation aimed at defining the state of conservation and maintenance also concerning the material and construction level of the individual architectures examined. One of the main experiences in recent years in the academic field was the PRIN 2004 project, conducted by a research group of the University of Basilicata, entitled *Borghi Rurali e Nuclei Urbani di Fondazione. Disegno, rilievo e documentazione dei sistemi architettonici del primo Novecento in Basilicata* [8].

Fig.4: Digital reconstruction with BIM models of unbuilt public and residential buildings in the rural village of Policoro. Source: elaboration by the authors.

Fig.5: Methodological diagram of the information apparatus structuring through an integrated GIS-HBIM database as the basis for multi-scalar analyses. Source: elaboration by the authors.

Due to the complexity of the topic, an integrated and inter-scalar analysis of settlements through the joint use of digital GIS (Geographical Information System) and HBIM (Historical/Heritage Building Information Modeling) systems, is required, together with the use of traditional approaches [9]. The use of these technologies applied to the field of modern heritage is crucial precisely because of their multi-scalar nature, both at the level of alphanumeric attributes and geometric models, in the management of appropriate information databases. Despite the obvious similarities and differences underlying their use and utilisation, recent sector studies have noted the possible integration between these two technologies in relation, above all, to historical analyses of the built environment [10].

4. Case studies

With reference to the field of investigation, two exemplary case studies were chosen, resulting from different academic research works, concerning the survey through the development of digital models and proposals for the rehabilitation and reuse of the existing rural heritage.

The rural village of Santa Maria d'Irsi (1948) was planned by Mazzocchi Alemanni e Calia in the countryside of Irsina, following the land transformation of 'Le Mattinelle' property.

This is the first intervention realised in the sub-region, characterised by some thirty terraced houses, for residential and service use, close to the civic centre with the church, the medical surgery, the school and the main public buildings. Due to the early failure of the reform project and the oversizing of many planned buildings, the village was quickly abandoned within a few years [11]. Between 2007 and 2013, as part of a general redevelopment plan for Matera's rural villages, several buildings were restored as part of the civic centre and spaces for public use, currently occupied by a rehabilitation community for drug addicts.

Fig.6: Overall views of the rural villages of Santa Maria d'Irsi (top) and La Martella (bottom).
Source: Archivio Buonsanti / Archivio MUV Matera.

The La Martella village (1951), on the other hand, is the first agricultural settlement realised by UNRRA-CASAS in collaboration with the Reform Authority, due to the displacement of the Sassi district of Matera, based on a project by architects Quaroni and Gorio. This intervention constitutes an important compositional experiment with the aim of reworking the historical neighbourhood units, reinterpreted according to an organic language and sober style, responding to the needs of the farming community moved there [12]. In addition to the residential aggregations located along neighbourhood streets, the church, civic centre and various collective services were built. However, strong disagreements between the two promoting authorities led to the village's unfinished and gradual partial abandonment, only recently partly rehabilitated.

4.1 GIS and HBIM digital models
The integrated methodology developed for both cases was essential for understanding and analysing the built environment, verifying its current alterations in relation to the original layouts and buildings. The information previously collected were subsequently reported and processed in special GIS-type databases, where analyses were carried out on a territorial and urban scale up to an early cataloguing and classification of the main original typologies existing and their conservation and alteration degree. From these preliminary digital elaborations, it has been possible to develop information layers contained in special local models within a single interoperable BIM-type platform, according to current Italian standards.

Fig.7: Plan and elevation sketch of the urban analysis carried out on the original heritage of a neighbourhood street in La Martella. Source: R. Pontrandolfi, 2018.

A multiscalar analysis of certain residential and service typologies originally intended for farmers was carried out on the case studies: from the territorial scale (level 0, LOD A), corresponding to a container of georeferenced information into which the respective sub-models can be linked, to the settlement fabric one (macro-urban, level 1, LOD B), modelled as simple 'masses' linked to specific attributes (metadata) and to a set of shared parameters, useful for analysing their historical evolution or maintenance status. The third layer (micro-urban, level 2, LOD C), referring to the area of building aggregates, involves the introduction of basic parametric object libraries in order to identify the main typological existing elements. The last layer developed (level 3, LOD D) relates to the individual building construction (architectural scale), through the implementation and development of the respective previously introduced parametric components. This information management process was therefore developed according to a specific methodology of 'architectural disarticulation' and 'digital reconstruction' of the existent [13].
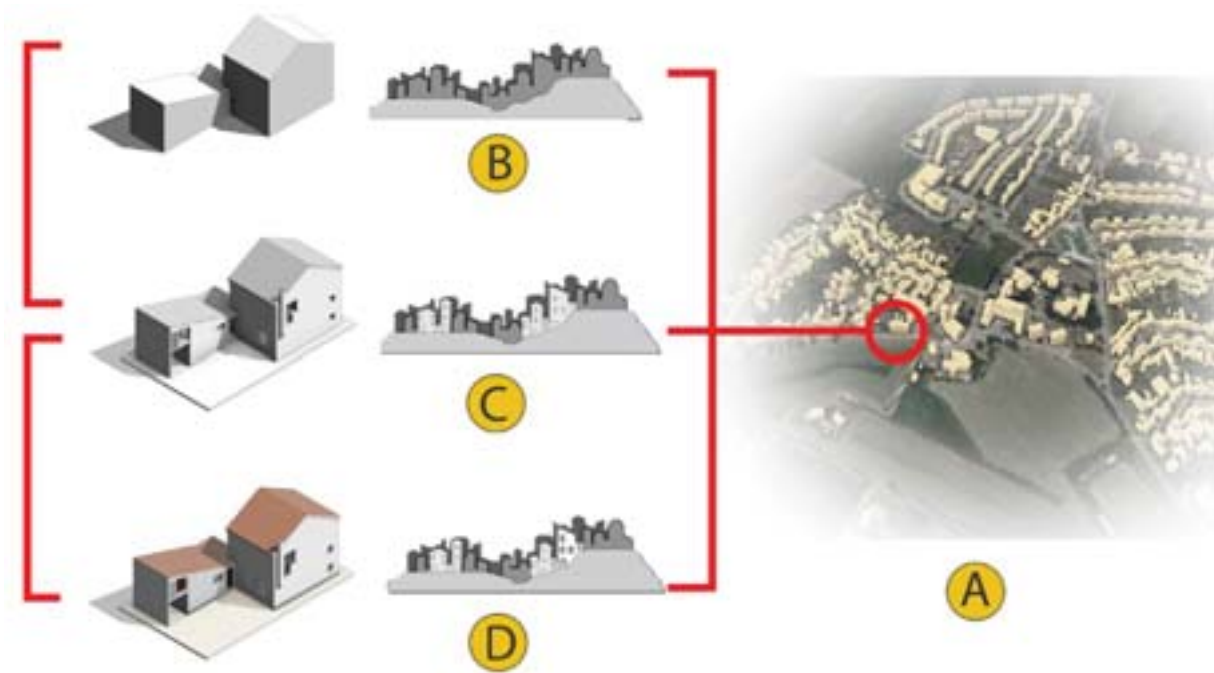
Fig.8: La Martella village. Multi-scalar analysis of a residential building typology with a stable annex through digital models developed in HBIM environment. Source: R. Pontrandolfi, 2019.

4.2 Proposals for rehabilitation and reuse

Following the multi-scalar analyses of the original urban and architectural heritage, both researches developed rehabilitation and reuse hypotheses. In the case of Santa Maria d'Irsi, the focus was on a restoration and refunctionalisation project compatible with the original destination [14].

Fig.9: Current situation (left) and project drawings (right) of the Santa Maria d'Irsi school intervention. Source: M. Cosola, 2019.

The survey, critical rereading and analysis of the typologies in the La Martella village also constituted the basis for a proposal for the redevelopment of the civic centre and residential aggregations, developing possible settlement completion hypotheses in the three areas already identified in Quaroni and Gorio's project: two-level residences in the southern area

below the church; a multifunctional complex in an area close to the civic centre; a productive-commercial structure with urban gardens and educational farms in the northern part [15].

Fig.10: Masterplan and views of the three project proposals for the La Martella village in Matera.
Source: R. Pontrandolfi, 2016.

5. Conclusions

The contribution aimed to highlight the relevance of the knowledge and rediscovery of certain examples of rural settlement colonization in Basilicata through methodological approaches based on the development of digital reconstructions, oriented towards the construction of holistic databases that can be implemented for hypotheses of rehabilitation and completion of the existing original heritage. This research made it possible to develop an integrated, multi-scalar workflow by structuring specific information layers on which to carry out different types of analysis and project proposals based on the data previously found.

The use of these digital tools has revealed the potential and criticalities associated with the management of the respective GIS and BIM models, which are still being tested. An increased integration between the two technologies is highly desirable, with a view to greater interoperability between the respective platforms that would allow for better organisation and dissemination of knowledge, as well as the development of hypotheses for the valorisation of the existing rural heritage also in terms of its environmental and settlement sustainability.

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Heritage digitalisation to preserve memory. Studying the archaeological evidence of Herdonia through the measure and the sign

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Abstract

The Apulian city of Herdonia is known for its remarkable architecture from the Republican and Imperial periods, but the archaeological site shows a historical stratification covering a wider time span than the Roman era. Since the 1960s, the site has been well documented with the studies of Professor Mertens first and the University of Foggia later, but several excavation campaigns have passed and exposure to weathering and lack of continuous maintenance are causing a slow transformation of the ancient structures compared to when they were first brought to light. In 2023 an Agreement was signed between the Secretariat for Apulia of the Ministry of Culture and the ArCoD Department of Polytechnic University of Bari to study the site through a scientific survey campaign using advanced technologies for data acquisition and processing. Surveying structures once again freed from vegetation to record their material and visual consistency in their current state of conservation means fixing their image in time, making them usable for studies and research also in the future, even in the hypothesis that any event could determine their definitive loss. In addition, the transposition of information from the survey into a digital environment and its restitution through modelling and drawing are necessary interpretative acts to complete the picture of knowledge on the architecture, the city, the landscape, fundamental in the case of site recovery and valorization projects.

Keywords: Archaeological Heritage, Laser Scanner, SAPR, 3D modeling, Digital Representation, GIS.

1. The area of investigation and state of the art

The archaeological area of the ancient Herdonia is located in the south area of Ordona (FG), in the Tavoliere delle Puglie, on the Carapelle valley (Fig. 1). The Roman town, originally

enclosed by a circle of walls, covers an area of around 25 ha with an irregular shape extending northwards on three hills, at an elevation of around 30 metres above the river valley. The vitality of the centre, attested since Daunian times, is due to its position along the main axes crossing the Apulian territory and the presence of the route of the Roman Via Traiana.

Scientific studies began in 1962 with the excavation project by the *Belge Centre de Recherches Archéologiques en Italie centrale et méridionale* directed by Prof. Joseph Mertens [1], with systematic excavation campaigns, which since 1993 have been extended to Italian and foreign university institutions [2], with the participation of the University of Bari and continued by the University of Foggia [3], under an excavation concession.

Archaeological research has brought to light considerable evidence of the urban fabric of the Roman age over the area of the Forum and the town centre of approximately 4 ha, while further excavations have revealed part of the Daunian settlement and medieval fortification. Herdonia returns the greatest evidence of the Roman age in northern Apulia of forensic public settlements, complexes of great urban and monumental value, with notable architectural elevations.

Most of the walls of the ancient settlement have not been brought to light, but their traces are known from geophysical prospecting campaigns conducted by the University of Foggia, implemented with a 2023 campaign conducted by Prof. L. Cerri, under the scientific direction of Dr. I. M. Muntoni, on behalf of the Soprintendenza Archeologia Belle Arti e Paesaggio of the provinces of BAT and Foggia, as part of a Ministry of Culture grant managed by the MiC Regional Secretariat for Apulia [4].

Currently, the site is managed through a grain sowing concession on state-owned areas that are not subject to archaeological excavation, with a ban on deep excavation, guaranteeing its perfect integration into the surrounding landscape, following seasonal changes and ensuring its care and maintenance through the productivity of the site and the application of specific precautions prescribed and carried out in the concession deed by the Superintendency.

The areas that have been excavated since the 1960s are subject to a different legal regime, as they are largely privately owned, and bear witness to the issue of the preservation and protection of archaeological sites. The risk that fragments, albeit minimal in terms of quantity, but with indispensable value as material evidence, may be lost with the passage of time, cannot be reduced to zero. The same process of conservative restoration, by its very nature implies a transformation of the place state, which, while pursuing maximum reversibility, in any case renders the asset differently usable from a cognitive point of view [5].

In 2023, the Secretariat for Apulia of the Ministry of Culture signed a Research Agreement with the ArCoD Department of the Polytechnic University of Bari to study the site, through a scientific survey campaign, using advanced technologies for data acquisition and processing, because it believes that the survey represents a fundamental knowledge tool, which allows the material and visual consistency of the property to be recorded over time [6]. The working team consisted of arch. D. Campanile, Architectural Officer of the MiC Regional Secretariat, Prof. V. Castagnolo, Scientific Coordinator of the Convention, and the Postgraduate students Architects E. V. Cordasco, C. Milardo, A. Nirchio, R. Pavone, F. Strippoli. This Convention builds on a previous Cooperation Agreement between the two institutions, together with the Soprintendenza Archeologia, Belle Arti e Paesaggio for the provinces of BAT and Foggia, signed in 2021.

The Secretariat wished to make use of the ArCoD Department's expertise for scientific research activities concerning studies on the archaeological site of Herdonia, through direct and instrumental surveys for the documentation of the areas and through the restitution of data at the architectural and detailed scale of the elevated structures and archaeological remains, and for stratigraphic analyses of the elevations [7].

2.   Surveying for knowledge, valorisation and memory preservation

Several years have passed since the last excavation campaigns and exposure to the elements and the lack of continuous maintenance are causing a slow transformation of the ancient structures compared to when they were brought to light. Despite the prescriptions of the preservation authorities, the area of the Forum, which is privately owned, is not always accessible because at various times of the year weeds are allowed to grow over the archaeological remains, causing minute but continuous damage to the structures (Fig. 2).

For the Research Agreement, it was decided to survey the architectural features included in

the state-owned areas, the so-called Castellum (Fig. 3), to the north-east of the site, the north-east and the south-east Gates and the sections of wall to the east and south-west, highlighting the planimetric and altimetric correlations between the structures, as well as the route of the Traiana, already known but today barely visible.

Before the start of the survey campaign, the archaeological structures were cleared of vegetation that in some cases precluded the legibility of their consistency and morphology. Therefore, given the rare opportunity to have total access to the structures, the team from Polytechnic University of Bari devised a work programme that envisaged the use of integrated methodologies for the survey and complete documentation of the remains of the monuments [8], with the aim of obtaining a digital twin with a high heuristic potential [9]. The transposition into digital space of the built reality, recorded in its current state of preservation, allows for the visualisation of structures in a practicable condition that is not easily repeatable. In digital space, the structures are usable and measurable, made accessible for any kind of remote investigation and with a high degree of accuracy and reliability: current surveys can be compared with old excavation data to understand the alterations that the structures have undergone over the years [10]; three-dimensional models make it possible to study information on materials, structural data, and carry out degradation analysis for conservation and restoration projects; in the digital space, morphological, typological and structural analyses can be carried out, which, conducted in parallel with historical studies and comparative processes, can lead to new levels of knowledge, also with the objective of a three-dimensional reconstruction of the architectures studied [11], carried out with a scientific approach because it is based on certain data from the survey (Fig. 4).

3.   Methods and tools: survey for knowledge

Considering the vastness and complexity of the survey to be conducted [12], it was necessary to plan in advance the working days to be spent in the field and the techniques and tools to be used, also depending on the accuracy of the survey and the amount of information to be obtained (Fig. 5).

To document the ruins of the archaeological area, methodologies that integrate different surveying systems have been used, applied at different times: the first step was to carry out a detailed survey of the architectural structures using photogrammetric techniques and a laser scanner; in the second phase the entire site was surveyed with aerial photogrammetry and was framed by a georeferenced topographic grid [13].

The photogrammetric survey was carried out using a double photographic scan: terrestrial, using a 24.1 Mpixel Nikon D5200 camera, which collected material data and color information through close-up photography; aerial photographic survey, utilizing a Mavic Pro 2 drone equipped with a Hassemblad 4K camera, to collect planimetric and altimetric data of the archaeological ruins (Fig. 6) and the morphological layout of the entire site. The next step was the processing of the photographs using Agisoft Metashape software, to transform two-dimensional digital images into georeferenced, scaled three-dimensional data. The orthophotos extracted from the models allowed for reading the material data and geometrical representation of the masonry equipment.

The Faro FocusS Plus 150 laser scanner, with an accuracy of ±1mm, was used to quickly and accurately survey the architectural structures (Fig. 7). At the end of the acquisition process, the data sets were processed using the FaroScene software to merge the different scans into a single scaled and georeferenced point cloud [14].

The second step, which focused on geolocalisation and the placement of the surveyed structures inside a topographic grid, a Geomax Zenith 06 GNSS station with an accuracy of Hz=2cm and V=3cm was used to collect terrain altimetry data, according to a 100x100m grid, which became denser in the proximity of the North-West Gate and Castellum areas, becoming a 10x10m grid.

All the information collected and returned in graphic form has been implemented in a Geographical Information System (GIS) with the aim of systematising it and making it available for dynamic consultation (Fig. 8).

4.   Conclusions

Surveying the structures in order to record their material and visual consistency in their current state of conservation means fixing their image in time, making them usable for studies and research in the future as well, and making them accessible even in the case that

any event could lead to their definitive loss (Fig. 9).

The transposition into a digital environment of information from the survey and its restitution through modelling and drawing, and the construction of a geographic information system are interpretative acts necessary to complete the framework of knowledge on architecture, cities and the landscape, which are fundamental in the case of site restoration and valorisation projects [15].

Fig. 1: High-definition orthophoto of the Forum area of the Herdonia ancient city.

Fig. 3: High-definition orthophoto of the Castellum: the Gate, the Domus, cisterns, traces of the walls and the slope of the aggere can be distinguished.
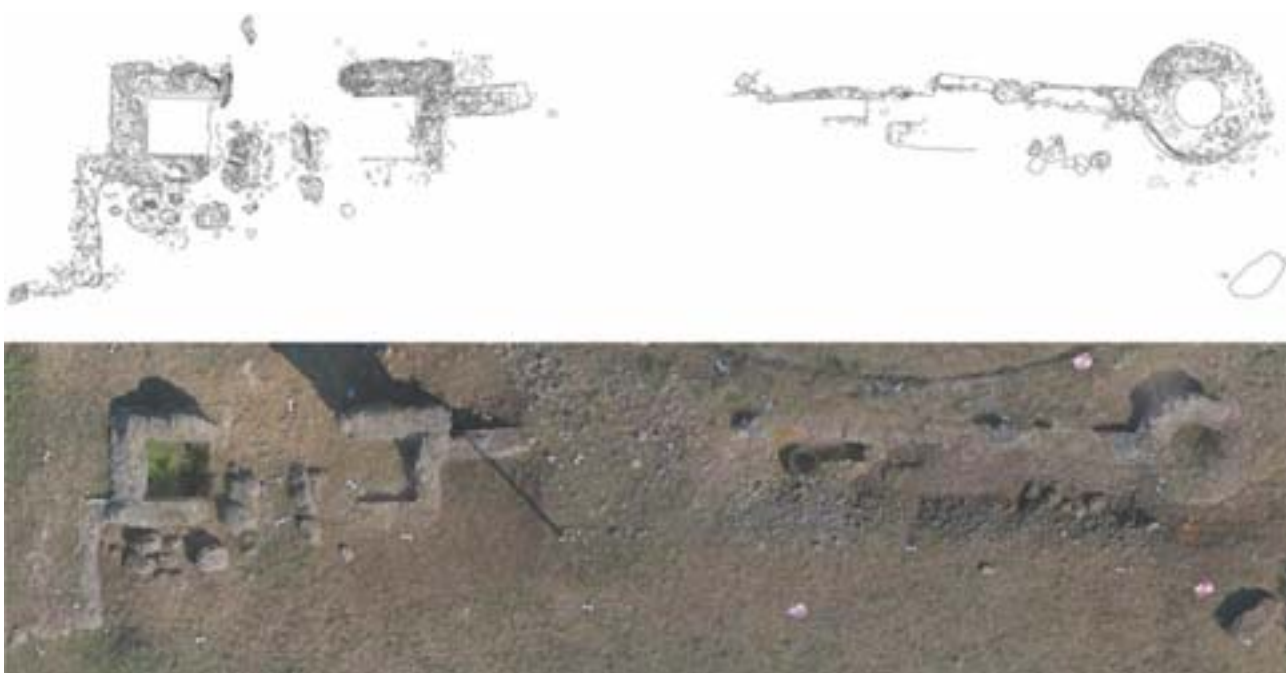

Fig. 4: High-definition orthophoto and drawing of the remains of the South-East Gate.

Fig. 5: Tools for the integrated survey of the archaeological site.

Fig. 6: Three-dimensional point cloud model from aerophotogrammetric survey of the Castellum.

Fig. 7: Point clouds from the photogrammetric and laser scanning survey of the south-west wall section.
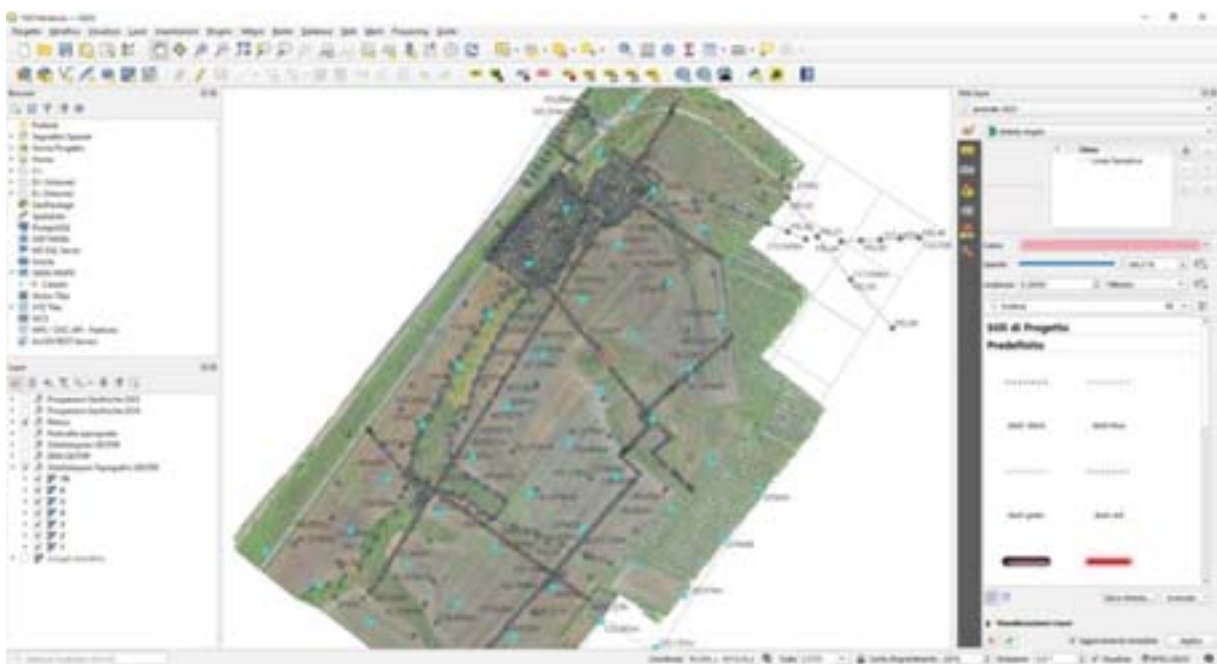

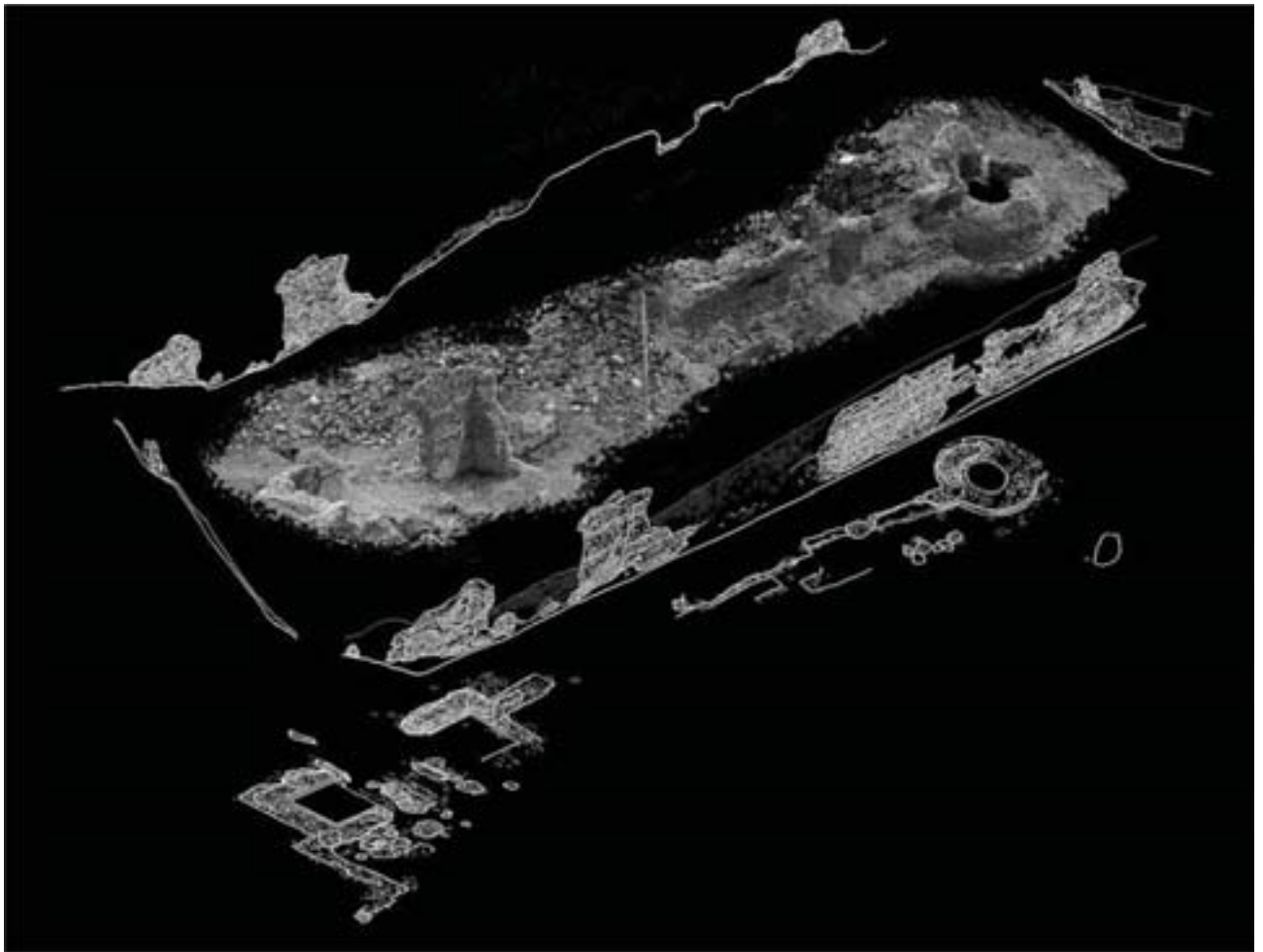**Fig. 8:** GIS of the archaeological area of Herdonia.

Fig. 9: Three-dimensional model of the South-East Gate.

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WHAT IS ARCHITECTURAL HERITAGE
after the "affective turn"

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Abstract
This paper intends to present an alternative to the customary way of dealing with architectural Heritage.

The usual procedure involves checking against "values", which are advanced by Conservation-Restoration theories. In time, these have attained a normative role. Through the sieve of these values the parts of the building that must be preserved and that which can be altered are chosen. To the latter, formal creativity, not necessarily in connection to the old building, is encouraged. The resulting whole suffers, most of the time, from a conflicting duality, which overshadows the *raison d'être* of the piece of Heritage.

The late 20th-early 21st century "affective turn" [a] endeavors to more all-inclusive approaches. These avoid the communication gap between experts and "ordinary people" [b]. They also grasp the events as "phenomena", meaning the object is not separated from the subject, and the body and world constitute themselves mutually and simultaneously. These approaches permit to acknowledge not only the objective data Science deals with, not only the subjective reactions of the self (so important in the humanistic field), but all this together and interconnected.

In the field of architectural Heritage, the concept of atmosphere allows for the all-encompassing approach recommended by the "affective turn". The process of conservation-restoration of a piece of Heritage would then have a first moment of individualizing the atmosphere that characterizes the piece of Heritage, by determining its significance to people and its physical generators. And then, an architectural intervention that defends these generators, and newly inserts just what respects the atmosphere's significance.

Keywords: Heritage, architecture, conservation, "affective turn", atmospheres.

1.   Science or Art

"The Body", a suggestive tale of Camilo Boito, proposes an insightful allegory about Architectural Heritage [1].

There are three main characters: the artist, the scientist, and a woman of rare beauty.

The artist is a painter. He has, as a model, the woman: her name, Carlotta. During the period when Carlotta poses for the painter, they fall in love and become engaged.

The painting effectively reflects the unparalleled allure of the woman. When completed it is sent to an exhibition and secretly bought for an amazing sum.

But Carlotta also entices the scientist — an ingenious anatomist — Von Karl Gulz. Gulz embodies the late nineteenth century Scientistic mentality, which looks at Science as the source of salvation. He intends to discover, through anatomical research, the nexuses behind physical beauty. He also defends that, for such causes, all sacrifices are permissible, human lives included.

The anatomist indulges a morbid attraction towards the perfect body of the woman. He wishes to dissect it — strictly speaking — in search of the causes of that beauty. The unnatural leaning of Gulz towards Carlotta torments her.

Unexpectedly, Carlotta dies. When searching the hospital, the painter finds her at the anatomist's cold white marble table. Carlotta's painting is there too. It had been Gulz, unable to reach her at first, who bought it.

Around the body, a tense confrontation takes place. The anatomist attacks the naive — he says — and unsubstantial endeavor of the painter, the superficiality of the infatuation with appearance. He claims that the subjective views of Art are unattuned to present times. Only science, in its objectivity, only scientific research — painstaking and exact — responds to the demands of the modern age, producing documented knowledge that allows for the construction of a real, fulfilling life.

The painter remains silent, perplexed — asphyxiated by the conceitedness of the other. He looks at the dead body. It is perfect as before: the rose white skin, the symmetry of the members, the bluish eyes, shining as ever — disturbingly. All these, which were warm and embracing before, are no longer, no longer speak: "that body doesn't say anything anymore to me", the painter realizes. Then, looking around in a distracted mood, he regards his painting. It recalls him to her beauty and to their love — as if it were present. Carlotta is lost forever, but through that image — which seems alive, which seems to talk — some of her grace resists, and remains. He wants to buy the painting back. The anatomist does not oppose.

The tale is rather silly when actual people are assumed — Gulz's posture is evidently abnormal. But, when considered as an allusion to Heritage, it acutely pins two divergent ways of dealing with it: to reduce a piece of Heritage to a mere document of past times, whose value can only be asserted through the scientific instruments of History, and which is crystalized in certain material parts; or to look for something else, something that encompasses affection and a more all-embracing understanding.

2.   Interventions (dis)oriented by values

Typically, when a Heritage expert (an architect, historian, archeologist…) addresses a building or a place, inspecting whether it could be acknowledged as a piece of Heritage, they look for its values. They have a checklist for it too. Riegl suggests five values: memorial, historical, antique's (concerned with the past), artistic (related to the current taste), and novelty's (resulting from a comparison with the present) [2]. Brandi asserts only two: one historical, the other aesthetic or artistic [3] (which ends up being correlated with the artist-architect who designed that work, and therefore is historical too). This way of seeing things has two main inconveniences.

First, only experts can recognize and assign such values. Hence, the experience of "ordinary people" [b], the dwelling effect (in the Heideggerian sense) that true architecture provides, is not considered (see below in this section, also 3.a.). Consequently, this evaluation favors a gap between the experts' view and the dwellers' or visitors' view.

Furthermore, those values are not sufficient to identify a piece of Heritage, inasmuch as all objects possess such values in some degree. Therefore, at best, they could only help in distinguishing a Heritage building from another kind of building by the quantity of each value. (Still, those values are helpful in laying boundaries for an intervention upon historic buildings.) Second, the subsequent conservation/restoration intervention may follow manifold strategies, which all end up being unfitting. The preservation operation can be merely technical — and then the values of the preexistence are accessible just for those (specialists) who are able to unriddle the hidden traces of value. Or the preservation can be both technical and architectural, where the architectural operation is mainly focused on revealing the values previously discovered by the historians or archeologists [4] — thus delivering, again, enigmatic, fragmentary, and dry architecture. Moreover, the preserving action can have two stages: one, to determine what parts have historical and artistic value, and to freeze them by a merely technical action; and then, in the rest, to take a freely creative stance (more fashioned by the architect's idiosyncrasies than the pre-existence's essentials). Thus, the end experience has a

Jekyll-Hyde result: the pre-existence plus the new intervention. The new intervention, although respecting the postulates of reversibility, distinguishableness and minimal intervention, often perceptually shuts the pre-existence, becoming the main input for the visiting people or dwellers. On that account, the reason why the community decided to preserve such a piece of Heritage in the first place becomes, henceforth, unnoticed, no more an active recall of and to the collective memory.

(This is the case of the Convent of Flor da Rosa, in Crato, Portugal. It was a medieval Monastery, listed, to whom was ascribed a new use as an inn. The architecture operation had three different strategies. The church and the parts with no use for the inn were kept "archaeologically", removing all additions since its presumed origin and repristinating the lacunae (Figure 1). This part purportedly looks like the old building as new. Still, it does not help getting to its Heritage content. Secondly, in the other parts of the old monastery, the architect inscribed exquisite new forms, with plasterboard and light panels of exotic wood (Figures 2-3). These are clearly different from the ancient parts — thus respecting the distinguishableness principle; they can be taken out without harm to the historic parts — therefore respecting the reversibility principle —; and they don't fill up most of the surface of the old building — hence allegedly respecting the principle of minimal intervention. But when one goes to visit the building, or to stay in it, one sees only the glamorous new inserts of the contemporary architect, not the atmosphere of the old historic building — which, it should be noted, was the reason to demand the preservation of it in the first place. Thirdly, in that complex another building, completely new, was added, since, for the inn to be profitable, it needed more bedrooms than those that could be placed in the old building. This new building has a scale and a language that dwarfs the old building and blocks its view from afar (Figure 4).)

There are also another two trends of intervention upon historic buildings, generally accepted as wrong. These two trends tend to occur simultaneously. One of them is when the architectural intervention is driven by touristic interests. It stages a fantasy that never existed (a present without past). Subsequently these touristic goals often enforce repristination. This means that the missing parts are filled up as if they were ancient, not distinguishing the material remains of the past from the new completions. The whole ends up being a rather conspicuous falsehood [4].

What aggregates the first two stances — those driven by historical concerns and approved by specialists — is, in my opinion, that the piece of Heritage is mainly considered a "document" — as Gulz looked at Carlotta.

DOCUMENT VS MONUMENT

'Document' comes from *documentum*, in Latin, the gerund of *docere*, a verb that means 'to teach' [5]. As an instrument for teaching (note: not for learning), the document possesses an aspect of meaning plainly exterior to the subject-person. The contemporary use of the word 'document' signals that aspect of meaning as well. 'Document' is understood as evidence: a material piece, which subsists outside of the subject, and conveys a message, which is not influenced by the subject — that's its purpose. A 'document' is therefore irrefutably objective, which implies that it is not assimilated by the subject, and consequently does not have any existential effect.

'Monument' is a completely different thing. It has acquired, in recent times, a pejorative sense, related both to big, pompous commemorative buildings that serve to enact power, supporting group pride and compelling submission on the "others". This inhibits the use of the word. Nonetheless, this is not the proper, fundamental, meaning. *Monumentum* is the gerund of the Latin verb *moneo* which translates 'to remind' (in an exhorting sense). A 'monument' is simply that which reminds us. It is the agent of an appealing "remember!"

Furthermore, the verb *moneo* derives from the Indo-European root *men*. From it proceeds the word *memini* (memory). The root men also participates in words like 'mind', 'mentality', and, in some languages, designates the human being — 'man', 'men', 'Mench'. '*Men*', therefore, expresses the essence of mankind. Memory, accordingly, as derived from *men*, is perceived

as the embodied deposit of the human essence (see for instance what Augustine says about it in the Confessions).

Once Memory is the content of a monument, it represents and sets in motion core aspects of humanity, usually correlated with the inner self (which are not just "cultural" aspects, in the current sense of the word). A monument is a reminder of those personal or collective experiences that have generated some form of insight, either self-revealing — of individuals or societies — or concerning others; an understanding, a perception, an awareness that leads somehow to a better, more humane life (that's why one safeguards that piece of memory).

'Monument' and 'document', thus, have completely different purposes and effects: the first calls for memory and in a sense reactivates the past event that is the content of a specific piece of memory; the second substitutes memory. The meanings of these words are structurally distinct. Whenever a piece of Heritage is understood as a document it no longer wishes to challenge people. Whenever there is not discovered, in a piece of Heritage, its "monumental" agency, it cannot convey its reason for being; it stays closed and incommunicable. *Monumentality*, in this sense, should, and will, be considered henceforth the essence of a piece of Heritage. Heritage must be engaging as the painting of Carlotta, not as the mishmash of her dissected organs. [6]

3.   A phenomenological approach.

The previous analysis of Heritage's values (necessarily succinct) enlightens two aspects that require serious consideration: 1) to look for a common base between specialists and "ordinary people" to recognize Heritage and list it; 2) that the topic found in the latter is such that it is able to guide an architectural intervention that does not throw away later the very value acknowledged. (In this paper I will deal just with the first topic.)

I'll use a phenomenological approach to respond to these aspects.

3.1. The real value

Let's envision a building which has not been listed as Heritage yet. That building, however, has something experienced as extraordinary. Hence, the community who coexists with it decides that it should be preserved and protected, whereupon they enact the process of listing it as Heritage. That community might have a lot of similar buildings with the same use — let's say it was an early industrial building, or a traditional vernacular house, or a *villa* designed by a famous architect who made some more in the same place (like the single-family houses Wright designed in Oak Park, Chicago). Even so they decided to preserve that specific building and not another. Why?

One can only assume that those people get some kind of *goodness* from that building, which they haven't gotten from the others. It's difficult to be more precise: people just feel good in or around that building, in a particular kind of way they don't feel in relation to anything else. It is, consequently, a unique *goodness,* inasmuch as, if that *goodness* occurred in other objects, that building need not to be preserved (people would get the same "goodness" from other things).

This means that the listed building does not present itself as an *instrument*, whose reason for existing rests only in what it does, in what it serves for.

NON-INSTRUMENTAL CHARACTER

Instruments fulfill a certain task — let's say, a hammer — and in that task they could easily be replaced by an object with the same function, but not necessarily the same form — another hammer, perhaps a more ergonomic one. This occurs with objects like a pencil, or a Bic pen, or a kitchen dish, or a car; or even a house or an office, a public building and so on. These objects work as *consumables*, resembling in their behavior food and the like (Certainly, during their lives, they can manifest that they have other values than just their use. In that case they become what's called *antiques*, which also perform as monuments.) As such, a building that exists only as an instrument would be replaced by another building with the same function as

soon as it commences fading to perform as demanded, or another one is considered more suitable for the same function.

Conversely, a building which is listed as Heritage is not apprehended as an instrument, though it could have been. Its reason for being is not what it does, but what it *is*. It values, not by its function, but by its form (or more precisely by what the form conveys, as we'll see later) — as it allows for a both desirable and unique experience. Contrary to buildings with an instrumental character, for Heritage buildings one prefers to search for a new use when the original one lacks topicality, rather than to lose it — and this over and over again. In the material world, besides monuments, only objects of art and antiques, grasped in their substance, exist in the same manner. Therefore, a piece of Heritage, taken in its essence, manifests itself to people's experience as *irreplaceable* — fully, completely, totally irreplaceable. Somehow it ceases to be just a building and becomes something comparable to a human being — a *quasi-human* entity — since only human beings, by their very nature, are entirely irreplaceable. When one is not treated as such, one feels manipulated. The same happens with an unfitting restoration or conservation action in relation to a Monument — it's felt as manipulative.

IRREPLACEABILITY

What does irreplaceability involve? That it's not a historical value or something akin that lays the foundations for the listing as Heritage, since this historical value could be more efficiently transmitted by a book or a documentary. If one wished to approach a building's historical values, it would be better if they read a book on that. "But", you would say, "it's not the same thing. We don't have the material testimony of the historic building in a book." Fair enough. Nonetheless, ask yourselves: what kind of added historical knowledge results from a non-expert gaze on an ancient particular of a building? If what you want to defend is the testimonial power of the old materials, then it's better to treat those materials as Archeology commonly does: the places are excavated, registered, and then covered again, not to be damaged by the meteorological or human agents; sometimes copies are made for people to look at without corroding the original — which means cutting off the testimonial factor of the original.

The same *rationale* applies — ordinarily though strangely — to artistic value. This should be tackled carefully. If one means by artistic value that the value depends on the manufacture or design of the building by a particular architect, one is sliding back to a historical value. What is frequently implied by artistic value is that those remains invoke a person who had done great feats. Again, this could be better communicated by writing and pictures. Likewise, if one says that the building represents a period, a particular architectural language of a time or a region, that knowledge would be better transmitted by an illustrated book, or by the drawing reports of an architectural survey, photos and the like. There one could measure the elements and proportions, in order to fully capture them and, eventually, learn from them and apply that knowledge to future designs. In such a manner one could attend to details that would pass unnoticed without close-ups or aerial pictures.

As regards historical and artistic values (when the latter lean to the historical) — or other values that could be better displayed by words or images — the experience of the building, which asks for its real presence, is not necessary.

Another case is when the value is *aesthetic*. "Aesthetics" — which in Greek correlates with sensation — can only be sensed, experienced. Yet, in this understanding of aesthetics, the issue is not *style* (as someone's mode of expression [7]), or the geometric organization behind the form, or the like. Aesthetics here means Perception.

Just when one needs to preserve the building because they cannot acquire its *goodness* other than by experiencing the real thing, one is dealing with its *irreplaceableness*.

SUBJECTIVITY — INTERSUBJECTIVITY

You may argue that such a claim is utterly subjective — and you are right. Consider though that the real value of Heritage, as a "monument", is subjective. That is to say: without a subject that experiences the building and recognizes in it a needed memory content, there wouldn't be any Heritage. Heritage *moves* people — that's how it is recognized in the first place. It is

not possible to train a dog or program a robot to discern pieces of Heritage from others. And not because AI cannot reach that level yet, but because the interface which gives the inputs to the judgment whether it is Heritage or not, is the human perceptive body (in Merleau-Ponty's sense [8]).

Therefore, the question is not subjectivity. The question is how to attain *intersubjectivity*: an assessment of the building that is common to most of the subjects. "This is impossible", you would argue, "We are all different. It's a matter of taste". I'm not so sure about that, inasmuch as most of us continually use intersubjective abilities. Communication, dialogue, even disagreement wouldn't be possible without assuming that an individual knows and feels what another individual is thinking and feeling. (Neurosciences, with the discovery of mirror-neurons and Theory of the Mind, has given a substantial boost to that. [9]) Architecture, as the process of designing an abode for anyone else but me, would be untenable. Justice, Freedom, are subjective concepts — while they require a human subject to acknowledge them. Yet they are shared by everyone (mentally sane) — although the concrete realization of these concepts might not be the same and disagreements may occur. (Nevertheless, the fact of disagreement presupposes a common basis from which to depart. A disagreement is not a misunderstanding). It is on these grounds that one should look for the intersubjective identity of a piece of Heritage. Intersubjectivity can be achieved by a careful hermeneutical process — if not by the phenomenological *epoché* — that gradually, through successive rounds, probes the unique *goodness* that a piece of Heritage hands out to the whole community. (I will return to this issue later, section 3.b.)

ARCHITECTURE — HERITAGE BUILDINGS

A small note: in the sense I've described before, Heritage buildings mostly coincide with architecture buildings.

I'm not able to thoroughly elaborate this issue here [10]. But if one needs to distinguish, phenomenologically, a piece of architecture from a straightforward building, what is at stake again is *irreplaceability*. A straightforward building acts as an *instrument*. It can be replaced by another more efficacious building, with no regret. Not so with what one calls architecture, independently of the time it has been built — recent buildings can be considered irreplaceable too. And they can be considered Heritage despite their age. Architecture, in relation to common buildings, displays irreplaceableness as well. (Undoubtedly one could prescind to assess the architectural identity phenomenologically. A piece of architecture could be defined objectively by a certain number of features. For instance, that it is well built, functional, and arouses an aesthetic feeling. Still, that would exclude old buildings that could be degraded or end up without any use. And it would include pieces of design that also have those features. Or even, for instance, architecture could be identified just due to the fact that it was designed by someone with the title of architect. However, unless it was labelled, "ordinary people" would not be able to recognize architecture [b], while there would be no specific perception that would determine architecture. It happens with Heritage very much in the same fashion. Other than that, it would make no sense to have schools of architecture, inasmuch as there wouldn't be any possible gradation of architectural quality, and consequently no exemplar architecture from which to learn and teach. Several other classifications fall in in the same pot of contradictions.)

Notwithstanding, a piece of architecture is not sufficiently defined as an irreplaceable building. An art-installation could also be an irreplaceable building, although not architecture (and it could have "interior space" as well, differing from what Zevi claims [10]). Therefore, I propose that architecture could be identified by a specific *intentionality* (in the phenomenological sense), namely *dwelling* (as defined by Heidegger and Levinas [11]). Accordingly, every piece of architecture would impart a *dwelling experience*, and no other type of object would involve the same experience. This is a postulate, of course. Nevertheless, it seems to me, it is a postulate that fits the necessary conditions: it includes all the objects one currently calls architecture and excludes any other that is not usually named like that.

However, a piece of Heritage, as a monument, offers something other than dwelling. It points to something in the past — it re-presents it. One could say it works as a kind of "time machine". Typically, it imparts "monumentality" to people (in the sense that has been particularized above), that is, it has a *memory* content.

But let's take a step back: what is this then that only the human experience of the building discloses? How do dwelling and monumentality reach the dweller?

By its *atmosphere*. A piece of architecture, as such, only provides atmospheres. The irreplaceable atmosphere that an architectural piece of Heritage creates is its reason for being.

3.2. Atmospheres

ATMOSPHERIC TURN

One decisive aspect of the "affective turn" in architecture and Heritage — and it's difficult to discern whether it was the cause or consequence of the "turn" — was realizing that a piece of architecture speaks through its *atmosphere*. That is the way an object of architecture interplays with "ordinary people" [b] and, in the first place, with all people [12]. It is its channel to talk to, to manifest itself in a human world; better, its mode of being.

Form is not architecture's way of talking to us, since form, in itself, is often neither noticed nor apprehended by a human subject. Form may not motivate any reaction, generate any effect — or affect — in the percipient. Thus, the potential piece of architecture is, at the most, seen as a building, as an instrument — not as *irreplaceable*, not as handing out any kind of *goodness*. Form is the normally unperceived generator of a space with existential value: an ambiance, an *atmosphere*. This understanding of architecture and architectural Heritage is a much more comprehensive alternative than the geometrical, scientific (third person) trend.

THE FAILURE OF OTHER APPROACHES

Other approaches have demonstrated that they are insufficient and inappropriate to explain how architecture engages with human subjects (as introduced in section 2).

A piece of architecture is not sufficiently explained — as Art Historians usually do — by its formal characteristics, or by the manner the author uses to express themself in their work, or by the chronology of the project, construction, and inhabiting; or by the external influences, upon the author or the client, of the socio-cultural context or the artistic-stylistic one; or even by the sum of all these aspects (despite the fact that all these can be important in deepening the understanding of the atmospheric effect). Architecture is not sufficiently explained by the Semiotic reading of its signs, inasmuch as architecture does not communicate itself as a sequential text to be read without involvement. Architecture is not even sufficiently appreciated aesthetical-artistically, as an enticing, albeit heartless, game of forms, as Theorists of Architecture ordinarily do (especially in relation to modern or contemporary architecture), because that requires a body of knowledge, mainly from historical treatises and theories, assumed as true but that has not been tested, and that only experts possess (despite that this analysis might help to understand some atmospheric factors) [4].

The main reason for the insufficiency of these approaches is the *analytical* feature. Simplifying, the professionals of those disciplines access the architectural object with a sort of hidden yet pre-established table of analysis, and they mainly check whether the historical, semiotic, or formal characteristics on the table exist or not in the object. Despite the fact that the table may have a lot of entrances, this method only allows for discovering what are the characteristics of this object that also exist in other objects of a similar nature (from which the lines of the analytical table were aggregated); this method does not allow for the suspension of preconceived ideas (in the phenomenological sense), which would enable finding the source of the specific personal effect the object motivates and which specifies it as felt architecture.

Acknowledging a piece of architecture for its enveloping and essential effect (from which derives a specific purpose in the world of humans) is regarding it from the "Atmospheres" point of view.

THE NOTION'S BIRTH

The *atmospheres* subject-matter was first (or at least, more publicly) brought to Architecture's realm by Peter Zumptor, in a 2006 book of the same title. It was further developed by Juhani Pallasmaa [13]. Other architects and Theorists of Architecture have nodded at this topic (Steven Holl, Christian Norberg-Schulz, Rodrigo Perez-Gomez…). From the field of Philosophy, yet in correlation to Architecture, it has been recently elaborated, chiefly by Hermann Schmitz, Gernot Böhme and Tonino Griffero. I'm mostly adopting the frame of mind of these last two. (For a more thorough account, consult the Bibliographic References [14].)

ATMOSPHERE CHARACTERISTICS

An atmosphere imparts itself pre-consciously. It is perceived before the separation of subject and object, which is the result of a later rationalization. It's a sort of original connection, a primary relation where subject and object are merged, "a relation before the relata" [15]. It happens "in-between" [16] body and world (much in line with the way Merleau-Ponty depicts perception). "What is first and immediately perceived is neither sensations nor shapes or objects or their constellation […] but atmospheres, against whose background the analytical regard distinguishes such things as objects, forms, colors, etc.", says Böhme. [17]

An Atmosphere is global and indistinct about the inputs that motivate it. It imparts itself in an all-enveloping, immersive mode.

Furthermore, it conveys an affection, it passes on a set of feelings, it *has* a mood. This mood or affection involves, in a tenderly immersive manner, those who are in the place from which the atmosphere emerges. One participates in that holistic set of feelings.

Consequently, an atmosphere is received in a "pathic" manner, being that it conveys a *pathos* (a set of feelings), which is passively received [18]. It is not a psychological projection of the self (because that wouldn't explain why one cannot project over an environment whatever mood or feelings comes to their mind, other than the fact that an atmosphere has the ability to change the feelings one carries before entering it [19]).

Therefore — this is paramount — an atmosphere is intersubjective [20]. Seeing it from a relativistic angle is putting aside its nature.

Moreover, besides the pervasive presence of atmospheres, they can have a positive or negative effect. A negative effect would take place when it arouses inconvenience and irritation, or has an anesthetizing effect [21]. A positive effect would be when it attunes to a person, either by continuing the already present feelings or by inserting new ones that the subject accepts willingly. This opens the possibility for what Kant calls the "sublime".

The "sublime" affections can be disturbing or frightening, though voluntarily received. Therefore, a steep mountainous landscape may produce some chills, as well as the view of the sea from a high cliff, yet still they are felt as captivating.

Nevertheless, according to what I stated about architecture's intentionality, I would exclude the sublime affects from architecture — and from architectural heritage too — preferring to limit its affections to the tender engagement of the dwelling experience. Still, I acknowledge that inside dwelling's theme exists an enormous variety. Architecture entails the act of paying attention to one's self (as Heidegger and Levinas remarked), in different manners. A sublime atmosphere calls attention to itself, distracting from the human self. Architecture works to make an abode that shields people from aggressive — whether sedative or stressful — atmospheres. Sometimes, though, it fails to do so, and it becomes hostile as well. (I will not assume these building events to be architecture, as defended above in section 3.a.)

Every environment conveys an atmosphere, not just physical environments: a circle of people concentrated in a conversation entails an atmosphere, which could be joyful or tense or something else. Dealing here with architectural Heritage, I will abstain from considering social atmospheres. They can, however, be very imposing and alter the atmosphere inanimate objects generate. Nevertheless, landscapes or gardens have atmospheres too: a sad winter evening, a joyful rising sun...

Another important aspect is that an atmosphere, which has a primary intersubjective impact, can then arose different emotions, according to people's temperament or condition. For example, the impression of grandiosity upon entering a gothic cathedral can be intersubjective. The effect of grandiosity can afterwards generate an intimidating emotion in some, and an influx of boldness in others. (Griffero gives a similar example in relation to the entrance hall of a bank, which chills those who go there for a loan, yet provide a reassuring environment for those employees who have a corporate feeling [22].) The atmosphere affect is, hence, the first paradigmatic one, not the secondary fruit of subjective personal reactions.

ATMOSPHERE'S GENERATORS

It's possible to accept, then, that an atmosphere has its *generators*: objects, forms, light, scale, materials…, and the constellation of these. Atmosphere's generators are the complex of physical conditions that convey the atmosphere.

The awareness of the specific generators of an atmosphere allows for architectural work upon an environment, without disturbing its atmosphere, or even to recreate specific genders of atmospheres in *ex-novo* designs.

Böhme [23] notes that this already happens with the theory of English gardens, whose atmospheres can be designed through certain elements. He quotes Hirschfeld from the *Theory of Garden Art*:

"The darkness […], which lies on ponds and other still waters, spreads melancholy and sadness. Deep, silent water, darkened by reeds and overhanging bushes, which is not brightened even by sunlight, is very suitable for benches dedicated to these feelings, for hermitages, for urns and monuments which sanctify the friendship of departed spirits. […]. If the wood consists of old trees reaching up to the clouds and of a thick and very dark foliage, then its character will be serious with a certain solemn dignity which calls forth a kind of respect. Feelings of peace possess the soul and involuntarily cause it to be carried away by a calm contemplation and gentle amazement."

Böhme also mentions Scenography:

"The fact that one can produce atmospheres, and that there is also a body of knowledge concerning how one can do that, turns the art of the stage set into a paradigm that can, or even must, orient any theory of atmospheres. Scenographers have always known how to generate in a performance space an atmosphere (which they often call Klima*, climate) that, on one hand, attunes the audience to the events to come and, on the other, provides the actors with a resonant ground for their performance. The art of the stage set teaches us to appreciate objects and qualities, less with respect to their characteristics, than with respect to their emanation into space, namely their ecstasies."*

[…]

"[…S]cenographic art […] also demonstrates concretely that atmospheres can be produced and, further, that what they produce (namely, a certain mood pervading the performance space, the so-called Klima*) is something quasi-objective or, better, intersubjective. For if everyone in the auditorium perceived the atmosphere on stage in a different way, the whole of scenography would be meaningless."* [24]

(Griffero [25], likewise, accepts the possibility of producing atmospheres, though not with the same certainty.)

CAPTURING ONE ATMOSPHERE

One might think that, once identified, the general mood that inheres to an atmosphere — melancholy, joy…— could be specified by the elements of form: color, proportion, materials, light, scale, etc.: "it's a melancholic space with blue walls". That would be to jump between unmixable domains. Light, materials and so on are the physics through which the atmosphere renders itself, but not the atmosphere *in se*. Leaping from the general mood that an atmosphere embodies to the elements it uses to convey that mood, is a risky traverse — inasmuch as one would only recognize the elements of form that have been precedingly identified in other

atmospheres, one wouldn't be aware of what makes that architecture's existential experience distinct from others (see above THE FAILURE OF OTHER APPROACHES).

If an atmosphere designates itself by a mood or a collection of affects, then it should be by determining precisely these affects that the atmosphere could be specified, namely, by determining the unifying affection that only happens there.

Music is a good example of an atmosphere, since it is all-enveloping and imparts a mood. Also, because it's apprehended by the movement it engenders — through *rhythm* and *tone* (sad, cheerful, energizing…) — like in a slow dance.

This also happens with architecture and architectural Heritage. Beyond the explicit thinking of Böhme and Griffero, I suggested earlier an analogy between Architecture and Music in what concerns the way they communicate themselves [26]. An architectural atmosphere induces a slow dance as well, which leads the human subject through the environment that encapsulates it (what Le Corbusier called "promenade architecturale"). This dance fosters a rhythm, and a tone too, creating a pattern of walking and seeing movements (which embraces other perceptive stimuli too). One might entitle this an architectural "melody". The melody, as in music, conveys a message. By "melody", I understand an interrelated array of affects *and thoughts*, via which the architectural atmosphere is specified. (I call "gesture" such a pattern [27].)

THE MESSAGE AND THE MEDIA

What is at stake in identifying an atmosphere is the specific *correspondence* to the percipient that inheres in an atmosphere, while it exists "in-between", and in an unconscious manner. An atmosphere, other than sharing affects, bears a meaning — when apprehended it conveys a message. This pertains the way an atmosphere is perceived, even when one is unaware of it. However, this meaning shouldn't be understood as the dictionary meaning, which has no connection to the self. In the sense I'm using it here, the meaning is affectively colored — it says something *to me* in a rather personal fashion. In other words, an atmosphere involves an existential relationship — there is in an atmosphere something that *corresponds* to me, that is *for-me*. This meaning, which is the essence of an atmosphere, could then be better explained as a *significance* (in the sense, for instance, that the behavior someone had towards another was full of significance; the way I use this notion here partially coincides with Susanne Langer's use of the term [28]). Significance is acquired through the experience of an atmosphere: a complex of feelings and thoughts.

Significance is evidently connected with the memory content of the piece of Heritage. Such memory content must have some *significance*, otherwise it wouldn't be remembered, and the purported piece of Heritage wouldn't perform. It wouldn't impart any *goodness*; it wouldn't be experienced as *irreplaceable*. It would be felt as indifferent, maybe not even acknowledged. The object may act as a "monument", recalling to something one needs, because the memory conveyed by that object corresponds to some existential necessity. Only because of this, the piece of Heritage is able to interplay, in a worthwhile manner, with the percipient.

Yet the significance which belongs and identifies the atmosphere needs to be disclosed. And, since the atmosphere is, at start, cloudy and undefined, this disclosure is not immediate. Moreover, the phenomenological *epoché*, though necessary, tends to fall short, ultimately: it does not reach specifying an atmosphere's significance.

DETERMINING ONE ATMOSPHERE

A hermeneutical process of comparing atmospheres of similar places, thence, allows to overcome that difficulty (Ruskin mentions this already). It permits the differentiation of them and their significance. This involves experiencing multiple environments, which are analogous to a certain degree (same typology, same architect, same period…), trying to apprehend the category of significance where the atmosphere under scrutiny belongs. Then, one could launch another set of comparisons, of atmospheres with identical significance despite having a distinguishable form. It might even entail a comparison to a piece of music which produces a

similar atmosphere, or between a garden and a room. The purpose is to ascertain the individuality of the atmosphere's significance.

Simultaneously, the process of comparing similar (but not equal physical) settings, which generate similar (yet different) atmospheres, allows pinpointing the precise form generators responsible for instilling the atmosphere.

These successive comparisons should be carried out until the atmosphere on analysis distinguishes itself from any other, both in significance and the specificity of the generators. (This requires a very thorough process, whose result would be fully proven only when the investigation has been taken to a near infinite number of comparisons. Evidently that cannot be achieved completely. Yet close approximations are possible when only a regional set of atmospheres, carefully chosen, are taken into analysis.)

(This topic will be expanded in a forthcoming paper.)

3.3. The significance of a piece of Heritage

The notion of atmosphere, in its details, corresponds therefore to a comprehensive understanding of a piece of Heritage, as it was designed before. This totally converges with the analysis entertained above (see especially section 3.a.). Architectural Heritage works to convey a *goodness*, and it conveys such by means of an *atmosphere*. Identifying the atmosphere is, consequently, the way one can identify a piece of Heritage.

The individualization of an atmosphere, or the specific *goodness* a piece of Heritage conveys, both in its significance and in its generators, leads thence to an appropriate intervention. This would require preserving the effective generators of the atmosphere. Furthermore, any addition of elements should keep the resulting atmosphere within the identified significance.

Despite the difficulty of the procedure, the proper intervention could be attained through a process of trial and error that retrieves its knowledge from previous atmosphere comparisons.

(I will elaborate on this argument in a forthcoming paper.)

4. A new paradigm

The purpose of this text is not to delve into Conservation's values, Ontology of Architecture, Atmospheres, etc. Rather, it is to present a full-range path that allows us to recognize and intervene in Architectural Heritage, acknowledging the "affective turn" [a]. This "affective turn" entails a new gambit in architectural and Heritage perception.

Previous elaborations about Heritage values and the Conservation-Restoration strategies, developed until the late 20th century, do not contemplate that "turn". Born from Phenomenological and Neo-phenomenological approaches, the "affective turn" argues against the Empirical and Cartesian ways of thinking. These disregard that perception happens before the differentiation between subject and object (as Merleau-Ponty thoroughly discussed [8]). This claim involves that all the acts of perception embody, from the beginning, an affective shade or tone. The affective tone prompts a preliminary and natural differentiation between what interests (or at least interferes with) the perceiving person, and what does not; between what may be benign or harmful. [29]. Only inside that tinted realm do I see the world. I do not notice what, in terms of personal interest, stays in the grey. Significance is pervasive (as Cassirer keenly observed [30]). The personal connection is motivated by what Husserl calls "intentionality". Perhaps oversimplifying, it might be explained as the will, one always carries, to look for something rewarding, asking subliminally and extensively "how does this or that concur to my happiness?"

From a general "affective turn" derives a lot of other specific turns, above all in the humanistic disciplines: the historical turn, the atmospheric turn, etc.

Regarding architecture, places, architectural Heritage, the "affective turn" implies that their perception occurs first through the concept of atmosphere. Atmosphere results from the all-embracing and amalgamated encounter between reality and the thinking body (since this encounter happens before the conscious step that separates subject from object).

Investigating the atmosphere of a piece of Heritage consents to consider it from the perspective of "ordinary people" [b], and to intervene accordingly. Thus, it would preserve the real value of Heritage, defending its *raison d'être*.

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4.   Images and Captions

Figure 1

Figure 2

Figure 3

Figure 4

(Photos by the author)

Seismic vulnerability: the case study of new Conza della Campania (Av) rebuilt on a different site after the 1980 Irpinia earthquake

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Abstract
In the last fifty years, earthquakes of Richter magnitude greater than five have destroyed entire Italian villages in the Sicily - Belice Valley (1968/5.9), the Tagliamento Valley (1976/6.5), Campania - Irpinia (1980/6.9), Umbria (1997/6.1-6.9), Abruzzo (2009/6.3-5.8), Emilia (2012/5.6-5.8) and Lazio (2016/6.0).The criteria used for analyzing and assessing the earthquake vulnerability of a settlement fabric are only building criteria as the method used by the **C**ivil **P**rotection **D**epartment-**I**talian **N**ational **E**arthquake **D**efence **G**roup (CPD-INEDG) [1] and do not interpret the city as a complex system of adapted spaces. The simplified model assumes a city as a simple sum of its built elements, but the city is a complex system in which the relationships between the various components are equally important. The **M**inimum **U**rban **S**tructure (MUS) method [2] is aimed at analyzing the vulnerability of functional, settlement and infrastructure systems to the occurrence of an earthquake, in an extended time perspective that considers not only the immediate damage, but also the deferred and long-term effects. The paper aims at comparing the *global urban seismic vulnerability index*, obtained from the application of two methods (CPD-INEDG and MUS), to the new Conza della Campania (Av) [3] entirely rebuilt off- site after the 1980 Irpinia earthquake [4].

Keywords: seismic vulnerability, seismic risk, urban planning

1.   Spatial hazard: vulnerability and seismic risk

All activities carried out by humans involve interaction with both the natural and man-made environment and can originate hazards [5], accidents and, therefore, damage. In the past, efforts had been made to equate the overall vulnerability of a system of objects with the sum of the partial vulnerabilities of its individual constituent objects. It seems clear that such an approach is totally insufficient to describe the real conditions of vulnerability of a system of objects. If seismic vulnerability is the propensity of people, artifacts, activities, or assets to suffer damage and/or change because of a seismic event, either with reference to a single

element or to the totality of a system, *vulnerability* can be defined as a measure of the loss or reduction of efficiency to perform functions that are ordinarily performed at normal capacity. *Seismic risk* is defined by the **I**talian **N**ational **E**arthquake **D**efense **G**roup as the *probability of occurrence and the relative degree of severity, in a specific time interval, of the set of possible effects that can be produced by an earthquake*. Seismic risk assessment requires a multidisciplinary study that can be carried out with different procedures, approaches and criteria with the aim of identifying, evaluating and quantifying all possible effects of an earthquake on a given human context. Although significant progress has been made since the 1970s in the construction of hazard scenarios and numerous studies have been carried out on the structural vulnerability of buildings [6] (*building vulnerability*), the vulnerability of networks and large infrastructure systems, it is only in recent years that procedures have been initiated to evaluate the vulnerability of urban centers, considered as systems [7] (*urban vulnerability*), whose response behavior and capabilities to a disaster event are not easily derived from those of the individual elements that compose it alone [8]. Urban seismic vulnerability depends on the morphological configuration of the city, the location of the most important functions and infrastructures, and the location within the urban organism of critical issues regarding the accessibility and usability of mentioned urban functions in the event of a seismic event. This seismic vulnerability depends on urban characteristics, the *extent* of which is profoundly different from what might be inferred from a simple *summation* of the building vulnerabilities of individual buildings. An accurate understanding of this system can allow planning for its progressive strengthening and adaptation over time, intervening on its components and interrelationships for the reduction of criticality, with an appropriate prioritization program for interventions, so that the city is more resilient and efficient in the event of an earthquake.

2. Seismic vulnerability analysis the CPD-INEDG and MUS methods

Technical literature offers several methods of vulnerability processing and correlation aimed at estimating seismic risk, which refer to different approaches. The *CPD-INEDG* method [1] aims to attribute, to each building class, a functional link between input (earthquake magnitude) and expected output (damage). Studies developed in this direction, since the 1980s, have proposed two different solutions for the construction of the mentioned functional link: damage probability matrices and fragility curves, the former, a direct type of methodology, allows in one step the prediction of the expected damage for each vulnerability class, the latter, an indirect type of methodology in that it requires the prior definition of a vulnerability index against which to classify the built environment. The starting assumption is that buildings with similar characteristics will manifest the same level of damage because of an earthquake with predetermined intensity. The validation of this method is based on the statistical analysis of the incidence of different damage levels on the set of buildings belonging to a certain typological class. The concept of vulnerability is seen as a factor, related to the typological characteristics of buildings, which can be measured a posteriori by defining for each class a frequency distribution of the different levels of damage, summarizing the corresponding effects of an earthquake with fixed intensity. The qualifying aspects of the definition of this vulnerability measure are the assumption of a typological classification of the reference building and the assignment to each typology of a vulnerability class, that is, a specific quantitative link between earthquake and damage. The approach of the MUS method [2] is to recognize at a sufficiently large scale (municipal or sub-municipal scale) the local conditions that may result in a potential loss of functionality and/or overall organization of the area subjected to earthquake. The point of view adopted is an urban planning one, this choice involves the identification of critical elements and factors that need to be resolved to ensure the best possible functioning of the urban organism in the event of a seismic event through the definition of priority urban planning actions and interventions, mutually coordinated, in which the promoting and coordinating role of public actors is preeminent.

3. The new Conza della Campania (Av): Seismic vulnerability analysis using the CPD-INEDG method

Among the countless earthquakes that have disrupted Conza's urban fabric and civic

context, the one of November 23, 1980, destroyed the entire town on the hill and caused the death of 184 people. The first problem tackled was the resettlement of the population in a new urban core at about 1.2 km from the historical settlement, as it was not too far away from the perched historical core, well exposed and safer from a geological and geo-seismic point of view. The new settlement sits on two pre-existing roads that meet at an angle of about twenty degrees, running parallel to the Ofantina; they divide the town into four sectors organized, in turn, around small facilities of local interest that identify a meeting place and collective recognition within the neighborhood units. At the intersection of these axes, in a barycentric area with respect to the residential lots, is the commercial center, which includes a market, a multifunctional center, a series of artisan houses and buildings with shops on the ground floor. The ensemble configures a space with a strong urban character; a public garden and a school further emphasize the centrality of the area. The municipal gardens and sports facilities are in the north-eastern part of the town, the town hall is located at the southern end of the town, and the public housing area to the east of the town, in the direction of Sant'Andrea di Conza. The seismic vulnerability analysis, carried out using the existing cartography of the territory, simulates the vulnerability level of the new Conza, entirely reconstructed further in the valley (Fig. 1) at 440 m asl, (1.275 inhabitants as of 2022), according to the concentration of vulnerable buildings and their typological-structural parameters. The CPD- INEDG methodology involves the preparation of four thematic map analyses:

- Cartography of roofing and/or floor levels
- Cartography of the height of buildings
- Cartography of the typological-structural distribution of the built-up area
- Cartography of seismic vulnerability

The resulting thematic mapping summarizes the *global urban seismic vulnerability index* of new Conza, using the spedictive methodology CPD-INEDG expressed as a function of vulnerability index (Fig. 2).
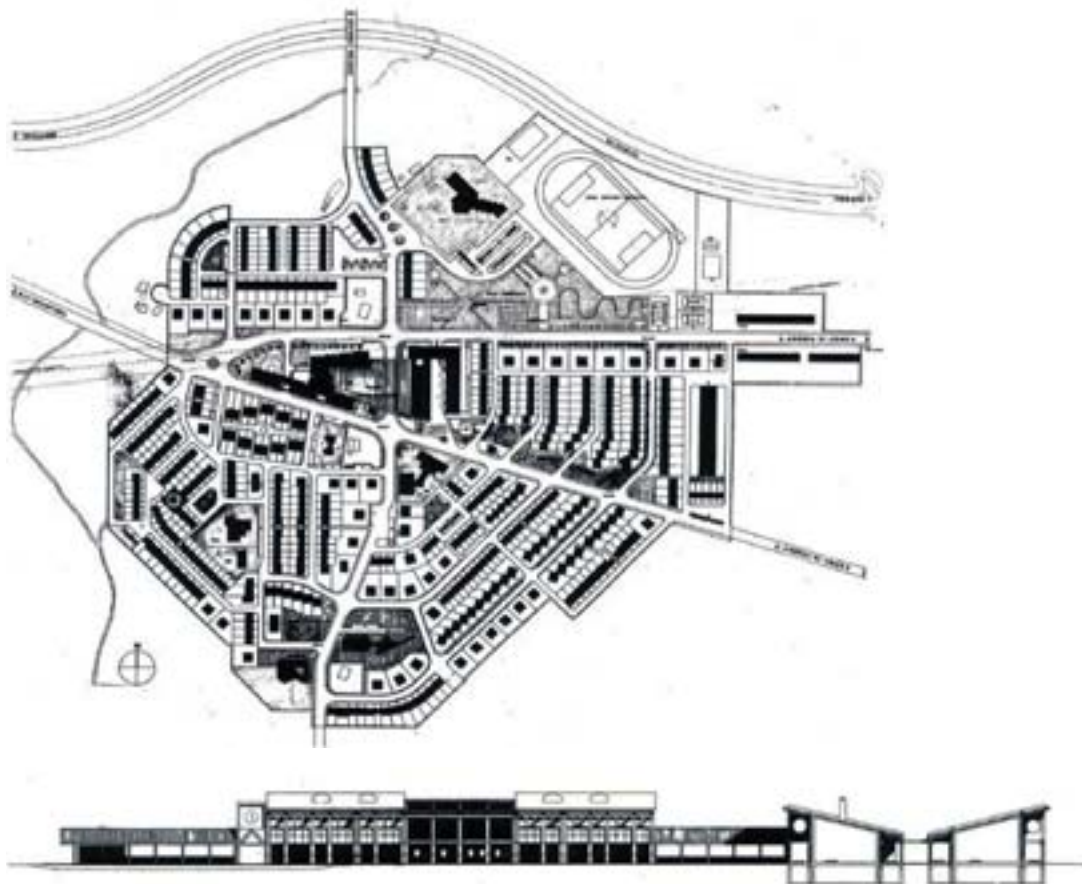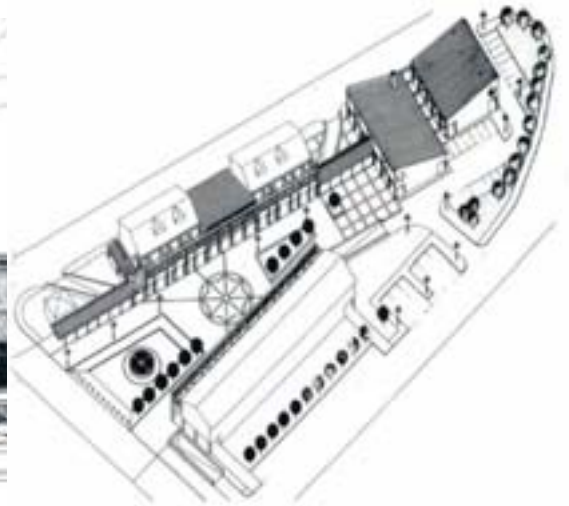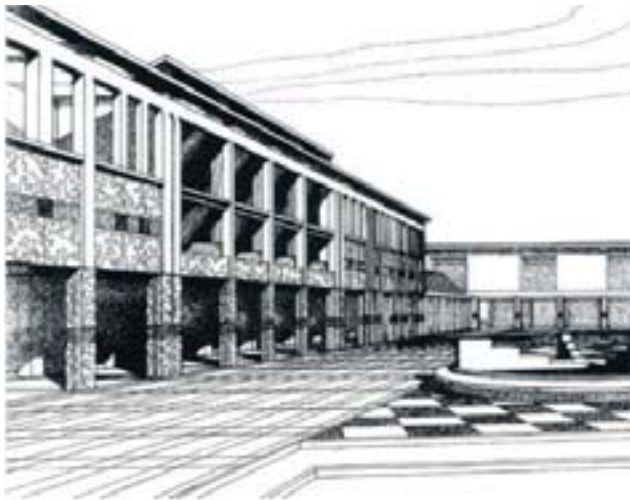

Fig. 1: The new Conza della Campania (Av) - Top: General project plan. Middle: Design of the elevation of the square in front of the church. Down: Perspective (on the left), axonometry (on the right) of the square project

The basic analysis of the methodology is mainly focused on the typological characterization of the built environment, considering the contributions of all other elements that interact in the evaluation of the seismic vulnerability of an urban center as insignificant. On the other hand, the method, properly referred to the building scale, aims, in the immediate term, to identify the areas where there is the greatest concentration of elements at risk, to plan the priority of emergency interventions and, subsequently, the buildings to which to allocate the greatest resources for seismic risk mitigation in the most vulnerable areas. The cartographies produced, in addition to providing the tools to support the drafting of Civil Protection Plans [9], can prove to be an important aid in undertaking detailed structural safety analyses of the building types exposed to the greatest risk, to define preventive mitigation interventions on the urban center.

Fig. 2: New Conza della Campania (Av) - *Global Urban Seismic Vulnerability Index* resulting from the application of the CPD-INEDG method. Violet, is not listed in the legend, public buildings for which vulnerability was not evaluated were highlighted

4. The new Conza della Campania (Av): Seismic vulnerability analysis using the MUS method

The urbanized territory has been divided into four zones: north, east, south-west and south-east side, that are merely conventional in value to facilitate the analytical aggregation of field data.

There are no specific geognostic surveys (detailed microzonation) on the area of interest, therefore it was decided, also due to its small size, to consider the area, from a geological and geomorphological point of view, homogeneous. This clarification is necessary because the present methodology, due to the seismic hazard analysis, presupposes the knowledge of the *Cartography of zones susceptible to amplification*, used to assign an amplification factor, obtained from surveys of detailed microzonations not available for the urban center of Conza. In any case, considering the seismic hazard of the urban center of Conza (high) and related damage scenarios, the overall local hazard index of 10 is assumed for the purposes of the assessment of the relative levels of overall urban vulnerability.

Seismic vulnerability assessment using the MUS method involves the preparation of four thematic map analyses:

- Seismic vulnerability cartography of settlement fabric
- Cartography of urban exposure of settlement fabric
- Cartography of the criticality of pathways and open spaces
- Cartography of overall urban vulnerability

Based on these analyses, the MUS is identified, highlighting the main parameters representative of urban vulnerability factors, i.e., potential loss of functionality and overall organization of the new Conza and its component systems in the event of an earthquake.

The sequence of operations to be performed can be summarized as follows:

- Collecting and organizing data from recorded analyses

- Determination of individual risk factors through the compilation of the assessment table:
    - of the local seismic hazard of settlement fabric
    - of the seismic vulnerability of settlement fabric
    - of the urban exposure of the settlement fabric
    - of the critical elements of pathways and open spaces
- Determination of Global urban vulnerability index (Fig. 3)

Settlement fabric	Seismic hazard levels	Seismic vulnerability levels	Relative exposure levels	Levels of criticality, open spaces and escape ways	Partial index sum	LEVELS OF SETTLEMENT FABRIC VULNERABILITY
ZONE 1	10	2,5	3,0	1,3	16,8	4,2
ZONE 2	10	3,0	4,1	1,6	18,7	4,7
ZONE 3	10	3,3	3,1	1,9	18,3	4,6
ZONE 4	10	3,3	4,9	1,9	20,1	5,0

- The urban vulnerability assessment is carried out based on the knowledge gained in the analyses, according to a dispatchable assessment procedure, based on easy-to-detect information and simple processing. The MUS method requires the development of a cognitive framework of possible interactions between settlement, infrastructural and functional systems, considers the mobility on which the possible repercussions in terms of systemic and/or managerial damage depend on the aim of identifying the fragilities of the urban system in the face of the seismic event. In the CPD-INEDG method, these aspects are not detected.

5.   Few concluding remarks

The reconstruction of the new Conza was guided by the principles of the CPD-INEDG method; confirming this, the seismic vulnerability index resulting from the application of this method is low throughout the settlement (Fig. 2). After the 1997 earthquake in Umbria, disciplinary advances formalized a new vulnerability index assessment method (MUS) that was tested on the new Conza. The basic objective was to verify what additional knowledge this method was able to bring and what differences were evident from the previous one. From the comparison of the results, it is possible to

deduce that, those returned by the CPD-INEDG, assign to the totality of the buildings a low vulnerability index varying between 0 and 25 percent while, with the application of the MUS, about 75 percent of the buildings, present a medium vulnerability index, while a portion of the built-up area registers a high vulnerability index (Fig. 3). This increase, recorded in the south-east quadrant of the new Conza, is related to two factors, specifically, the average value assumed by both the seismic vulnerability of the fabrics and the level of urban exposure of the fabrics themselves (the values were graded in four increasing steps: low, medium, high and very high). Therefore, it emerges that the CPD-INEDG underestimates the vulnerability of an urban part (southeast quadrant) compared to the MUS method; this is ascribed to the fact that, in the former, the vulnerability class is a consequence only of building factors, weighted in various ways, while in the latter, urban elements are also considered, with various weights (Fig. 4).
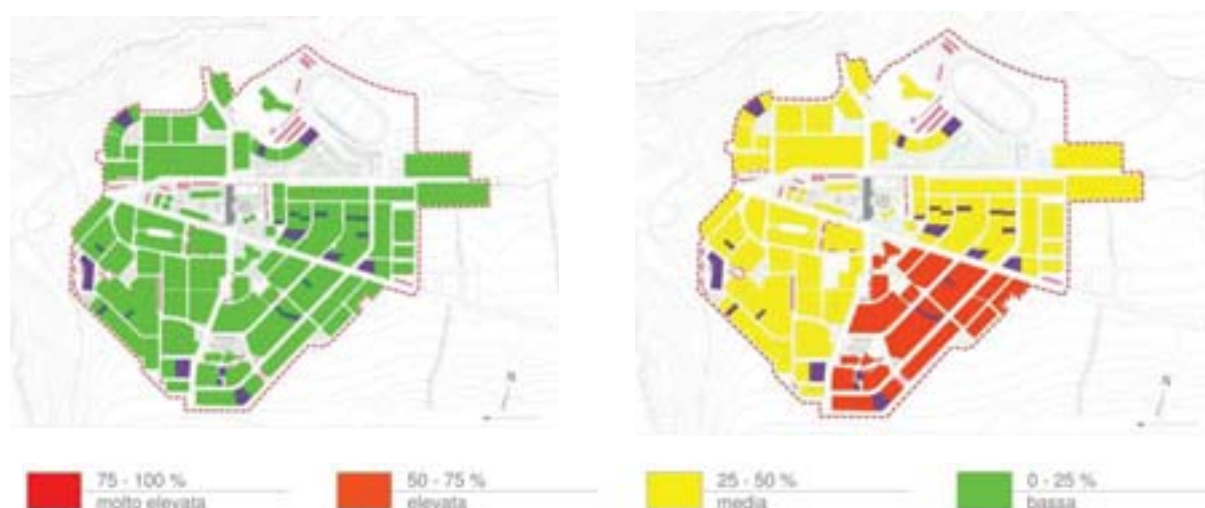

| | 75 - 100 % molto elevata | | 50 - 75 % elevata | | 25 - 50 % media | | 0 - 25 % bassa |

Fig. 4: New Conza della Campania (Av). *Global Urban Seismic Vulnerability Index* in comparison: on the left using the CPD-IENDG method and on the right using the MUS method. Violet, is not listed in the legend, public buildings for which vulnerability was not evaluated were highlighted

The techniques of seismic micro-zoning and vulnerability index assessment with MUS [10] can provide an important contribution to the planning of settlements at seismic risk by integrating analysis, vulnerability assessment and risk mitigation interventions from the plan scale to the building scale. In the technical construction standards 2018, in Section 8.7.1 - Masonry Construction, [11] the concept of aggregate buildings is confirmed, which shifts the

boundary of structural verification from the building unit to the building unit, although further elaboration that integrates the Technical Standard on Construction with the tools of Spatial Planning would be recommended.

Attributions

Within this paper, which is the result of joint elaboration by the authors, personal contributions can be identified as follows: *Spatial hazard: vulnerability and seismic risk* and *The new Conza della Campania (Av): Seismic vulnerability analysis using the MUS method* (Salvatore Losco), *Seismic vulnerability analysis the CPD-INEDG and MUS methods* and *The new Conza della Campania (Av): Seismic vulnerability analysis using the CPD-INEDG method* (Claudia de Biase), *Abstract* and *Few concluding remarks* (joint elaboration).

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choices contained in the plan. Limit Conditions are defined as the thresholds or levels of physical and functional damage at which, during an earthquake, the settlement, due to damage to the various systems that compose it, undergoes significant changes in its functionality, progressively increasing, such as to compromise its maintenance. The Settlement Limit Conditions correspond to increasing levels of loss of functionality of its components as defined as follows: Settlement Operational Limit Condition, Settlement Damage Limit Condition, Settlement Life Preservation Limit Condition, Settlement Collapse Prevention Limit Condition, and Emergency Limit Condition.

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Cultural Heritage Governance in the aftermath of a crisis: How policies are supporting the revitalisation of the Rione Terra in Pozzuoli

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Abstract

Effective management of cultural heritage in the aftermath of a crisis, such as an earthquake, plays a pivotal role in safeguarding historical treasures and revitalizing impacted regions. The study investigates how policies influence the revitalisation of an area post-crisis, focusing on stakeholder perceptions regarding the impacts of investment endeavors. Specifically, we explore a case study centered on the Rione Terra of Pozzuoli, Italy, which received funding through various financial instruments.

The analysis examines the dynamics involved in managing cultural heritage post-crisis, highlighting the link between policy frameworks, community engagement and resource allocation. Through in-depth interviews with stakeholders, we aim to elucidate the efficacy and obstacles of heritage management strategies.

This study aims to comprehend the effects of investments in cultural contexts, providing insights for decision-making regarding future investments in the city. Insights gleaned from the case study shed light on the complex balance between preservation imperatives, economic considerations and social cohesion goals in post-crisis recovery efforts.

Moreover, the analysis emphasizes the importance of holistic approaches and comprehensive frameworks in cultural heritage governance. It is anticipated that revitalization will emerge as crucial forengaging the local community and reclaiming territorial identity.

Keywords: cultural heritage; policies; governance; revitalisation; crisis.

1. Introduction

Governance encompasses the systems of rules and norms that shape the relationships among stakeholders. In a broad sense, governance includes both formal and informal mechanisms of governing, including legal frameworks, regulatory systems, administrative procedures, cultural norms and social practices. Governance is the coordination of social action. Focusing on public governance, it is the sum of government activities, mainly policies,

whether pursued directly or through agents, as those activities have influence on the lives of citizens.

Taking in consideration the two interpretation of culture, functional and constituent, the functional interpretation of culture denotes the practice of culture through cultural production, consumption and participation, with major focus on the creative industry and the private sector; the constituent interpretation defines culture as a set of shared values, beliefs and norms and, in this sense, acts as a facilitator or as a barrier to development by influencing human perceptions, actions and results. This latter interpretation is closer to the definition given by Mulchay of culture as a form of hegemony or soft power, and Weber, according to whom culture has the role of facilitating the maintenance or the transformation of the social order, two complementary aspects in the construction of society; but also Hawkes, who identifies culture as far as the fourth pillar of sustainability.

Culture is an important element of public policy for social, cultural and political cohesion and inclusion and its potential could be significantly enhanced. While cultural governance refers to the instruments through which cultural affairs and resources are managed within a society, the actions and means by which the cultural domain, including its production, dissemination and consumption, is managed and regulated; cultural heritage governance involves a range of stakeholders, including government agencies, cultural institutions, private sector entities and international bodies, collaborating to preserve and promote cultural heritage for present and future generations.

Cultural policies aim to preserve, enhance and disseminate cultural heritage, foster cultural diversity, support artistic expression and stimulate creativity. Therefore, "cultural policy is the sum of the laws, regulations, administrative provisions and practices which influence the preservation, production, dissemination and free flow of cultural expressions, as well as the structures which are designed to protect and foster them" (UNESCO).

In a post-crisis scenario, effective governance become even more crucial as societies navigate through recovery and rebuilding processes. The ability to adapt governance structures, implement agile management practices and foster inclusive decision-making mechanisms becomes paramount in addressing the challenges that arise in the aftermath of a crisis. By leveraging cultural resources and heritage as drivers of resilience and cohesion, while simultaneously embracing innovative approaches to governance, societies can emerge stronger and more resilient from crises, laying the foundation for sustainable development and inclusive growth.

2.   Case Study

Rione Terra is an archaeological site dating back to the second century BC. It houses the Cathedral of Pozzuoli, which serves as the seat of the Diocese of Pozzuoli. The area was once inhabited but was evacuated following the fire of the Cathedral (1964) and the bradyseism crisis of 1982-84. Since the '90s, efforts have been underway to rebuild the structures. Currently, management of the area is sporadically granted to both commercial businesses and neighborhood associations. Stakeholders cohabiting this reality include Coopculture, which manages guided tours in the archaeological area; the Diocese, which manages the diocesan museum in collaboration with former inmates, and the church; the Municipality of Pozzuoli, which grants spaces for bars and commercial activities to private entities and to category associations for cultural and social initiatives.

Revitalisation takes place through a series of co-participation and public-private listening initiatives, as the area is of interest to several actors linked by complex relationships. Consequently, we have decided to investigate the effectiveness of these initiatives. In this paper, we delve into the intricate interplay between these stakeholders and between governance, cultural governance, cultural policy and heritage governance in the specific context of Rione Terra of Pozzuoli. By examining these concepts within this unique setting, using the data extrapolated from the platform 'OpenCoesione', which puts together all the fundings' sources obtained by Rione Terra and the city of Pozzuoli from the EU, we aim to unravel their complexities and explore their practical implications for the preservation, promotion and sustainable management of cultural heritage. Through this focused investigation, we seek to contribute to a deeper understanding of how these principles manifest in real-world scenarios and their potential to drive positive societal transformation.

3.   Methodology

Qualitative research methods are often concerned with garnering an in-depth understanding

of a phenomenon or are focused on meaning (and heterogeneities in meaning) — which are often centered on the how and why of a particular issue, process, situation, subculture, scene or set of social interactions. The strength of such qualitative methods for studying policy processes is that they can be used to "delve into parts of the policy process which quantitative methods cannot reach" which, importantly, offers a way to explore innovation, originality, complexity, interactions, conflicts, and contradictions.

This article provides an account of the challenges associated with the co-participative management of a cultural and ecclesiastical site renovated, following an earthquake, by some European policies, the Rione Terra of Pozzuoli.

The research involved an empirical collective-case study design, compared the development of three contemporary policy issues in Pozzuoli: (1) Stakeholder perception of the effectiveness of restoration;

(2) stakeholders' perception of the effectiveness of co-participated policies; (3) perceived gaps in the management of organizational processes regarding the revitalisation of the Rione Terra.

To assemble the case study, in-depth semi-structured interviews were conducted with people identified as key actors from above mentioned groups. Interviews were on average half-hour in length and were conducted in person.

Most scholars recommend guidance and suggest anywhere from 5 to 50 participants as adequate. In our study, this number is considered adequate for the research because it effectively summarizes the views of the different realities in the area, and it highlights the possibilities of negative and hypothetical negative cases being explored in the data. These were 1 head of neighbourhood associations, 2 former prisoners re-integrated into society through neighbourhood associations, 2 members of cultural associations involved in a handicraft exhibition, 2 shop managers, 2 tourist guides belonging to a cooperative, 1 member of the diocesan ecclesiastical body. Interviews were on average half-hour in length and were conducted in person.

4.   Findings

Based on the insights gathered from the interviews conducted with stakeholders in Rione Terra, we canexpound that:

(1) interviewees expressed limited awareness of co-participation initiatives, raising doubts about their efficacy;

(2) the majority of them emphasized that the redevelopment of Rione Terra wouldn't have occurred without the EU's funding, but these funds only revitalised the city district from an urban-architectural point of view and not from a social-economical one; while the Municipality of Pozzuoli is seen as a necessary presence for revitalising earthquake- affected buildings and ensuring public access to Rione Terra, operational inefficiencies detract from its effectiveness as the primary operational entity, causing challenges in translating it into tangibleoutcomes due to bureaucratic hurdles or inadequate coordination;

(3) there is a perceived lack of marketing and promotion efforts, hindering their visibility and potential impact;

(4) stakeholders highlighted the need for diversified commercial and recreational activities to encourage longer stays within Rione Terra; they emphasized the importance of creating a vibrant and dynamic atmosphere, conducive to socializing and leisure activities, beyond mere sightseeing. The concentration of initiatives around Christmas seasons also leads to discontinuity, undermining private investment opportunities and limiting long-term development;

(5) for artisans participating in holiday exhibitions, the revitalization of Rione Terra provided a valuable networking opportunity, facilitating connections with local authorities and other community associations.They expressed hope for continued involvement in future initiatives;

(6) for formerly incarcerated individuals reintegrated into the management of the diocesan museum, the revitalization of Rione Terra signifies more than just urban renewal — it represents a personal revitalization, offering them a chance to rebuild their lives and contribute positively to their community.

5.   Implication and Limits

The ongoing governance of the post-crisis period underscores the complexities and challenges inherent in transitioning from crisis response to long-term recovery and resilience-

building efforts. Implications of our study suggest the promotion of co-participation activities and listening initiatives, alongside the establishment of a governance hub involving key stakeholders and the local community. Additionally, efforts should focus on promoting Rione Terra as a tourist destination and attraction, ensuring continuity in processes, sustaining economic recovery and revitalizing the local economy.

However, it's important to acknowledge the limitations of our study, particularly the insufficiently deep sample, which underscores the need for future research to employ mixed methods and incorporate quantitative analysis to provide a more comprehensive understanding of tourist flows and fund utilization dynamics in post-crisis contexts.

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Dynamic Climate Adaptation Strategies to Tackle Sea Level Rise Bådparken Project for Coastal and Port Areas of Aalborg Vestby (DK)

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Abstract
The manifestations of climate change, characterized by a greater frequency of extreme weather events and rising sea levels, represent an unprecedented challenge that requires adaptable and far-sighted public policies.
In urban contexts, the impact of climate change is particularly pronounced, requiring specific urban planning strategies that are not only adaptive and reactive, but also preventive.
However, the complex dynamics of climate change and the extent of sea level rise present a high degree of uncertainty that grows exponentially with increasing time. Managing uncertainty, particularly the profound uncertainty linked to sea level rise, is a challenge in adapting to climate change.
A new paradigm for planning under conditions of deep uncertainty has emerged in the literature: the "Dynamic Adaptive Policy Pathways" (DAPP) which provides an analytical approach to explore and sequence a series of possible actions based on alternative developments over time and adaptation strategies to deal with changing circumstances.
The DAPP method was used for the Bådparken climate adaptation project in the coastal and port area of Vestby in Aalborg (DK). The area is subject to flooding due to rising sea levels and more frequent storms; the project includes a series of complementary strategies to mitigate risks, adapt architecture to coexist with water and make the city safer.

Keywords: Sea Level Rise; Coastal management; Climate change; Dynamic Adaptive Policy Patway; Bådparken.

1. The Dynamic Adaptive Policy Pathways approach

Sea level rise (SLR) poses a significant threat to low-lying coastal areas around the world, significantly increasing the need to put in place adaptation measures to protect communities and infrastructure from flooding and coastal erosion [1].
Depending on climate change mitigation, mean sea level could rise further by 0.26 to 0.98 m by 2100, with a possible large increase due to accelerated melting of ice sheets [2, 3]. Even if emissions are reduced as defined in the Paris Agreement, sea levels will continue to rise, albeit more slowly [4, 5].
According to the IPCC Special Report on Oceans and the Cryosphere, global mean sea level (GMSL) has risen by 17 cm over the 20th century and this phenomenon is accelerating [6, 7]. Therefore, by 2050, one billion people living in low-lying areas will be exposed to coastal risks. Various responses can allow densely populated coastal areas to adapt to SLR, coastal erosion and flooding, but it should be kept in mind that the number of adaptation options decreases

with sea level rise. Furthermore, adaptation to coastal flood risk is hampered by high uncertainty about the speed and extent of sea level rise.

The Dynamic Adaptive Policy Pathways (DAPP) method represents an innovative and flexible approach for urban planning and adaptation in response to climate change, especially when addressing the uncertainty associated with extreme weather events. This approach allows us to explore a series of possible actions and strategies over time, adapting them to evolving circumstances [8].

At the origin of the evolution of this paradigm are Dewey's reflections [9] who applied the scientific method to policies to promote continuous learning and adaptation in response to experience over time. The first applications of the DAPP method to planning can be found in the field of environmental management: dynamic adaptation plans adopt flexibility as an indicator to evaluate the robustness of strategies under conditions of uncertainty [10] and aim to provide a flexible and reactive response to changes in environmental and socioeconomic conditions with extensive monitoring of effects [11].

Practical applications of these concepts are developing in various geographic areas, such as New York, New Zealand and the Rhine Delta in the Netherlands, demonstrating the effectiveness of this approach in managing the profound uncertainties associated with global climate change.

The DAPP method can be summarized in the following sequence of key steps [8]:
1. Exploration of future scenarios. The DAPP method allows us to explore a range of possible future scenarios, considering changes in sea level rise, storm intensity and other climate factors. This analysis allows us to identify potential challenges and develop appropriate adaptation strategies.
2. Sequence of actions. Rather than adopting a single static solution, the DAPP method proposes the sequence of actions over time in response to the evolution of climatic conditions. Actions can be planned in successive stages, taking into account expected changes in the climate and surrounding environment.
3. Adaptive strategies. DAPP promotes adaptive strategies that can be modified or integrated as new information and data become available. This allows us to reduce uncertainty and optimize responses to changing conditions.
4. Stakeholder involvement. A key element of the DAPP method is the active involvement of local stakeholders in the decision-making process. This ensures that adaptation strategies are sustainable, acceptable and responsive to the specific needs of the community.
5. Continuous monitoring and evaluation. The DAPP method involves continuous monitoring and evaluation of the actions undertaken, allowing constant updating of the strategies based on the trend of the climatic conditions and impacts observed.

Adaptation decisions also carry strong risks of over- or under investment and could lead to costly adjustments or high, unnecessary margins [12]. Adaptation pathways provide a useful method to better allocate resources in a timely and effective manner and achieve long-term sustainability.

1.1 The possible response options to the SLR

There are several answer options available, each with specific benefits and considerations [7, 13, 14]. The main coastal adaptation strategies currently adopted consist of:
1. Tough protection. This category includes expensive static infrastructure such as seawalls, barriers, groynes and artificial headlands designed to stabilize the coast. However, these structures can cause erosion and unwanted changes in coastal conditions [15].
2. Soft protection. Soft protection responses include dune restoration, beach nourishment, and other similar techniques that allow the coast to dynamically adapt to changes. These strategies are more flexible and often integrate with the natural environment, but often require frequent maintenance or restoration.
3. Solutions to reduce vulnerability. This category includes adaptations of existing infrastructure to mitigate coastal risks, such as technological, architectural or urban planning solutions. Answers can range from modifications to buildings, drainage

systems, urban planning and the design of public spaces along waterfronts to make them more resilient to extreme events [16].

4. Ecosystem-based adaptation (EbA). This approach takes advantage of coastal ecosystems such as salt marshes, mangroves, oyster beds or coral reefs to mitigate the effects of flooding and erosion [17]. Additionally, coastal ecosystems contribute to long-term carbon storage.

5. Managed retreat. Managed retreat is the most drastic solution as it involves relocating entire urban settlements or vulnerable coastal infrastructure away from risk areas. This is a complex strategy that requires advance planning and stakeholder involvement [18].

1.2 The challenges of urban design of public spaces along the waterfront

The transformation of public spaces along waterfronts to address climate change scenarios represents a significant challenge in contemporary urban design [16]. These spaces, more than simple borders between land and water, should rather be conceived as nodes of connection and integration between the natural environment and urban settlements.

This means considering new types of public space that can adapt to the effects of sea level rise and flooding. These spaces can be designed as "amphibious" (wet-proof or dry-proof), meaning they can withstand periods of flooding or stay dry, or they can even float on water.

The transformation of threshold spaces represents a way to increase the adaptive capacity of cities in the face of climate change and water-related challenges. This involves not only resistance to extreme events, but also the ability to transform and adapt urban spaces over time.

2.   The *Bådparken* project for the coastal and port areas of Aalborg Vestby

The city of Aalborg, capital of Northern Jutland in Denmark, came to life from the Limfjord and its development has always been directed towards the waterfront, first as a means of livelihood and then as the main landscape and recreational element of the city. Since the 1990s, Aalborg's seafront has undergone an important regeneration process, transforming disused industrial areas into public green spaces equipped for cultural and recreational purposes. This process has generated perhaps the most exemplary seafront in Europe today [19].

Vestbyen is the westernmost district of the city; it is a place rich in historical and contemporary relationships with the fjord where two ports have developed which flourish with recreational activities and host the majority of nautical clubs.

In recent years, extreme weather conditions have become more frequent and rising water levels (Fig. 1) cause more and more flooding in the port area (Fig. 2).
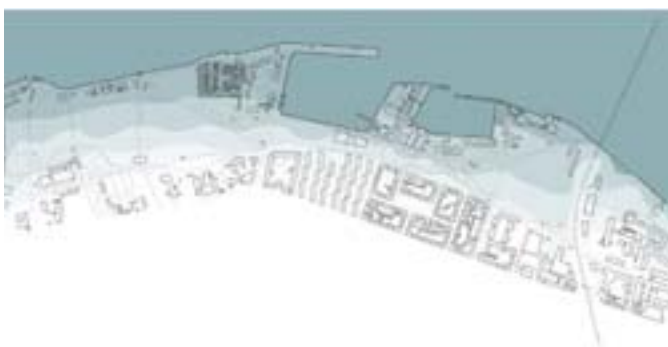

Fig. 1: Aalborg Vestby is exposed to future rising water levels and more frequent flooding. The map shows the areas that will be flooded in a 100-year risk scenario (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

Fig. 2: Vestbyen seafront at high tide. The coastal stretch is below the current high tide level and is periodically flooded. The sea reaches the pedestrian park equipped with benches, making it inaccessible (ph A. Badami, 2022).

The *Bådparken* project (design group CF Møller Architects, Deltares, Rawmobility, Arki.lab, Ekj, Broconsult) – winner of the first prize of the Aalborg Development 2022 architecture competition – aims to integrate innovative climate adaptation strategies with urban and natural interventions of protecting Vestby's coastal areas from rising sea levels (Fig. 3) whilst maintaining the unique identity and qualities of the place.
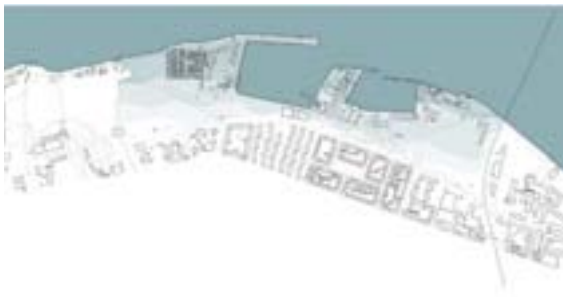
Fig. 3: Highlighted in the map are areas of Aalborg Vestby that will be subject to flooding after *Bådparken* project implementation under a 100-year risk scenario (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

This plan adopted the DAPP method (Fig. 4) and includes multiple initiatives and integrated solutions to protect and adapt vulnerable coastal areas [20]. The adaptive process permeates the project approach which is based on the following three key strategies: maintain, adapt, innovate.

Fig. 4: The DAPP method applied to *Bådparken* project (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

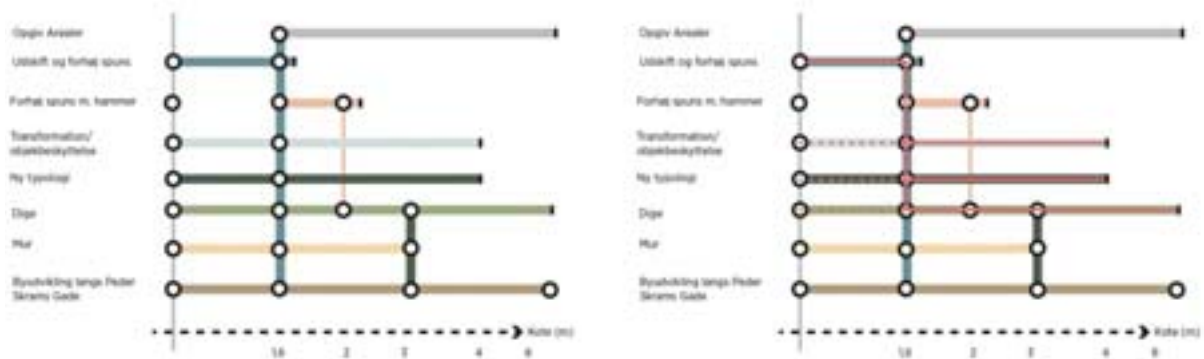The first strategy involves maintaining the functions and stakeholders present in the area: the two ports, the nautical clubs, the Streetfood pavilion and the park enclosed between the city and the port are well functioning and teeming with activity. Currently the port area is subject to the risk of flooding. The project intends to live with this risk by implementing the architectural typologies that have developed in the port area. These types have ground floors made of water-resistant materials and are intended for public activities (bars, club houses, boat storage). There are no technical systems here that could be damaged by water. The upper floors are also made of wood and house the technical systems. This way, when floods occur, the damage is not extensive. The plan includes the active involvement of current users and information and warning strategies to manage periods of critical weather conditions.

The second strategy involves various adaptation actions. The future quay will be raised up to 1.6 m, a height that will protect the port areas from a twenty-year event, with protective sheet piles and a raised edge shaped with terraces and benches. The height of 1.6 m was considered optimal to maintain good accessibility of the port facilities to the sea. The quay will be equipped with numerous accesses to the sea equipped with anti-water protection bulkheads (Fig. 5).
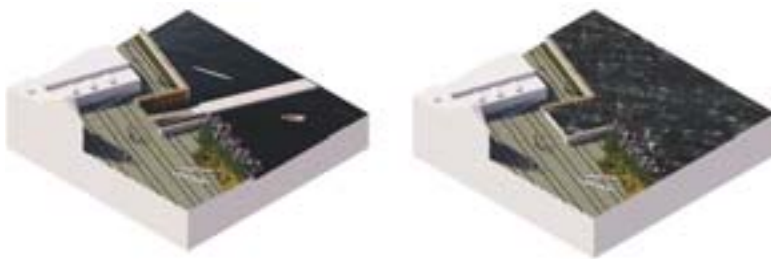

Fig. 5: Prototypes of sea accesses equipped with anti-water protection bulkheads (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

The urbanized area of the Vestbyen district, where there are residential buildings vulnerable to water, will be protected from storm surges by a dune that will reach 3 m in height, a barrier that will protect homes from a hundred-year event. The dune is conceived as a sinuous landscape element that creates new green and recreational spaces. The dune will be equipped with transversal crossing paths defended by retaining walls and anti-water bulkheads (Fig. 6).

Fig. 6: Phases of construction of the transversal paths that cross the dune defended by retaining walls and anti-water bulkheads and flooding scenario (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

The third strategy involves the construction of new buildings, to be built with sustainable and water-resistant construction techniques, to enhance the recreational use of the area. The new interventions planned concern the creation of new equipment conceived as amphibious constructions. Among these are: the new *Kranhuset* sports club (Fig. 7), a five-storey building of which the ground floor is made of concrete, resistant to rising water, and the other floors are made of solid wood elements. This building will implement the sports and recreational activities that characterize the area. The *Klima-Lab* climate laboratory (Fig. 8), where all the port's waste

will be collected, separated, recycled and treated; the building will host classrooms and laboratories for schools, companies and universities, informal meeting points and picnic spaces. This building is designed as a device to raise awareness of the issues of environmental sustainability and recycling and will be built with waste or recycled materials. The *Søheltens Have* scout shelter has been designed as a roof rather than a building: it will be a symbol of refuge and security, where socially vulnerable people can be welcomed into structures that represent openness, inclusion, safety and cohesion with other nautical park users. All of these new buildings included in the plan offer spaces for social, recreational and educational activities and help strengthen the social fabric of the area.

Fig. 7: Render of the *Kronhuset* building (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By, 2022*).

Fig. 8: Render of the *Klima-Lab* climate laboratory (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By,* 2022).

The *Bådparken* project (Fig. 9, Fig. 10) foresee the active involvement of local communities and stakeholders in the design and implementation of climate adaptation strategies. The nautical park will be developed iteratively and user-driven over time as sea levels rise, maintaining the strong identity and unique character of the area and creating a safe, sustainable and resilient urban environment.

The implementation of the plan will be carried out in successive phases to ensure a gradual approach to securing and developing the area. The project involves three development phases; the start of the first phase is scheduled for the end of 2024; the entire execution is expected to be completed by the end of 2027.

Fig. 9: Aerial view of the Bådparken project (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

Fig. 10: General plan of *Bådparken* project (source: CF MØLLER ARCHITECTS et alii, *Bådparken. På kanten af Fjord & By*, 2022).

3.   Conclusions

The adaptation pathways approach is a promising strategy to address uncertainty in adapting to coastal flood risk, allowing for more effective resource management and greater flexibility in adapting strategies to changing environmental and socioeconomic conditions.

Designing effective coastal adaptation strategies requires a holistic approach that integrates different solutions and carefully considers the needs and peculiarities of the local context. Stakeholder involvement and flexibility in management are key to successfully addressing sea level rise and extreme events in coastal areas.

The DAPP approach represents a robust methodological framework for addressing uncertainty associated with climate change in urban planning, enabling the design of flexible, responsible and future-oriented adaptation strategies as in the case of the *Bådparken* project in Aalborg.

The *Bådparken* project illustrates how coastal urban environments can adapt and thrive in response to climate change, incorporating architectural innovations, technical solutions and local stakeholder engagement to promote the resilience of urban areas at risk of flooding and, at the same time, create environments quality urban areas.

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From bombs to cities: the silent spread of particulate matter and metals.

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Abstract
Wars cause human suffering and devastate the environment and the climate. Weapons of war often release many pollutants into air, such as particulate matter and heavy metals, which can also poison soil and water, damaging the entire ecosystem. This can also jeopardise food safety and people's health. These pollutants tend to remain in the environment even years after the conflict. In addition, the remediation of contaminated sites is often expensive and burdens the economies of countries, already severely tested by the war.

Keywords: War, environmental pollution, climate change, atmospheric particulate matter, heavy metals.

## 1.	Introduction
1.1 Relationship between military activities, atmospheric particulate matter (PM) and metals.
In addition to the tragic human and social losses, war poses a serious threat to the environment. The environmental impact of war is long-lasting and can take decades to restore, with effects extending far beyond the areas directly affected by the conflict, but to the entire planet. War activities cause devastating damage to ecosystems through the release of numerous polluting species. Residues generated by explosions from gunfire, bombs and other war devices release significant amounts of atmospheric particulate matter into the atmosphere, often exceeding occupational exposure limits. In addition, war can cause accidents and fires that can affect buildings and vehicles, releasing smoke and dust. Under the influence of the winds, particulate matter rises creating dust storms, the intensity of which depends on the morphology of the territory. In this way, the particulate matter is dispersed over very large geographical areas, even hundreds of kilometres away from the point of emission [1]. Atmospheric particulate matter is defined as mixture of liquid and solid particles suspended in the air. The size and composition of these particles vary widely. The Environmental Protection

Agency (EPA) identifies two fractions of particulate matter that are small enough to penetrate the lungs: PM_{10}, also called coarse particulate matter, and $PM_{2.5}$, called fine particulate matter. The origin of such particles can be natural or anthropic. In fact, particulate matter can be produced during forest fires, volcanic activity, sandstorms, and sea spray. An important contribution comes from human activities that include the burning of fossil fuels, vehicular traffic, agricultural and industrial activities [2]. It has been observed that war activities produce significant amounts of $PM_{2.5}$ [1], a more dangerous fraction than PM_{10}, as it is smaller and able to penetrate deeper into the respiratory system. $PM_{2.5}$ can induce more serious and irreversible damage, such as reduced lung function, increased risk of cardiovascular mortality and the onset of cancer. PM_{10}, being larger and less dangerous, induces less serious irritative phenomena such as asthma, bronchitis, and cough [3]. Particulate matter can remain suspended in the air for a long time, altering air quality and reducing visibility. The danger of particulate matter to humans is intrinsically linked to its ability to settle and persist inside the body for prolonged periods, sometimes even years [4]. Its danger also depends on the species it carries, such as metals [5]. Military activity is a significant source of environmental pollution, with emissions of various harmful substances. Among these, heavy metals play a role of primary importance due to their toxicity and persistence in the environment. Military activity releases a significant amount of heavy metals through gunshot residues (GSRs), as well as from the use of artillery, grenades and rockets. The metals released into the environment are mainly lead, antimony, barium, copper, zinc, iron, chromium, cadmium, mercury, and arsenic [6]. After release, the metals contaminate the atmosphere and return to the earth, causing contamination of soils as well [7], of the species that inhabit them and of the bodies of water [8]. The different ways in which metals are absorbed by animal and plant organisms lead to the accumulation of these elements in humans, with possible health consequences. Plants absorb metals mainly from the soil, while animals absorb metals through water and food. Humans are at the top of the food chain and, through the consumption of contaminated plant and animal species, in turn accumulate metals in their bodies. Exposure to metals has been shown to induce health problems, including damage to the nervous, cardiovascular, kidney, immune, respiratory, and reproductive systems [9].

2. Material and methods
2.1 Determination of atmospheric particulate matter.
The assessment of the concentration of atmospheric particulate matter is a fundamental practice in the field of human health and environmental protection. It is possible to monitor the presence of PM through a sequential sampling device, as SWAM 5 Dual Channel (Fai Instruments, Italy) that can sample PM_{10} and $PM_{2.5}$. The instrument sucks in large volumes of air and conveys them to a quartz filter on which the particles suspended in the atmosphere are deposited. The weight of the filter is measured before and after sampling to determine the mass of the deposited particulate matter [10]. Subsequently, the filter undergoes specific analysis to identify other species present on it, such as metals. Figure 1 shows the analysis steps that include loading filters, sampling, particulate matter determination, and data analysis.

Fig. 1: Steps of the atmospheric particulate analysis method.

2.2 Determination of metals.

Inductively coupled plasma mass spectrometry (ICP-MS) is an analytical technique used for the determination of trace metals in different matrices, directly in the case of liquid samples, or after oxidative acid digestion for solid samples as in the case of PM filters. This technique is distinguished by its high sensitivity and accuracy; in fact, it is possible to determine metals present in very low concentrations, in the order of micrograms and nanograms per liter (mg/L and µg/L). The heart of the instrument is plasma, a gaseous flame characterized by very high temperatures, which can reach 8000 degrees Celsius. The plasma transforms the metal particles in the sample into electrically charged particles, called ions, which are then separated according to their mass and charge. The analysis of the number of ions of each metal element makes it possible to trace the relative amount of metal present in the sample [11, 12]. Figure 2 shows the different steps of the analysis aimed at the determination of metals.
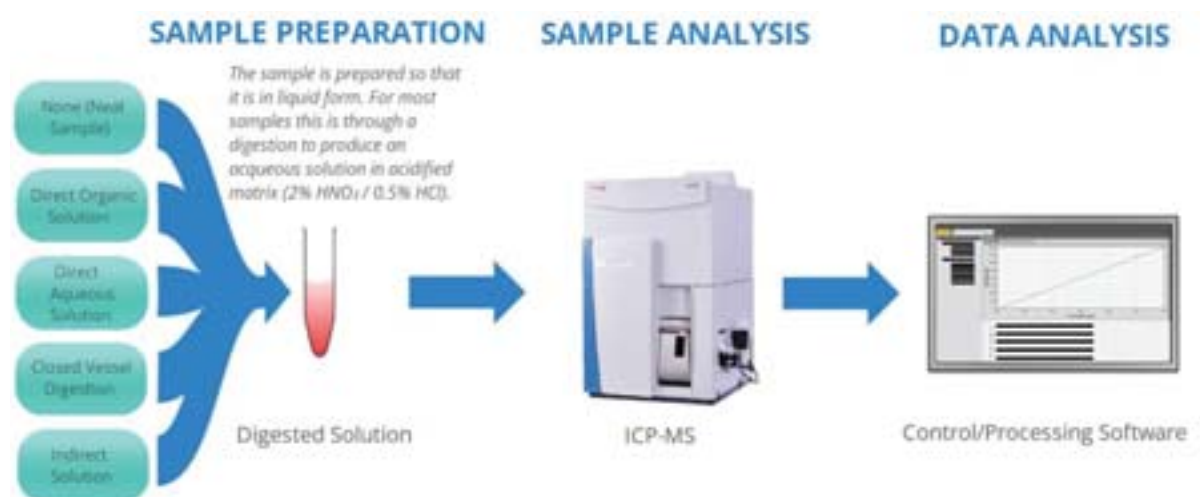

Fig. 2: Phases of the analysis in ICP-MS for the determination of metals.

3. Environmental mitigation strategies

Pollution from particulate matter, metals, and other contaminants in relation to war zones has been discussed, but it is important to underline that this problem is not limited to these areas but affects many cities on the planet, even those not directly involved in armed conflicts. Cities around the world, in fact, are subject to significant levels of pollution, resulting from a variety of natural and man-made activities. The causes of this phenomenon are many and complex, such as:
- vehicular traffic, through exhaust emissions.
- industrial activity, through the combustion of fossil fuels and the use of solvents.
- agricultural activity, due to the ever-increasing use of pesticides, fertilizers, and intensive animal farming.
- domestic heating produced through fossil fuels.

The implementation of some mitigation strategies can lead to a significant reduction in air pollution, with benefits for human health and the environment. Several scientific studies demonstrate the effectiveness of various environmental mitigation strategies:
- the reduction of industrial emissions.
- reducing the use of pesticides and agricultural fertilisers [13].
- the promotion of sustainable mobility: the use of public transport, bicycles and electric vehicles is encouraged [14].
- investment in renewable energy sources to replace fossil fuels with clean energy sources such as solar and wind power [15].

- the promotion of urban vegetation through the creation of urban parks, vertical gardens, and the planting of trees along the roads: plant species can clean up the air by absorbing many pollutants dispersed in it [16].

4.Conclusions

War-related environmental pollution poses a serious threat to the health of the planet and living beings, with serious effects that extend far beyond the areas affected by conflicts. The release of atmospheric particulate matter and heavy metals from explosions and warfare contaminates air, soil, and water, causing damage to ecosystems and risks to human health [1]. However, this issue is not limited to theatres of war: cities around the world are subject to often worrying levels of urban air pollution, caused by a variety of anthropogenic and natural factors. Vehicular traffic, industrial activity, agriculture, and domestic heating are just some of the main sources of pollution in urban areas [13]. The fight against air pollution requires a global and multifaceted commitment. Scientific research is developing increasingly sophisticated analytical methods for the determination of air pollutants, making it possible to monitor air quality and identify emission sources. Implementing mitigation strategies is crucial for reducing air pollution and protecting the environment and public health. The promotion of sustainable mobility, the use of renewable energy sources, the reduction of industrial and agricultural emissions and the protection of urban greenery are just a few examples of concrete actions that can be taken [13, 14, 15, 16]. Awareness of the seriousness of the problem of air pollution is the first step in a collective commitment to protect the planet and build a more sustainable future.

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Changing Agriculture: Enhancing Crop Quality and Production Through Remote Sensing and Artificial Intelligence

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Abstract
The agricultural sector is undergoing a transformative shift with the advent of groundbreaking strategies aimed at enhancing crop quality and production levels. This paper presents an innovative approach that leverages remote sensing technologies to revolutionize agricultural management practices. By harnessing the power of real-time monitoring through satellite or airborne sensors, coupled with sophisticated artificial intelligence algorithms, this approach enables precise management of agricultural areas. Through continuous monitoring and analysis of data, valuable insights are extracted to optimize production processes, prevent abandonment of agricultural lands, and mitigate risks to crop health, including the threat of epidemics such as xylella. The proactive nature of this system ensures timely interventions to address emerging challenges, thereby safeguarding crop health and enhancing overall productivity. By integrating remote sensing technologies and artificial intelligence algorithms, agriculture is propelled into a new era characterized by increased efficiency, sustainability, and resilience. This holistic approach not only optimizes resource utilization but also minimizes environmental impact, contributing to the long-term viability of agricultural practices. Furthermore, the ability to extract actionable insights from vast amounts of data enables informed decision-making and strategic planning. This empowers farmers and agricultural stakeholders to adapt to changing environmental conditions and market dynamics, thereby ensuring the continued success and viability of the agricultural sector. Ultimately, the integration of remote sensing technologies and artificial intelligence algorithms represents a paradigm shift in agriculture, paving the way for sustainable and resilient food production systems capable of meeting the challenges of the 21st century.

Keywords: Precision Farming, Crop Monitoring, Yield Prediction, Remote Sensing, Data Analytics in Agriculture.

1. Introduction
Agricultural practices are undergoing a significant transformation in the face of increasing global demand for food, the need for sustainable resource management, and the challenges posed by climate change. Traditional farming methods, which often rely on experience and manual observations, are no longer sufficient to meet the modern requirements of efficiency and sustainability [1]. To address these pressing issues, this paper presents an innovative approach that leverages remote sensing technologies to revolutionize agricultural management practices. Remote sensing, which involves the acquisition of information about

an object or phenomenon without making physical contact, has been a game-changer in various fields [2]. In agriculture, remote sensing technologies, including satellite and airborne sensors, provide comprehensive and real-time data on crop conditions, soil health, and environmental factors. When integrated with advanced artificial intelligence (AI) algorithms, these technologies offer unprecedented capabilities for precise management of agricultural areas.

The core of this innovative approach lies in the power of real-time monitoring through remote sensing. Satellite and airborne sensors continuously capture data over large agricultural landscapes, enabling the observation of crop growth, soil moisture levels, and weather patterns [3]. This wealth of information, when processed using sophisticated AI algorithms, can generate actionable insights for farmers and agricultural managers. AI algorithms, particularly those based on machine learning, are adept at handling vast amounts of data and identifying patterns that may not be evident through traditional analysis methods. By applying these algorithms to remote sensing data, it is possible to perform tasks such as crop health monitoring, yield prediction, and early detection of plant diseases. For instance, spectral analysis of crop imagery can reveal subtle changes in plant coloration that indicate stress or disease, allowing for timely intervention [4].

One of the significant benefits of this approach is the optimization of production processes. By continuously monitoring crop conditions and environmental variables, farmers can make informed decisions about irrigation, fertilization, and pest control. This precision farming reduces the wastage of resources such as water and chemicals, thereby enhancing both economic efficiency and environmental sustainability. Moreover, it enables targeted interventions, such as applying fertilizers only where needed or adjusting irrigation schedules based on soil moisture data, leading to improved crop yields and quality. Preventing the abandonment of agricultural lands is another critical aspect addressed by this approach. Agricultural land abandonment, often due to declining productivity or unfavorable economic conditions, poses a threat to food security and rural livelihoods [5]. Through continuous monitoring and data analysis, farmers can identify and address factors that lead to land degradation, such as nutrient deficiencies or pest infestations. This proactive management helps maintain the productivity of agricultural lands and supports sustainable farming practices. Additionally, the threat of epidemics, such as the devastating impact of Xylella fastidiosa on olive trees in Europe, underscores the need for advanced monitoring and early warning systems. Remote sensing technologies, combined with AI, can detect early signs of disease spread, enabling prompt and targeted responses to contain outbreaks. By mitigating risks to crop health, this approach contributes to the resilience and stability of agricultural systems.

2. Methodology

This paper outlines a comprehensive methodology for monitoring vegetation health using remote sensing technologies, specifically hyperspectral and thermal sensors, combined with advanced machine learning algorithms. The approach focuses on leveraging the detailed spectral information provided by hyperspectral sensors and the thermal data from thermal sensors to assess the health of vegetation through various descriptors, including the Normalized Difference Vegetation Index (NDVI). Hyperspectral sensors capture a wide spectrum of light across numerous bands, providing detailed information about the reflectance properties of vegetation. Unlike multispectral sensors, which capture data in a few broad bands, hyperspectral sensors collect data in hundreds of narrow bands, allowing for the identification of subtle differences in vegetation health. Hyperspectral data acquisition involves using satellite or airborne platforms equipped with hyperspectral sensors. These sensors capture reflected light from the vegetation canopy across a range of wavelengths. The data collected includes reflectance values for each pixel in the image, representing the spectral signature of the vegetation.

Preprocessing steps include radiometric correction, atmospheric correction, and geometric correction to ensure the data accurately represents the ground conditions. These corrections adjust for sensor noise, atmospheric interference, and geometric distortions, resulting in high-quality spectral data ready for analysis. Thermal sensors measure the thermal infrared radiation emitted by objects, providing information on surface temperature [6]. In vegetation

monitoring, thermal data helps assess plant water stress, transpiration rates, and overall health. Thermal data is acquired using thermal infrared sensors mounted on satellites, drones, or aircraft. These sensors capture temperature variations across the vegetation surface, which can be indicative of water stress or other physiological conditions affecting plant health. Preprocessing thermal data involves calibrating the sensor readings to ensure accurate temperature measurements and correcting for environmental factors that may affect the readings, such as atmospheric temperature and humidity.

In remote sensing imagery, several descriptors and indices are used to detect vegetation suffering and assess overall plant health. These descriptors help identify various stress factors affecting vegetation, such as water stress, nutrient deficiencies, disease, and pest infestations. Below are some of the key descriptors and indices used in remote sensing for monitoring vegetation health:

- Normalized Difference Vegetation Index (NDVI): NDVI is one of the most widely used indices to measure vegetation health.
- Enhanced Vegetation Index (EVI): EVI is an improvement over NDVI, designed to enhance the vegetation signal with improved sensitivity in areas with dense vegetation.
- Normalized Difference Water Index (NDWI): NDWI is used to monitor changes in water content in vegetation.
- Thermal Infrared Imaging: Thermal Infrared Imaging measures the thermal radiation emitted by the vegetation, providing information on canopy temperature. Higher canopy temperatures can indicate water stress as plants reduce transpiration under stress conditions. Thermal indices such as the Crop Water Stress Index (CWSI) are derived from thermal data to assess plant water status.

Machine learning algorithms play a crucial role in analysing the vast amounts of data generated by hyperspectral and thermal sensors. These algorithms can identify patterns and correlations that may not be evident through traditional analysis methods. Hyperspectral and thermal data are integrated to form a comprehensive dataset that captures both spectral and thermal characteristics of the vegetation. This integration allows for a more holistic assessment of plant health. Supervised machine learning algorithms, such as Random Forest, Support Vector Machines (SVM), and Neural Networks, are trained on labeled datasets where the vegetation health status is known. These models learn to associate specific spectral and thermal signatures with healthy or stressed vegetation. The trained models are validated and tested on independent datasets to evaluate their accuracy and robustness. Performance metrics such as accuracy, precision, recall, and F1-score are used to assess the effectiveness of the models in predicting vegetation health.

The final step involves the continuous monitoring of vegetation health using the trained machine learning models. The models analyse incoming hyperspectral and thermal data to provide real-time assessments of vegetation health. This monitoring enables early detection of stress conditions, allowing for timely interventions to mitigate potential impacts on crop productivity.

3.   Case study

In response to the growing challenges posed by climate change, resource scarcity, and the economic pressures facing agricultural enterprises, a project was initiated to implement sustainable management practices for wheat and tomato cultivation in southern Italy. This project leveraged advanced 'air-earth-water' technological instruments to enhance precision agriculture, aiming to optimize production processes and improve both environmental and economic outcomes. The following sections detail the results achieved through this innovative approach. One of the primary outcomes of implementing precision agriculture techniques was a significant improvement in crop health and yield for both wheat and tomato cultivation. Using hyperspectral and thermal remote sensing technologies, the project team was able to continuously monitor crop conditions and detect early signs of stress, such as water deficiency or nutrient imbalances. This technology provided detailed spectral information that enabled the identification of specific stress factors affecting plant health. The data revealed patterns related to chlorophyll content and biomass, which are critical indicators of crop vigor. By addressing these issues promptly, farmers were able to enhance the overall health of their crops. Thermal sensors measured canopy temperature, which helped in detecting water stress early. Adjustments in irrigation schedules based on thermal data ensured that crops received adequate water, especially during critical growth stages. This targeted approach resulted in better water management and healthier plants.

A significant outcome of the work is the optimization of water and nutrient use. Precision agriculture technologies have enabled more efficient management of resources, which is critical in areas suffering from water scarcity and nutrient limitations. Variable rate irrigation systems can be implemented based on data derived from remote sensing technologies. These systems adjust water application rates based on the specific needs of different areas of the field. By avoiding over-watering and ensuring water was

directed where it was needed most, water use efficiency can be improved by 25%. This reduction in water consumption not only preserves a critical resource, but reduces costs associated with water use.
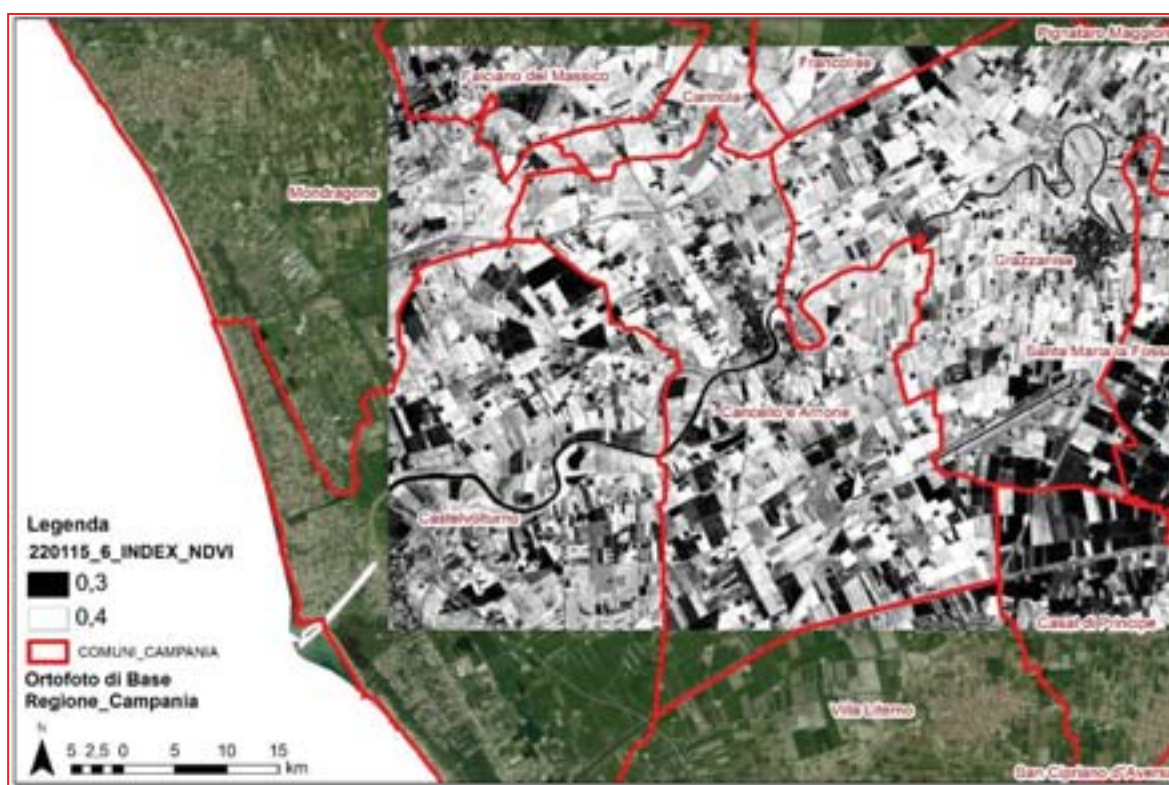

Fig. 1: Normalized Difference Vegetation Index (NDVI) calculated on the hyperspectral image.

Likewise, precision fertilization techniques have been employed to apply nutrients more effectively. Soil nutrient levels and nutrient uptake by plants were monitored using hyperspectral data, enabling precise fertilizer application. This targeted approach minimized nutrient runoff and environmental pollution while ensuring plants received the nutrients they needed for optimal growth.

Improvements in crop yield and resource use efficiency can be translated into better economic performance for participating agricultural businesses [7]. Increasing grain and tomato yields can lead to increased revenues, while optimized use of water and nutrients can reduce production costs. Reducing water and fertilizer use can lead to significant cost savings. With higher agricultural yields, farmers can generate more income from their products. The combined effect of increasing yields and reducing costs can lead to an increase in income for farmers involved in the project.

In addition to the economic benefits, this methodology can also bring substantial environmental benefits. By reducing the use of water and fertilizers, the method can contribute to the conservation of natural resources and minimize the environmental impact of agricultural activities. Reducing nutrient runoff can help protect local water bodies from pollution, promoting healthier ecosystems.

4.   Conclusion

This study has demonstrated the transformative potential of integrating advanced 'air-earth-water' technological instruments into precision agriculture to address the multifaceted challenges facing modern farming. By leveraging hyperspectral and thermal remote sensing technologies, the project achieved significant improvements in crop health and yield for wheat and tomato cultivation in southern Italy. The precise monitoring and timely interventions enabled by these technologies led to optimized water and nutrient use, resulting in substantial cost savings and enhanced economic performance for farmers. Furthermore, the environmental benefits of reduced water consumption and minimized nutrient runoff underscore the sustainability of this approach. The increased efficiency in resource use not only supports the economic viability of agricultural operations but also contributes to the conservation of natural resources and the protection of ecosystems. Overall, this case study highlights the critical role of innovative technologies in fostering sustainable and resilient agricultural practices. By embracing precision agriculture, farmers can navigate the challenges of climate change and resource scarcity, ensuring the long-term sustainability and profitability of their operations. This approach offers a

promising pathway for the future of agriculture, promoting both environmental stewardship and economic stability.

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Aerial Remote Sensing for Land Monitoring

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Abstract
In the vast field of digital technologies and transformation, observational devices assume a crucial role, acting as extensions of the researcher's mind. Although they may seem like simple tools, they actually amplify the ability to understand the environment.
This concept is reflected in the Research, focused on aerial remote sensing activities with hyperspectral sensor, conducted in the Albanian Territory by Benecon University Consortium, is aimed at land control and monitoring. The appropriately configured hyperspectral technologies, algorithms developed by the Consortium, and cartographic interpretations, allow to discretize and to analyze the territory in detail, improving the ability to detect the spectral tracks of cannabis, thus identifying and monitoring, illegal cultivations with precision.
The data, processed in this way, provide an accurate snapshot of the overflown territory, allowing for a detailed representation of the current state of the area. Using multi-temporal footage, it is possible to monitor landscape transformations over time, both those due to natural causes and those caused by anthropogenic activities. This approach allows for a better understanding of environmental dynamics and for planning more effective interventions for land management and conservation.

Keywords: Albania, monitoring, remote sensing, Territory, technologies

1.   Introduction

The research activity conducted in the Albanian territory by the Benecon University Consortium in partnership with the Albanian Ministry of Interior and the Italian Guardia di Finanza, at the Joint Laboratory set up in Tirana, [1] represents a significant step forward in the use of aerial remote sensing technologies. This project focuses on post-processing activities of images processed by the Consortium and related to the Guardia di Finanza's microCASI-1920 sensor and the application of hyperspectral sensors for land control and monitoring. The acquisition of hyperspectral images, makes possible a variety of approaches to the territory, promoting its timely investigation. The study pays more attention, with a special focus, to the identification and management of illegal cannabis cultivation in Albanian territory.
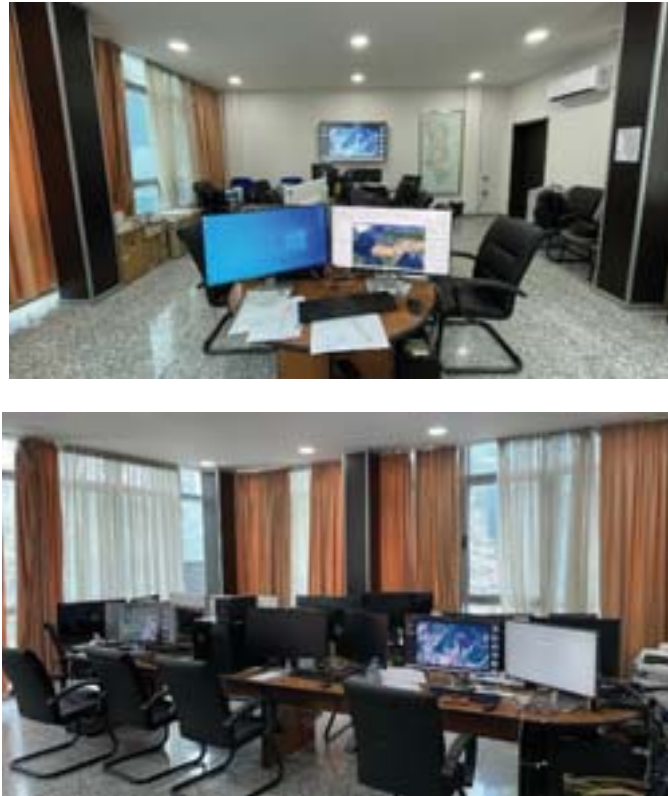
Fig. 1: Joint laboratory in Tirana by the Benecon University Consortium, Albanian Government and Italian Guardia di Finanza.

In particular, the application of the algorithms, developed by the Benecon University Consortium Researchers, makes it possible to obtain hyperspectral images processed by the microCASI sensor, directly compatible on GIS platforms and queryable in terms of unique archiving of individual acquired flight lines.

The algorithm allows for a geographically and geometrically correct measurement of each acquired and processed flight line. What's more, these algorithms make it possible to automatically select certain hyperspectral bands to obtain georeferenced images in GeoTIF format directly readable by GIS software, both in "true color" in the visible "RGB" and "RedVeg" bands in which areas with a greater presence of vegetation are highlighted.

The important aspect of the project is, also, the cartographic interpretation of the collected data. Hyperspectral images are transformed into detailed maps showing the distribution of different land cover types. This process of land-cover discretization makes it possible to accurately analyze the composition and status of the monitored areas

2. Materials and Methodologies Adopted

The microCASI 1920 sensor, appropriately configured on board the Guardia di Finanza aircraft, uses up to 288 spectral bands that ensure maximum resolution in the visible and near-infrared (visible-near infrared). Therefore, it enables a variety of environmental, forestry, agricultural and wetland applications for classifying organic and inorganic matter on the ground according to its relative "spectral signature." The PhaseOne optical sensor, sensitive not only to the RGB bands of the visible spectrum, but also to the near-infrared (Near InfraRed NIR) band on the other hand, enables highly detailed aerial photographs of the overflown area, thus providing, fundamental information on vegetation cover. The product of PhaseOne image post-processing are the nadiral photos, which are essential to better describe the phenomena observed with the hyperspectral data and resolve any interpretative ambiguities. Based on advanced algorithms developed in-house and to map interpretations, it is possible then, to process hyperspectral images that are composed of many layers (layers) of electromagnetic information.

In order to be able to analyze in detail the complexity of the information contained in the hyperspectral images, the data are then classified according to specific procedures that allow the "spectral traces" of illicit cultivation, which differ from those of other crops and vegetation, to be processed and legitimized, and thus obtain a precise and detailed view of the conditions of the land, allowing for accurate identification of the areas cultivated illegally. [2]

- The processing is divided into:
- - 'true-color' RGB images, sampled in the electromagnetic wavelengths distinguishable by the human eye, for photo-realistic representation of the territory; this representation in natural colors associates each red (Red), green (Green) and Blue channel of the monitor with the corresponding CASI channels;
- - 'RedVeg' images, sampled in shades of red in relation to the presence of vegetation, for the representation of vegetated areas (gradations from red); this representation in false color associates each Red, Green and Blue channel of the monitor with specific channels. This representation enhances with shades of red the greater or lesser density of vegetation. [3]

Hyperspectral imaging and analysis systems represent a technique with great potential, in the field of environmental analysis. The basis of hyperspectral remote sensing systems is the physical property of objects to emit or reflect radiation in various bands, in addition to visible radiation, with varying intensities depending on their chemical and physical characteristics. Similar to other airborne sensing systems, such as photogrammetric cameras or LiDAR systems, with which it can be integrated for the acquisition of comprehensive information about the survey area, the hyperspectral sensor is normally employed in conjunction with a GPS-Inertial positioning system for georeferencing the images produced. Hyperspectral radiometers measure reflected radiation in many narrow and contiguous bands, i.e., for each measurement band an image is acquired, for each of which a pixel represents the reflectance at a precise wavelength of the terrain area seen from that pixel. From the analysis of the data collected by the hyperspectral sensor, including by combining the data acquired on different channels, false-color images representative of the characteristics of the investigated surfaces can be processed.

Each image pixel contains a spectrum composed of a large number of bands (in radiance or reflectance) that can be used to characterize objects in the scene with great precision and detail. Typical uses of this technique include, for example, thermal mapping of the territory, which can be obtained from the analysis of infrared bands, and the identification of specific substances or components, by searching for the "spectral signature" peculiar to the material object of interest. The range of applications that can be realized with the use of this technology is very wide:

- Agriculture: monitoring of vegetation health status (NDVI) and analysis of agricultural productivity
- Hydrology: study of coastal environments through the analysis of water temperature and turbidity and the
plankton and chlorophyll monitoring
- Environment: monitoring of active landfills and the search for illegal ones, monitoring of snow deposits and glaciers
- Fire prevention: identification of fire-prone areas and survey of burned areas.

It is precisely these hyperspectral peculiarities and technologies used in the project that offer far greater detection capabilities than traditional methods. A hyperspectral sensor captures spectral information in hundreds of narrow frequency bands, providing much more data than multispectral sensors. This higher spectral resolution enables distinction between different types of materials on the Earth's surface with greatly increased accuracy.

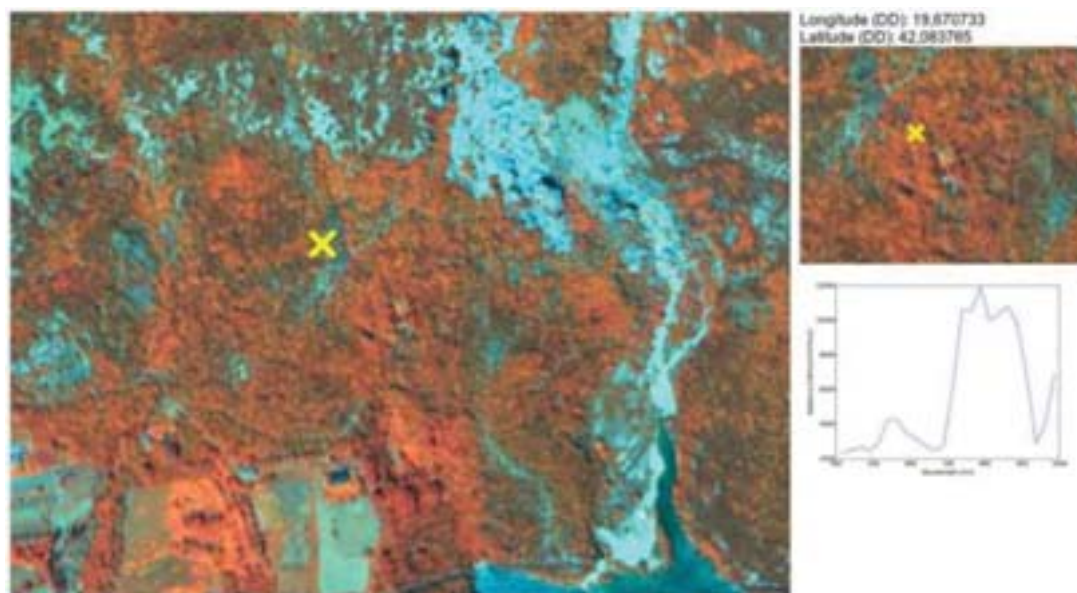**Fig. 2:** PhaseOne image taken by the Guardia di Finanza.

Fig. 3: RedVeg image with identification of cannabis cultivation and its spectral signature

3. Benefits for Land Management

Using data collected at different points in time, it is possible to monitor landscape transformations over time. This is critical for understanding environmental dynamics and the evolution of cannabis cultivation, as well as for detecting changes due to natural phenomena such as erosion, flooding or vegetation growth, and anthropogenic causes such as urbanization or deforestation. The processed hyperspectral data provide an accurate snapshot of the land overflown, allowing for a detailed representation of the current state of the area. This representation is not just a static map, but a dynamic resource that can be updated and analyzed over time. This allows for continuous monitoring of land transformations, identifying any changes early on that might indicate new illegal activities or expansion of existing cultivation. In addition, the use of hyperspectral technologies and multi-temporal footage provides a better understanding of environmental dynamics. This in-depth understanding is essential for planning more effective interventions to promote sustainable natural resource management and land conservation.

4. Conclusions and future prospects

This work, which the Benecon University Consortium has been conducting in Albania since 2012, represents a model of how advanced digital technologies and big data management can be applied to address complex land management problems. The use of hyperspectral sensors, combined with advanced algorithms and detailed map interpretations, offers a powerful solution not only for monitoring illegal cannabis cultivation, but also for managing environmental resources.

Continued evolution of remote sensing technologies and further development of more sophisticated algorithms will be able to improve detection and analysis capabilities even more. In addition, expanding the use of these technologies to other geographic areas and for other purposes, such as water resource monitoring or protected area management, can contribute significantly to environmental conservation and the promotion of sustainable development practices.

In conclusion, this work demonstrates how the integration of advanced technologies and academic research can produce effective tools to address complex environmental and social challenges.
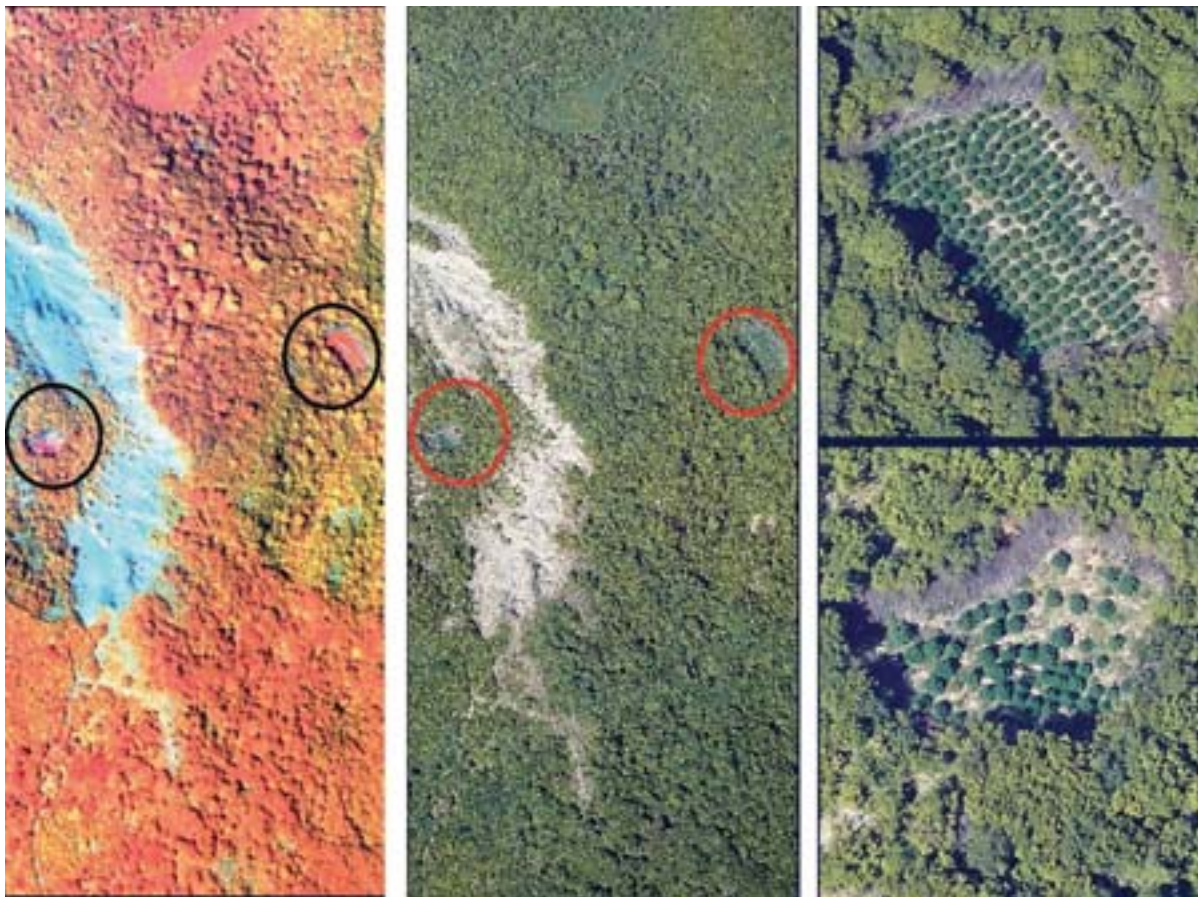
Fig. 4: RedVeg image, PhaseOne image and zoom of cannabis cultivation

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Integrating Facility Management, Machine Learning, and Building Information Modeling for Cultural Heritage Management

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Abstract

Preserving cultural heritage is a complex task that benefits from advanced technologies and strategic management. This paper examines the integration of Facility Management (FM), Machine Learning (ML), and Building Information Modeling (BIM) to improve not only to preserve or conserve heritage but to revitalize potential heritage from the past. This new approach leads to establishing new strategies for Cultural Heritage Management (CHM). This synergistic approach combines the strengths of each discipline: FM ensures efficient daily operations and systematic maintenance, ensuring longevity and usability, ML analyzes data to predict issues and optimize maintenance, offers predictive analytics for proactive conservation and reduced damage risks, and BIM provides a detailed digital twin (a detailed digital representation) for enhanced visualization and planning aiding in analysis and decision-making. Integrating these technologies enables a proactive, informed, and efficient preservation strategy. The paper presents a case study showing the successful integration of FM, ML, and BIM in heritage projects, highlighting benefits like improved condition assessment, predictive maintenance, and resource allocation. This example demonstrates the potential of this approach to revolutionize heritage preservation, ensuring effective maintenance for future generations while respecting historical significance.

Keywords: FM, BIM, ML, Memory Work, CHM.

1. Introduction

The relationship of humanity with the past has changed immensely in the last three centuries. The historical buildings, monuments, artifacts, events, and even the stories of the past gained importance in modern society. Since the 18th century preserving cultural heritage has become one of the main governmental considerations. United Nations (UN) also gives priority to protecting cultural heritage sites, with the notion that these sites not only belong to one nation but to all humankind. As one of the many consequences of exponential transformation due to technological changes related to industrial revolutions, the meaning of the past and history changed as well. The rapid change brought consideration of preserving cultural heritage (Lowenthal, 1985). UNESCO (2024) defined cultural heritage as tangible (artifacts, museums,

monuments, sites, etc.) and intangible heritage embedded in culture, which have significant historical, artistic, aesthetic, ethnological, anthropological, and social value.

The monuments, artifacts, buildings, and paintings from the past standing among modern civilization demonstrate the continuation of human history. When we talk about preserving cultural heritage, we do not only refer to the materiality but also the continuous life in and outside of that spatial materiality (Halbwachs, 1950). For example, the physical surroundings create the light or the acoustic of the interior space at different times of the day or the comforting shadow of that building on a summer day. Preserving such heritage enables the transferring of the collective knowledge and experience of the past nations to the future (Landsberg, 2015). Thus, cultural heritage management (CHM) organizations gain more importance due to their importance on preserving the societies cultural heritage. CHM organizations are responsible to choose a strategy to preserve the past. These organizations legitimize themselves by working with governmental institutions and profits from society by preserving cultural heritage.

We limit our paper on the preservation of building structures and regarding different aspects of CHM we focused on the technological dimension (Zundel et. al, 2023). Technological changes are accepted as the reason for destruction of the building structures of the past whilst building the new, developed and modern world. Yet we argue that technology is the also the best antidote to save, preserve and transfer these buildings with their whole memories to the next generations.

2. Overcoming Preservation Challenges with Integrated Technology

CHM Organizations can use technology in particular FM as a tool to make a relation with the past. We argue that new integrated approach of Facility management including BIM and ML makes a new strategical approach regarding the uses of the past possible. Facilities management (FM) is a versatile discipline that involves the management and maintenance of an organization's physical assets, infrastructure, and facilities to ensure they operate in an efficient, productive, and effective way (Aksu & Kumcu, 2023). Since technological advancements upgraded facilities from simple buildings to intelligent beings, facility managers of the CHM organizations are challenged to find new asset management and maintenance strategies. An integrated approach opens new possibilities of decision making by implementing BIM with ML as a decision-making strategic actor.

Preserving cultural heritage sites presents numerous challenges, including environmental deterioration, aging infrastructure, and limited resources. Overcoming these obstacles requires innovative solutions that leverage modern technologies. An integrated approach combining FM, ML, and BIM offers a promising strategy for addressing these challenges effectively. FM plays a crucial role in the preservation of cultural heritage by providing a systematic framework for maintenance and operation. FM ensures that heritage sites are managed efficiently, with the help of structured processes for routine inspections, repairs, and conservation activities. This systematic approach helps in identifying and addressing potential issues before they escalate, thereby safeguarding the structural integrity and historical value of heritage sites. Machine Learning enhances this framework by introducing predictive analytics and data-driven insights. By analyzing large volumes of data collected from various sensors and monitoring devices, ML algorithms can predict potential issues such as structural weaknesses, material degradation, and environmental impacts. This predictive capability allows for proactive maintenance, reducing the risk of sudden failures and minimizing the need for costly emergency repairs. For instance, ML can analyze patterns in temperature, humidity, and pollution levels to forecast deterioration rates, enabling targeted interventions. Building Information Modeling adds another layer of sophistication to heritage preservation. BIM provides a comprehensive digital representation of the physical and functional characteristics of heritage structures. This digital twin includes detailed information about materials, construction techniques, and historical modifications. BIM facilitates detailed analysis, visualization, and planning, enabling conservators to make informed decisions. For example, BIM can simulate the impact of proposed conservation interventions, helping stakeholders understand potential outcomes and optimize preservation strategies.

The integration of FM, ML, and BIM creates a synergistic approach that leverages the strengths of each technology. This combined strategy offers several benefits for cultural heritage preservation:

• Improved Condition Assessment: The integration enables more accurate and comprehensive assessments of the current state of heritage sites, identifying vulnerabilities and prioritizing maintenance tasks.

• Enhanced Predictive Maintenance: Predictive analytics from ML allow for timely interventions, preventing deterioration and extending the lifespan of heritage structures.

• Optimized Resource Allocation: With detailed insights from FM and BIM, resources can be allocated more effectively, ensuring that conservation efforts are both efficient and impactful.

• Proactive and Informed Decision-Making: The integration of these technologies provides a holistic view of heritage sites, enabling data-driven decisions that balance preservation goals with practical constraints.

Case studies have demonstrated the successful application of this integrated approach, showcasing its potential to revolutionize cultural heritage preservation. For example, in historic buildings, integrating these technologies has led to significant improvements in monitoring structural health, managing environmental conditions, and planning restoration projects. These successes underline the potential for FM, ML, and BIM to transform heritage preservation, ensuring that cultural heritage sites are maintained for future generations while respecting their historical significance.

3.   Marketing Strategies with the Integrated Approach

Effective promotion of heritage sites should leverage a mix of traditional and digital marketing strategies. In today's digital age, marketing and public engagement are presenting new methods for promoting heritage sites and fostering a sense of community around cultural heritage. Promoting heritage sites involves creating awareness and generating interest among the public. This can be achieved through targeted marketing campaigns that highlight the historical and cultural significance of these sites (Peters, 2019). CHM organization's campaigns might include the promotion of heritage sites, construction of digital marketing platforms, and the use of VR technology (Smith et al., 2020).

Utilizing the FM with ML-BIM integrated approach can significantly enhance these efforts. ML integration into marketing strategies allows for the analysis of vast amounts of data to understand audience preferences, optimize content delivery, and predict the success of various promotional activities (Brown & Lee, 2021). By using predictive analytics, marketers can tailor campaigns to specific demographics, ensuring that the right message reaches the right audience. This personalized approach increases engagement and encourages more people to visit and support heritage sites (Wang et al., 2022).

Social media, websites, and mobile applications offer interactive and immersive experiences that bring history to life (Johnson & Adams, 2018). BIM can be used to create detailed 3D models of heritage sites, providing virtual tours that allow people to explore these locations from the comfort of their homes (Kumar & Alavi, 2019). Engagement can be further enhanced through community-driven content. Encouraging visitors to share their experiences and stories on digital platforms creates a sense of ownership and connection to the heritage site. User-generated content also serves as powerful testimonials that can attract new visitors (Davies, 2020).

Virtual Reality (VR) offers a transformative way to experience heritage sites. By creating virtual replicas of these sites, VR allows users to immerse themselves in history, providing a deeper understanding and appreciation of cultural heritage (Loomis et al., 2019). Interactive experiences, such as VR tours and augmented reality (AR) applications, can be used in marketing campaigns to generate excitement and curiosity (Chen & Huang, 2021). These technologies can also be used for educational purposes, offering interactive lessons that make

learning about history engaging and fun. Schools and educational institutions can incorporate VR and AR into their curriculums, promoting heritage sites as valuable learning resources (Nguyen, 2022).

Utilizing digital platforms, interactive experiences, and community engagement strategies can create a comprehensive marketing approach that resonates with diverse audiences. Incorporating advanced technologies like ML, BIM, and VR into marketing strategies can revolutionize the promotion of heritage sites. These technologies not only enhance the visitor experience but also provide valuable insights for optimizing marketing efforts. By creating immersive and interactive experiences, marketers can foster a deeper connection between the public and cultural heritage, ensuring the preservation and appreciation of these sites for future generations (Jones, 2023).

4.   Conclusion

In a rapidly changing environment preserving values and cultural heritage became an important asset for all humankind. By means of new technology preservation of valuable artifacts, monuments and buildings is much easier than past generations. Digital technologies enable to gather continuous information of every aspect of the physical surroundings, simulate a digital twin during longitudinal observation of that material-spatial environment. Technology makes possible to rebuild the observed building (Yilmaz, 2022). Until today renovations had the problem of looking the past in today's eyes. Thanks to ML embedded digital technology, evolving of the building through time could be captured, such as the acoustic, the light or how and where it wears out in years. Knowing these information makes possible that even a destruction of that building from wars or catastrophes, we can rebuild the exact building, moreover we can bring back the originality of the spatial environment. Hence BIM is an essential tool used by facility management organizations to preserve the cultural heritage of humanity.

This study gives insights into how a facility management organization of a spatial environment uses technology to preserve cultural heritage. An integrated facility management approach for cultural preservation has three main implications. First, a synergistic approach would increase productivity in operating procedures by reducing the time and money needed. Secondly, the realization of the decision-making processes of facility managers while cultural preservation becomes more efficient. This efficiency leads to better goal orientation and more accurate preservation can be possible. Third, by the integrated approach culturally important heritage can be revitalized by the preservations leads to attracting attention from social communities and humanity in general. By doing so the marketing value of cultural preservation would increase, hence the effectiveness can be obtained.

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World Heritage and Dwelling on Space
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Le Vie dei. Mercanti

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Precision agriculture: Big data for crop control.

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Abstract

The use of integrated technologies useful for knowledge of the territory and terrain, such as the TABI 1800 thermal sensor, the CASI 1500 hyperspectral sensor and the PhOne optical camera allow the collection of Big Data which is fundamental for the creation of a GIS project suitable for management, monitoring and control of the territory and land.

The complex of characteristics acquired for the analysis of cultures make the remote sensing image from aircraft and satellite scientific data totally compatible with the introduction into integrated digital platforms of geographic information systems - GIS.

A remote sensing image can be visualized using the false color representation (R, G, B) associated with the spectral responses measured in each pixel.

In order to make remote sensing data suitable for measuring certain phenomena, and therefore usable beyond photointerpretation, it is necessary to extract significant information from the images and therefore be able to identify the classes of objects contained in them, and possibly physical properties.

Keywords: technologies, knowledge, terrain, agriculture, GIS.

1.   Introdution

This study intends to address the dynamics of land management, starting from traditional survey systems, passing through survey systems with high technological value, arriving up to the integrated digital use of data to be entered, processed, updated or retrieved exclusively through GIS platforms , big data for the control of precision agriculture.

2.   Data management

Precision agriculture refers to a whole series of strategies and tools that allow us to optimize and increase the quality and productivity of the soil through a series of targeted interventions, a result that can be achieved thanks to increasingly innovative techniques.

It is called "precision" because thanks to the most modern tools it is possible to carry out the right intervention, in the right place, at the right time, responding to the specific needs of individual crops and individual areas of the land, with a high level of precision.

Technologies are used first of all to collect BIG DATA and information that are used firstly to make decisions on how to improve production and secondly to implement the corrections necessary to achieve this objective.

Today we also talk more and more often about Agriculture 4.0, which is the evolution of the concept of precision agriculture: this expression indicates all those tools and strategies that use

cutting-edge technologies in an interconnected way starting from the use of data to improve and optimize production.

All this is achieved through interpretation or classification operations of remotely sensed images. The classification operation generally involves the reduction of the visual values present in the image, which vary continuously, to categorical values to which homogeneous pixel values dependent on the spectral bands are associated (for example through clustering and classification operations). The classification of the crops present in the images produces a data set that can be immediately implemented within a Grid-type structure (capable of being used as a thematic map). The point where the crop under study is located is identified by a pair of Cartesian coordinates (x, y); the line is identified by a succession of pairs of coordinates corresponding to the ends of the segments constituting the line itself; the polygon is instead described by a closed line.

Ultimately, the format in question is based on the use of a basic element, called a vector, through which it is possible to construct any geometry, even the most complex: a point is identified by a vector of zero modulus, a broken line by a sequence of vectors, a polygon from a sequence of vectors such that the starting point of the first is the ending point of the last. Alphanumeric data (attributes) on the other hand are all the information useful for representing graphic and geographical elements and describing their characteristics. GIS also provides for the management of this information in a relational database. A database is a collection archive of one or more data files or tables cataloged in a structured way. The rows are called records and the columns are called fields. GIS software uses the DBMS (Database Management System) to manage these data archives. With a DBMS it is possible to establish relationships between the fields of a database useful for data manipulation. This is where the concept of Relational Databases comes from. The fundamental characteristics are the following: Minimum redundancy, Consistency, Integration, Integrity and savings, Ease of management and accessibility, Reliability, Independence, Security.
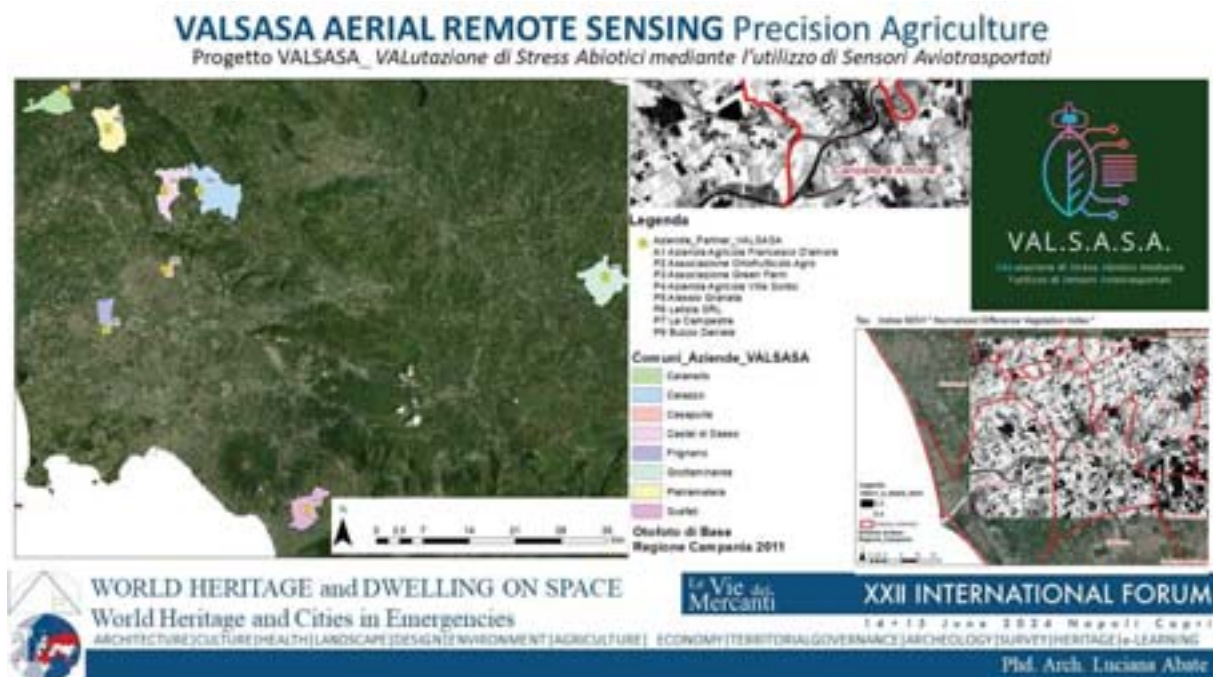

Image acquired with CASI 1500 hyperspectral sensor, application of RedVeg filte

A fundamental characteristic of a GIS is its ability to georeference data; that is, to attribute to each element its real spatial coordinates. This is a software procedure which consists in positioning, using points with known coordinates (control points), the spatial data in the respective

area of the real territory, according to a specific reference system, the one in which the object is actually located, and in the real size, not to scale.

The representation scale at this point becomes only a parameter to define the degree of accuracy and resolution of the graphic information, and therefore usable for example to define the representation density.

The topological overlay consists of the superposition of two or more information levels (layers) not only graphically but also at the attribute level. Overlays can be divided into three main categories: points on polygons, lines on polygons, and polygons on polygons. Common to all overlay operations is that at least one of the two themes considered is of a polygonal type.

Queries are of two types, spatial and attribute-based. Spatial queries are database queries starting from spatial criteria (proximity, inclusion, overlap), attribute queries consist of table queries based on the value of a field. As a result you will see the layer elements highlighted both as graphics and as records in the table.

The Buffering operation, on the other hand, is carried out starting from a point, a line or a polygon. Through this function, it is possible to highlight an area that is a fixed or variable distance away from a specific graphic element depending on the attributes of the element.

The result is always a polygonal information level, which can be used for subsequent analyses; for example by overlaying with other layers or by executing spatial queries on the obtained layer.

The raster and three-dimensional operators arise from the need to operate from a single environment on different types of data. This has pushed the evolution of GIS systems towards integrated systems in which operators capable of carrying out qualitative and quantitative analyzes were available. the case study of the VALSASA Project is proposed as an example, for the innovation and improvement of the economic performance of all agricultural companies and to encourage the restructuring and modernization of agricultural companies, in particular to increase market share and orientation to the market as well as the diversification of activities.

Image acquired with CASI 1500 hyperspectral sensor, application of PSRI

Image acquired with CASI 1500 hyperspectral sensor, application of NDVI

In conclusion, it should be underlined that despite the growing qualitative and quantitative development of aerial and terrestrial survey techniques and data for territorial remote sensing, to date there has not been a significant increase in the use of such data for territorial governance. This limitation essentially derives from the scarcity of a systemic and multidisciplinary approach to the territorial planning process that allows the integration of data from different sensors in each phase of the planning process.

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Beyond the devastation of war. The reconstruction of Montecassino Abbey between regulatory measures and symbolic impulses

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Abstract

Wars have the extraordinary ability to erase, with equal destructive force, not only human lives, but also works of art and monuments, evidence of the past of communities and societies settled in a specific territory. On February 1944, 15, Montecassino Abbey was bombed by the Allies as part of the bombing campaign on the Gustav Line. It suffered irreparable damage and was reduced to ruins. The involvement of a site of historical and artistic interest in the bombing was caused by different reasons: on a material level, the desire to control a crucial territory in the conflict and to occupy a site that had become a stronghold for the Germans; on a moral level, the desire to demonstrate the Allies' determination to achieve the goal at any cost and despite any impediment. The bombing of Montecassino, a treasure chest of culture and an identity monument for an entire territory, had a high symbolic meaning: the same value that its reconstruction was destined to take on in the same architectural lines existing before the destruction. Thanks to the synergy between various institutions and regulatory initiatives aimed at its reconstruction, the abbey has returned to its splendor, as a model of resilience as well as beauty.

Keywords: war, Montecassino Abbey, resilience, cultural heritage.

1. The destructive force of war

Wars have the extraordinary ability to erase, with equal destructive force, not only human lives, but also works of art and monuments, evidence of the past of communities and societies settled in a specific territory. In this way, thefts and illegal contracts are not the only enemies of the cultural heritage. Sometimes wars eradicate the roots of a population, destroying historical, artistic and cultural heritage. The damaging effect of a war is incredible. History testifies that wars always involved the destruction of cultural heritage: a building can be an economic or military target; more often, the artistic and cultural heritage, which today we appreciate for its aesthetic value, is intrinsically a political target. Monuments are the most significant symbols of power. So the destruction of a monument is the first step to destroy the past.

The financial implications of these activities are disconcerting: they may be difficult to assess. They included the high cost of repairs, restorations and reconstructions. All over the world, this consideration is under the eyes of everyone. In this way, the enormous costs of repair or replacement has been used by those responsible for the cultural heritage to try to persuade decision-makers of the real cost of a preventive planning, where it's possible. Of course, both war and natural disasters make it difficult to estimate the risks of the event and the costs of prevention.

In Italy the consequences of the Second World War on the artistic treasures were incredible. During the Second World War, deprivation and destruction of the documentary, artistic,

monumental patrimony were without precedent. First of all, the importance assumed in the military strategies by the bombings, often indiscriminate, must be considered. In addition, more than a million are estimated to be the number of works of art, many belonging to Jewish families or institutions, object of kidnapping by Nazists. Allied governments soon became aware of this robbery. With the London declaration of 1943, every "robbery" of works of art and sciences was declared interdicted, even if carried out through operations, formally, legal. [1]

The destructive impact of the bombings was only the final shock.

On February 1944, 15, Montecassino Abbey was bombed by the Allies as part of the bombing campaign on the Gustav Line. As it's known, the Gustav Line divided the national territory into two parts: the South, under the control of the Allied forces, and the North, still in the hands of the German army and the Social Republic. From January 1944, to overcome the German defenses, the Anglo-Americans concentrated their attacks on Cassino and after they decided to bomb the Abbey of Montecassino. The bombing was motivated by the belief that the abbey was occupied by German troops. [2]

On February 15, 1944 the bombing began.

The central role of the Montecassino Abbey was motivated both by the belief that the abbey was occupied by German units and it was used as an observation point, and by the fact that the famous Abbey was in a strategic position, useful for being able to advance and enter finally in Rome. On 15 February 1944 the bombing began but the war operation was long and it lasted until May 1944. Between 17 and 18 May, the Allied forces launched a fourth air attack on the Abbey of Monte Cassino. This bombing sets the stage for the final land attack.

The loss of human life was enormous, but the destruction of the architectural, artistic and cultural heritage was equally considerable. The Montecassino Abbey suffered irreparable damage and was reduced to ruins. [3]

Certainly, the involvement of a site of historical and artistic interest in the bombing was caused by different reasons: on a material level, the desire to control a crucial territory in the conflict and to occupy a site that had become a stronghold for the Germans; on a moral level, the desire to demonstrate that the Allied were determined to achieve the goal despite any impediment.

The bombing of the Montecassino Abbey during the Second World War is one of the darkest and most controversial events of the conflict. This tragic event sparked a wide interest among historians and academics, aimed at revealing and understanding its historical, cultural and human implications.

Founded in 529 by San Benedetto da Norcia in an area where in the past there was a temple dedicated to Apollo, it had been the place where the famous *Regula* was composed and had soon become the cradle of Western monasticism. In its thousand-year history, the Abbey of Montecassino had already been destroyed: the first time in 577 by the Lombards; in 883 it had to suffer the assault of the Saracens; in 1349 there was a violent earthquake that caused its destruction. The destruction carried out by the Allied forces was the fourth time of the destruction. [4]

The national and international reactions aroused by the destruction of the Abbey of Montecassino were very strong. It asked questions that continue to question us. Who should have protected that chest of priceless treasures? How could such an important testimony to the past be secured during a conflict? Could the attacks carried out by the Allies against the Abbey be considered necessary?

These questions animated public opinion and, beyond the positions taken, there is no doubt that that event strengthened the determination of the Italian Resistance to fight the Nazi occupation. For their part, the Allies defended the legitimacy of their attacks by arguing that it stemmed from German forces using it as a defensive position, making it a legitimate target.

The debate concerned war and, particularly, the use of military force against cultural and religious objectives. Eighty years ago, the answer was conditioned by a main urgency: the repair of the damage that had been caused by the war. The damage had to be repaired: it could rightly be considered very serious and irreparable. The war had erased an extraordinary testimony of history, it had taken away a treasure of inestimable value.

2. The civil function of rebuilding

The bombing of Montecassino, a treasure chest of culture and an identity monument for an entire territory, had a high symbolic meaning: the same value that its reconstruction was destined to take on, using the same architectural lines existing before the destruction.

After the war's shock there is always a great choice to do. It was between the preservation of what remains and the reconstruction of what is destroyed, falsifying historical identity. As a consequence, the choice to define normative tools to redesign, restore and reconstruct is not neutral but rich of consequences.

Moreover, after the destructive effect of war, an increasing interest is focused on historical monuments: they are real witnesses of the past that shouldn't be deleted. In this way the post-war reconstruction stimulated the study of historical sources and the expansion of archaeological research.

Monuments and works of art are considered the main historical testimony both of the past and of the war. The historical substance that has developed through the times must be preserved in all its significant parts, even in those ruined. They testify to authenticity and origin of human history involved
in the destructive event.

The restoration of historical monuments destroyed during a war must show the evolution of the work of art from the origin to the present time. The restoration of monuments destroyed by war becomes so significant because it is able to express the meaning of history: from its birth to its contemporaneity. A strong sense of responsibility is needed.

On a regulatory level, when Italy faced these problems, the «Carta del restauro dei monumenti» was in force. In 1932 the Superior Council for Antiquities and fine Arts had issued it: the first Italian official law about restoration. A year earlier, similar principles had been codified in Athens. According with it, the purpose of the restoration must be to preserve public and private works of art and monuments.

The Italian Carta aimed at the careful conservation of historical buildings giving real importance to the care of them. All the elements having an artistic or historical value must be kept without any elements being excluded. The principle of stylistic unity didn't have to be followed. This resulted in the refusal of selective removals and new rebuilding. All kinds of demolition were banned. It was necessary to act in a not invasive way. Added elements must have a character of bare simplicity. They must be designated either with material different from the original one or with the adoption of development frames or with the application of acronyms or epigraphs that verify and give information on the restoration work carried out. [5]

All the principles responded to a single purpose: to preserve the authentic historical meaning of the work of art.

This was the legal framework that still exists at the end of the second world war, but was it really respected?

Referring to the case of Italy, in its preface to the «La ricostruzione del patrimonio artistico italiano», Roberto Pane remembered: «abbiamo spesso sentito ripetere, specie dagli stranieri, che un paese come il nostro, così eccezionalmente ricco di opere d'arte, non avrebbe mai dovuto entrare in guerra; [..] ed altrettanto vero è che, se l'Italia si trovò militarmente impreparata, a maggior ragione essa fu impreparata ad attuare, con quella larghezza di mezzi e tempestività che la guerra imponeva, una completa e valida protezione del suo tesoro di arte e di storia». [6]

In 1947 the publication of the collection «Cinquanta monumenti italiani danneggiati dalla guerra» produced a real alarm for the Italian monuments damaged by the war. Both in Italy and everywhere, the image of devastation made it plausible to think, before so much ruin, that there was no possibility of recovery. Yet, in spite of the tragic situation, in 1950 Pane wrote: «dinanzi a quanto invece è stato fatto vi è ragione di chiedersi con meraviglia in cosa può mai essere consistito questo restauro dal momento che tutto in talune fabbriche appare esattamente com'era». [7]

Despite the high-level of Italian theoretical elaborations and rules, the framework of destruction that was achieved during the Second World War imposed hard solutions. The prevailing operative choice of restoration was in favour of analogical falsification. The regulatory limits set by the Charter of the restoration were incompatible with the situation occurred after the end of the war. The tools of the philological restoration included precise interventions and excluded the possibility to rebuild.

These limits were unthinkable in a condition that required the recovery both of monuments of great historical value and works of inferior artistic value but fundamental for popular affection. The theoretical validity of the 1932 Carta was not in doubt: those rules continued to be valid. However, throughout Europe, the hugeness, gravity and urgency of the damage created a strong gap between theory and practice, between norm and facts. Overcoming the thesis of the philological restoration, the new trend opposed the "old" to a "new contemporary".

The effects of the War, on the other hand, had attributed to the restoration a new aim. Usually, restoration was born from the desire to restore the primitive aspect of a work of art. Almost always, cultural heritage was neither mutilated nor in need of urgent intervention. On the contrary, after the war, a new request was born: it was necessary to save the ruins of precious forms of the past, which were part of «una grande sinfonia […] elementi di un tutto unitario ed organico». The efforts to restore the great simphony had been imposed by the «imperiosa necessità, anche a costo di compromessi che hanno rischiato di non essere del tutto conformi alle norme del restauro moderno». [8]

In some cases, the choice was to reintegrate the pre-existing forms and the most ancient structures eventually found. The restoration of the Basilica of Santa Chiara in Naples is an example. The previous formulation of the monument, in fact, had greater qualities than that destroyed. The intervention involved the restitution of the primitive aspect. This intervention was justified by the exceptional nature of the situation. The church, dating back to 1328 and originally built in Gothic-Provencal forms, had been extensively renovated in 1735 in Baroque style by Domenico Antonio Vaccaro. The building, hit by the Allied bombs in 1943 and devastated by a fire that lasted three days, completely destroyed the Baroque decoration, reviving many 14th-century structures, which were consolidated and integrated. [9]

Despite the problematic choices made from time to time, in Italy and in the other countries, the restorations became the tools through which recover the identity of a destroyed country. Rebuilding had a civil function: to save ruins, witnesses of the past. Restoration didn't satisfy an aesthetic aim, a need for taste, a cultural predilection. The monument, the work of art should not be preserved for its functionality: certainly it would have been much easier to break down churches and buildings and build new ones.

3. Law supports the reconstruction

The challenge imposed by the destruction was very different: the work of art, even if reduced to fragments, testified to the history and claimed to remain alive. Therefore, despite the limits imposed by

the normative framework, a greater force was required. The hard choice between the preservation of what remains and the reconstruction by falsifying historical identity took place with the prevalence of the second choice on the first. The destruction caused by the war imposed a forced solution, necessary to rediscover the roots of a lost identity, to repair the wounds of a lost soul. It was not a matter of saving the individual good, the work of art, that could be the purpose of a law. It was the tool to save cities, environments and places and to give this heritage to resilient people.

Thanks to the synergy between various institutions and regulatory initiatives aimed at its reconstruction, the Montecassino Abbey has returned to its splendor, as a model of resilience as well as beauty. [10]

After the end of the war, Abbot Ildefonso Rea headed the project to rebuild Montecassino exactly where it was before, in all its former glory and to bring back all the precious objects and documents that had been kept in the Vatican during the war.

As we read in the "Report of the Commission for the Study of the General Plan of the reconstruction works of the Abbey of Montecassino", it was agreed that the abbey should be rebuilt with the same architectural characteristics and in the same exact point as the previous one, "where 'it was-as it was and in the pre-existing architectural and volumetric lines".

The financing of the works, in agreement with the Holy See, was supported by the Italian State and also thanks to some donations from private individuals. So, the role of national institutions in the reconstruction of the Abbey of Montecassino was very significant. The Italian government played a central role in coordinating the abbey's reconstruction efforts.

In 1948, a census was carried out of the countries devastated by the war that fell within the vast area defined by decree no. 688 of 2 April 1948, called "Zone of the Battle of Cassino".

The Ministry of Public Works also drew up a percentage of destruction of the towns and entrusted the execution of the extraordinary works plan to E.RI.CAS.

This organization - under the guidance of the Ministry for Public Works - conceived a complex program of works with the sole purpose of repairing the torn fabric and allowing local communities to start living again.   The reconstruction work lasted 20 years and ended with the rededication of the basilica.

The new Abbey was consecrated in 1964 by Pope Paul VI.

The history of the Abbey of Montecassino demonstrates how serious the consequences of conflicts can be and how hard and long the reconstruction work can be. Furthermore, the wound opened following a war event cannot be healed and even in this case the goal must be prevention.

For this purpose, in 1954, the Convention for the protection of cultural heritage in the event of armed conflict was stipulated. It was ratified in 1958 in Italy and its overall content draws attention to the importance of preserving cultural heritage in armed conflicts: a primary, fundamental, unavoidable need.

So, the reconstruction of the Abbey is an extraordinary example of resilience: a significant symbol of the historical, artistic and religious heritage was returned to the people after the devastation of the war. Its reconstruction was an example of hope, resilience and it shows how men can be capable of the most total devastation and the most beautiful rebirth.

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Innovative Policies for Sustainable Development: Learning from Organic Farming Leaders

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Abstract

This study explores the contributions of pioneering organic farming leaders—Masanobu Fukuoka, Albert Howard, Bhaskar Save, Rudolf Steiner, and Eve Balfour—in promoting sustainable development. By aligning their practices with the United Nations 2030 Sustainable Development Goals (SDGs), the study highlights the relevance of organic farming in achieving global sustainability. The paper discusses key principles and practices of these pioneers and offers policy recommendations to support sustainable agriculture. Importantly, it also emphasizes how the holistic and mystical approaches of these pioneers—rooted in a deep connection with nature and spiritual understanding of ecological balance—are essential in today's world for combating climate change and ensuring a sustainable future for coming generations. By integrating these profound philosophies into modern agricultural practices, we can create resilient, productive, and environmentally sustainable systems that support both human and planetary health.

Keywords: Sustainable Development, Organic Farming Leaders, Sustainable Development Goals (SDGs)

1.   Introduction

Sustainable development is a core objective of the United Nations 2030 Agenda, aiming to harmonize economic growth, social inclusion, and environmental protection (United Nations, 2015). Among various strategies to achieve these goals, the integration of organic farming practices plays a crucial role. This paper explores how the pioneering work of organic farming leaders aligns with and supports the Sustainable Development Goals (SDGs). In the face of rapid environmental degradation and climate change, their philosophies offer valuable insights. Fukuoka's concept of "do-nothing farming" and Steiner's biodynamic methods, which incorporate spiritual and ecological principles, promote a profound respect for natural processes and biodiversity. These approaches are not merely about avoiding synthetic chemicals but are rooted in an understanding of the interconnectedness of all living systems. This holistic perspective is crucial as it encourages practices that enhance soil health, sequester carbon, and increase resilience to climate extremes (Fukuoka, 1978; Paull, 2011). Moreover, these pioneers' methods align with the growing movement towards regenerative agriculture, which seeks to restore and enhance the ecosystems that modern industrial agriculture has depleted. By prioritizing soil health, water conservation, and biodiversity, organic farming practices can significantly mitigate the impacts of climate change. For instance, the increased soil organic matter from these practices enhances the soil's ability to retain water and sequester carbon, thus playing a critical role in climate adaptation and mitigation (Gamage et al., 2023; Balkrishna et al., 2023).

2.   Methodology

Recent literature emphasizes the role of sustainable agricultural practices in achieving the SDGs. Organic farming has been recognized for its potential to enhance food security, environmental health, and social well-being (Altieri, 1995; FAO, 2018). Studies from 2022 to 2024 have documented the contributions of organic farming pioneers in promoting soil health, biodiversity, and sustainable livelihoods (Gamage et al., 2023; Panday et al., 2024; Balkrishna et al., 2023). This study employs a qualitative approach, analyzing the contributions of key organic farming pioneers through a review of their seminal works and related literature. The analysis focuses on their alignment with the SDGs and their implications for sustainable development policies.

3.   Organic Farming and Sustainable Development

Organic farming is intrinsically aligned with several SDGs, including Zero Hunger (Goal 2), Good Health and Well-being (Goal 3), Clean Water and Sanitation (Goal 6), Decent Work and Economic Growth (Goal 8), Responsible Consumption and Production (Goal 12), Climate Action (Goal 13), and Life on Land (Goal 15) (FAO, 2018; Panday et al., 2024). The practices and principles developed by organic farming pioneers provide a foundation for policies that promote sustainability across these goals.

Masanobu Fukuoka's Natural Farming; Fukuoka's natural farming methods, detailed in "The One-Straw Revolution," advocate for minimal human intervention (Fukuoka, 1978). His principles emphasize natural processes to maintain soil fertility and control pests, reducing dependency on external inputs and supporting ecosystem balance (Kassam et al., 2011). Recent studies highlight the significance of such approaches in improving soil health and resilience against climate change (Gamage et al., 2023).

Albert Howard's Soil Health Advocacy; Howard's work on soil health and composting, particularly his development of the Indore Method, has been instrumental in promoting organic farming practices worldwide (Howard, 1943). His emphasis on the "Law of Return" has been fundamental in maintaining soil fertility and health (Pretty, 2002). Howard's advocacy underscores the importance of maintaining foundational agricultural elements (Scialabba & Müller-Lindenlauf, 2010). Recent research supports the long-term benefits of composting and organic soil amendments in sustainable agriculture (Balkrishna et al., 2023).

Bhaskar Save's Integration of Traditional Knowledge; Save's farm in Gujarat, India, is a model of sustainable agriculture, combining traditional knowledge with modern organic practices (Save, 2008). His emphasis on water conservation, soil health, and biodiversity has made his farm a benchmark for sustainable practices (Shiva, 2012). Recent studies have further validated the effectiveness of traditional and organic methods in enhancing agricultural sustainability (Sangeetha et al., 2023).

Rudolf Steiner's Biodynamic Farming; Steiner's biodynamic farming methods incorporate spiritual and ecological principles, viewing the farm as a holistic organism (Steiner, 1924). His biodynamic preparations and emphasis on lunar and cosmic rhythms in farming have contributed significantly to organic agriculture (Paull, 2011). Steiner's holistic approach continues to be relevant in modern sustainable farming systems (Reeve, 2023).

Eve Balfour's Soil Association and Advocacy; Balfour's work in the UK, particularly through the Haughley Experiment and the Soil Association, has provided scientific validation for organic farming (Balfour, 1943). Her advocacy for soil health and holistic farming practices has influenced global organic standards and policies (Woodward et al., 2004). Recent advancements in organic farming standards and practices continue to build on her legacy (Jeyabalan, 2022).

4.   Policy Recommendations for Sustainable Development

Drawing from the principles and practices of these organic farming pioneers, several policy recommendations can be made to align with the UN 2030 Development Goals:

1. Support for Organic Farming: Governments should provide financial incentives and technical support to farmers transitioning to organic practices (IFOAM, 2016; Panday et al., 2024).
2. Research and Innovation: Investing in research on sustainable farming techniques and soil health can lead to improved practices and increased resilience (Lal, 2004; Sangeetha et al., 2023).
3. Education and Awareness: Raising awareness about the benefits of organic farming among consumers and policymakers can drive demand for organic products (Lotter, 2003; Balkrishna et al., 2023).
4. Water Management: Implementing policies that promote water conservation techniques can enhance water sustainability in agriculture (FAO, 2011; Gamage et al., 2023).
5. Climate Action: Encouraging practices that improve soil carbon sequestration and reduce greenhouse gas emissions can mitigate climate change (Lal, 2004; Sangeetha et al., 2023).
6. Biodiversity Conservation: Policies that promote the preservation of biodiversity on farms can enhance ecosystem resilience (Altieri, 1999; Balkrishna et al., 2023).

5.   Conclusion

The holistic and mystical approaches championed by organic farming pioneers such as Masanobu Fukuoka, Albert Howard, Bhaskar Save, Rudolf Steiner, and Eve Balfour are increasingly relevant in today's efforts to combat climate change and protect the planet for future generations. These pioneers emphasized a deep connection between farming practices and the natural world, advocating for methods that work with, rather than against, nature. The spiritual and holistic elements of organic farming also contribute to the broader cultural and ethical dimensions of sustainability. They foster a sense of stewardship and responsibility towards the earth, which is essential for mobilizing collective action to address environmental challenges. This perspective encourages sustainable consumption and production patterns that are vital for achieving the Sustainable Development Goals (SDGs) and ensuring the well-being of future generations (Shiva, 2012; Panday et al., 2024). Their contributions align closely with the UN 2030 Development Goals, offering strategies for promoting sustainability (United Nations, 2015). By adopting these practices and principles, policymakers can support sustainable development and contribute to a healthier, more resilient planet.

Further research and innovation in organic farming practices will be crucial in addressing climate change, resource depletion, and food security. By building on the foundational work of these pioneers and integrating modern advancements, sustainable agricultural systems can meet global needs while preserving planetary health (Panday et al., 2024; Jeyabalan, 2022).

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3D survey and drawing of an architectural artifact: methodologies, studies, and innovative applications

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Abstract
The Research draws from the activity conducted in recent years as the Supervisor and Co-Supervisor of numerous theses on the topics of drawing and representation, with particular focus on the use of new technologies used for the survey of architectural artifacts and the processing of the data collected. This contribution will report on the methodology tested to automate the return of data, that is, to speed up the process of redrawing from point clouds. A case study surveyed with remote sensing techniques will then be reported. It is also an opportunity to reflect on the advantages of using remote sensing techniques and the potential offered by the methods for representing the surveyed assets.

Keywords: Technologies, Architectural survey, APR, Point Clouds

## 1.	Introduction

New surveying techniques that speed up the execution and production phases of the documentation have become fundamental over the years. The discipline of drawing constantly follows technological developments with a view to considering instrumentation as a prosthesis of the Surveyor. Remotely Piloted Aircraft APRs can be used in a variety of areas, such as architectural surveying, topographical surveying, inspections, surveys of agricultural land to identify diseased plants, surveys to analyze heat dispersive sources in buildings, seepage, deterioration, damage to buildings, and with some models it is possible to use them in civil defense due to special features with which they are equipped.

The advantages can be many, for example in architectural surveying there is the possibility of surveying any building in significantly reduced time compared to the traditional method.

In flight there is the possibility of acquiring all the information necessary to be able to carry out an accurate survey, and in addition, the photographic documentation helps the technician, in the post-production phase, in the elaboration of the graphic tables.

Also to carry out a field survey of a terrain, the drone can be used with appropriate features both mechanical and photographic, of a landing pad "H" for departure and landing and if 'necessary a rover and gcp (ground control points) to acquire some points on the ground for proper georeferencing of the survey.

2. Methodologies and tools

There are different types of cameras for Drones, for example some of the latest models from DJI, with specific features and intended uses. The DJI Mavic 3T model, is equipped with 3 sensors: wide-angle sensor with 4/3 and 20 MP CMOS, a 12 MP zoom camera, which supports a maximum hybrid zoom of 56×, so you can see every detail from any distance and a thermal camera with a resolution of 640 × 512 that supports point and area temperature measurement, high temperature alerts, color palettes and isotherms to help you find your targets and make quick decisions especially if it is used in civil defense.

This model, is a photographic instrument can be used for architectural and topographical surveys thanks to its GPS; but its strong point is the thermal camera that offers the possibility of analyzing factors that cannot be analyzed with the naked eye.

The Thermal Camera Drone has advanced features to perform an analysis thermography that is accurate and detailed.

Parameters:

1. Distance: an infrared camera generates thermal images by receiving infrared radiation from objects. The further away the object is, the more the radiation is attenuated. The default calibration distance of the camera is generally set during production. This is the distance at which temperature measurements are most accurate. Being too close or too far away will result in larger measurement errors.

2. Relative humidity: you have to configure this parameter according to the actual environmental conditions. The default value 70 means the relative humidity is 70% and the range is [20~100]. Humidity configurations could affect the measurement result, but the effect is limited.

3. Emissivity: how strongly the target surface is emitting energy in the form of thermal radiation. Emissivity configurations could have a significant impact on the measurement result.

4. Reflected temperature: the surface of the target being measured could reflect energy radiated from surrounding objects. This reflected energy could be picked up by the camera along with the radiation, which could cause an error in the temperature reading. If there are no objects with extremely high or low temperatures nearby, set this parameter as room temperature. Reflected temperature configurations could affect the measurement result, and the greater the difference between the reading and the ambient temperature, the greater the impact.

Fig. 1: Vertical Mission Front Facade

3. The case study

The case study was treated as part of a thesis in Civil Engineering, conducted by student Aldo Calcaterra, and was an opportunity to prepare a new approach to the methodologies of redesigning surveyed assets. This is a masonry building located in a municipality in the province of Naples, where the property chose to carry out a facade restoration.

The building under study dates back to the last decade of the 1800s and has a central courtyard and a large garden in the back side.

In order to carry out an accurate survey and saving both money and time, a Drone with GPS was used, which has the characteristic, to connect to GNSS (Global Navigation Satellite System) systems.

Fig. 2: Horizontal Mission Orthogonal

3.1 Description of the survey steps

The first stages of the field survey consisted of making an initial inspection of the site and then in making sure that the operational space was not obstructed by flight impediments and any antennas that could disrupt the transmission from the controller to the drone.

It was then verified that it was possible to use the APR by first checking whether the area is restricted. The APR can fly at a maximum height of 120 meters and must always be flown visually by the operator.

Before a flight, a pre-flight checklist should be made to increase the safety of the operation.

considered all parameters that can cause problems, e.g., hardware, environment, sensor parameters, command response.

The model checklist to be carried out before each mission to reduce possible risks includes:
1. Wind speed and direction.
2. Visibilitỳ conditions (VMC: Visual Meteoroological Conditions).
3. Verify that the flight area has no restrictions or prohibitions (Described above).
4. Integrity check, mounting and securing of propellers.
5. Camera lens cleaning.
6. Locating persons unrelated to operations, obstacles on the ground, overhead power lines and
antennas or repeaters.
7.Checking radio link quality and possible interference.
8.Waiting for GPS signal and evaluating the amount of satellites engaged.

9.Checking drone and controller battery charge.

10.Checking and recalibrating compass and IMU (Inertial Measurement Unit) if necessary.

11.Engine start-up, take-off and control response check.10.Checking and recalibrating compass and IMU (Inertial Measurement Unit) if necessary.

Having verified the check list listed above, one must plan the mission, either in the case of an automatic flight or a manual flight.

Automatic flight is very useful in topographic but also architectural surveys when flying with a camera perpendicular to the ground (rotated 90° from the initial position) for mapping the entire area from above.

The settings for the automatic mission are made through the radio control app where fundamental parameters can be set for the correct mapping of the site.

In our specific case, it was decided to adopt a manual mission with vertical flight and a manual or automatic mission with horizontal flight.

Mission planning consists of implementing a flight plan to cover the entire building both planimetrically and vertically for each facade.

First, the camera settings need to be acted upon to ensure optimal data acquisition and then the Drone settings.

Since the APR has its own internal GPS with reference system in WGS84, each photo we are going to take will have its own geographical position.

For vertical flight, several parameters were set: best resolution, continuous shooting with 3-second interval, orthogonal position of the camera with respect to the facade of the building being surveyed, path to be followed.

For this type of mission, a path was chosen starting from one end of the main façade, starting from the bottom to the top and vice versa and then arriving at the opposite end of the same façade [1]; following the completion of the main façade, the same methodology was adopted for the other three façades using the same method.

The number of verticals to be covered is given by the distance of the Drone from the building and the focal length of the camera.

In order to perform an optimal survey, photos must be taken with an overlap of 70/80% from the previous and the next photo, while at least a 50% overlap on the previous and the next vertical. Once the mapping of the four facades was completed, a nadir flight was made, with the same camera settings but at a 90-degree angle, to cover the entire site on which the building is located. [2]

4.   Processing and reprocessing of data

In order to proceed with data processing, Agisoft Metashape software was used, which enables photogrammetric processing of digital images and generation of 3D spatial data. It can also be used for GIS applications, documentation of cultural heritage, as well as indirect measurements of objects of various scales.

In the first stage in Metashape, common points on photographs are searched for, camera position is calculated determined for each image taken, and camera calibration parameters are refined.

As a result it generates a sparse point cloud and a set of figure positions [3].

The scattered point cloud represents the result of aligning the photos and is the first step to proceed with the reconstruction of the 3D model.

For the location of the building on the cartography, to georeference according to coordinates, it is necessary to use a gps or total station of the targets, called gcp (ground control points), which are placed strategically around the building. Then the relevant coordinates are measured with the topographic instrument.

This technique was implemented within the software to optimize the survey performed by drone and provide additional accuracy to the project.

The next step is the construction of a dense point cloud. Based on the estimated camera shooting positions and the sparse cloud, the software generates a dense point cloud. The latter, can be edited and classified before an export task or before the generation of the 3D model mesh.

Once the dense cloud is generated, we will already have at least a visual effect of the "final" result of the survey performed. The dense cloud appears as per the figure below. [4]

The third step involves the construction of the mesh; a 3D polygonal mesh representing the object is made, based on the dense cloud of points obtained from the calculation of the measurements taken from the surface of the photographed object. There is also a method based on a sparse cloud of points for faster generation of the geometry.

A digital elevation model (DEM) can be generated, which can be rasterized from a dense point cloud, a sparse point cloud, or a mesh. In addition, contour lines can be calculated for the model, and displayed within the software itself either on DEM or in Orthomosaic in Ortho view. Export to Orthomosaic is normally used for generating high-resolution images based on the source photos used for the reconstruction model. Metashape allows editing of the joining lines of the orthomosaic to achieve better visual results. The software allows the orthomosaic to be projected onto a plane set of your choice, as long as mesh is selected as the surface type. To generate the orthomosaic of a planar projection, the desired Projection is chosen in the dialog box. [5]

Fig. 3: Scattered point cloud of the Masonry Building

Fig. 4: Dense point cloud Masonry Building

Fig. 5: Orthophoto North elevation

5.   Processing of the template for drafting the drawings.

Once all the material described above was generated, it was decided to export the files needed for processing using drawing/modeling software.

The files needed for further processing are the dense cloud, the Dem and the various orthophotos generated in the various views. The dense cloud is exported to a file with a ".las" extension, this format contains LIDAR (light and distance sensing) data stored in binary format. This format is the result of efforts to standardize LIDAR data formats undertaken by ASPRS (American Society for Photogrammetry and Remote Sensing).

This type of file with a .las extension greatly simplifies the exchange of information between providers and receivers. The introduction of the LAS format has enabled the simplification of the complexities inherent in LIDAR data

It stores the data collected by the light sensors. The sensors illuminate the target with light laser and measure the reflected and scattered light to generate a three-dimensional image of the targeted object. This method is commonly used to create accurate terrain maps. In order to proceed with importing the point cloud into Autocad or Revit drawing software, one must first import the file, "Masonry building.las, into the Autodesk Recap software," in which one can clean up the cloud of excess points, which may interfere with the proper drafting of the drawings.

Having completed the cleaning of the trouble points, the file was exported in the ".Rcs or .Rcp" format

in order to import it into Autocad.

Once the point cloud of the interior design was imported, we proceeded with 2D graphic processing, and then with the drawing of plans, elevations and sections [7] [8] [9].

6.   Automating the redesign

In writing the thesis, one of the goals was to seek a method for automating the 2D restitution of the surveyed architecture with the aim of reducing the time required for processing and drafting the plans.

Due to an oversize issue, the procedure involves processing individual portions of the building under study, such as one elevation, section, or floor plan at a time.

In the case of the building under study, the procedure for returning the dwg starts after processing the 3D model. [8]

We proceeded with the sectioning of the various elevations or details, and then generated a mesh such that a high degree of detail could be achieved, generating a file that was smaller in size and more manageable.

Once the 3D mesh was generated, the model was exported in .dxf format so that it could be imported into autocad.

With the creation of a mesh, interpolated 3D triangulations between them are generated such as to generate, with high detail, the restitution of demarcation lines of elevations and its decorations, if any.

The elevation under consideration is the front elevation, which, once imported into the modeling software, has a graphical representation as in figure [10].

By dissecting part of the cloud, particularly the one related to the 'entrance door, it is possible to analyze the detail and subsequently evaluate any changes to the lines generated in the dxf model.

The lines represented are three-dimensional, so they may have graphical errors being placed in a perspective view.

One command that you can use to zero the dimensions and eliminate any errors in the representation, is the "Flatten" command, which transforms the 3D model to 2D by 'flattening the z-axis.

The detail of the entrance door, with graphical errors due to overlapping lines, looks as in the figure. [10].

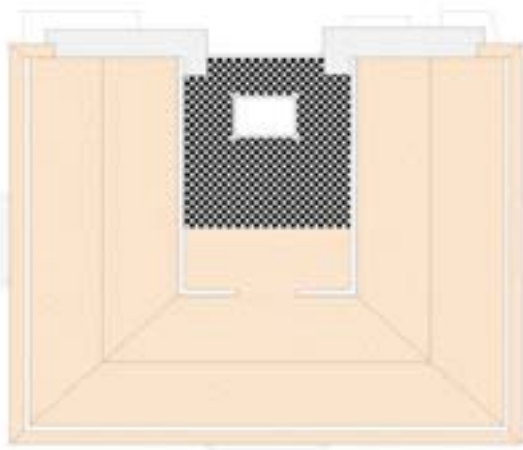Once the excess lines are removed, a perfectly measurable and editable.

Fig. 6: Plan of roofing and **Fig. 7:** North Elevation

Fig. 8: 3D Textured Model Masonry Building

7.   Conclusions

This paper presented the results of a broader Research that aims to investigate possible simplifications in the area of architectural representation and drawing. With technological development, in the area of Drawing it may become interesting to delve deeper and find solutions that help the surveyor in speeding up the representation while always leaving the primacy to the mind. All these tools represent only the prostheses of the surveyor who continually enriches his toolbox.
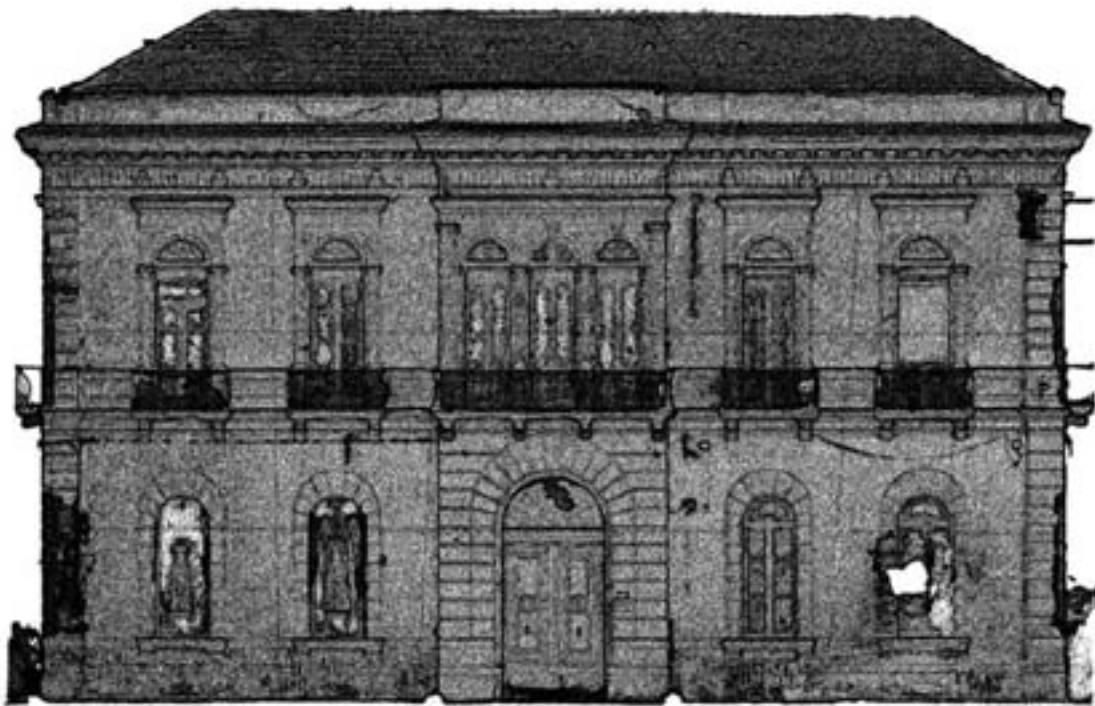
Fig. 9: Mesh in dxf format of the Front Elevation
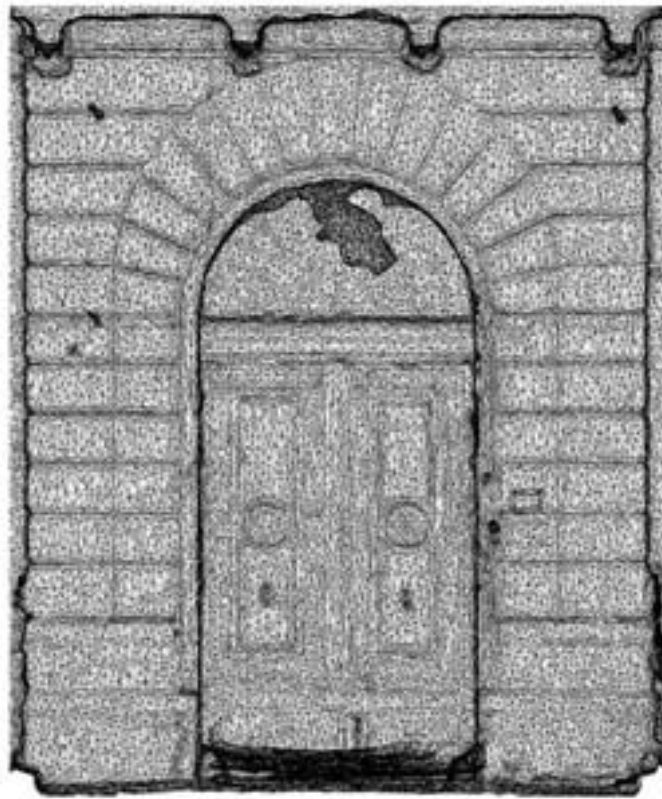
Fig. 10: Mesh in dxf format of the front door

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Internet of things and Artificial IntelligenceTechnologies Preserve Cultural Heritage

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Abstract (Arial – 12 pt – Lower case letters - Bold – left aligned)
The novel Information technologies become a strong booster of the progress. The synergy of Internet of Things and Artificial Intelligence can be helpful tools to study, conserve, protect and popularize the Cultural Heritage.
The power of Artificial Intelligence paradigms in solving problems is shown, using Expert systems, Neural Networks and Robotics.
The interaction between Internet of Things and Artificial Intelligence is illustrated with case study in the Cultural Heritage domain.

Keywords: Artificial Intelligence, Cultural Heritage, Internet of Things

1. Introduction

The process of a study, conservation and protection of the Cultural Heritage (CH), in its aesthetical and rational aspects, is fully dependable on the professional skills, knowledge and expertise of the scientists, who are involved in this process. Reaching the proper productive level of the mentioned skills is a question of an evolutionary process, which is time consuming. On the other hand the knowledge, which is relevant to the CH processes is mostly not formalized and empirical. To this the aesthetical categories have to added, which are generally not formalized as well. Thus, it is obvious the difficulty to cohere and to implement these two aspects of the processes   in   the   CH   in   one   not   contradictive system. The advancements in information technology and especially the Artificial Intelligence (AI) and Internet of Things (IOT) technologies are an opportunity for a successful solving of these problems.

2. AI paradigms

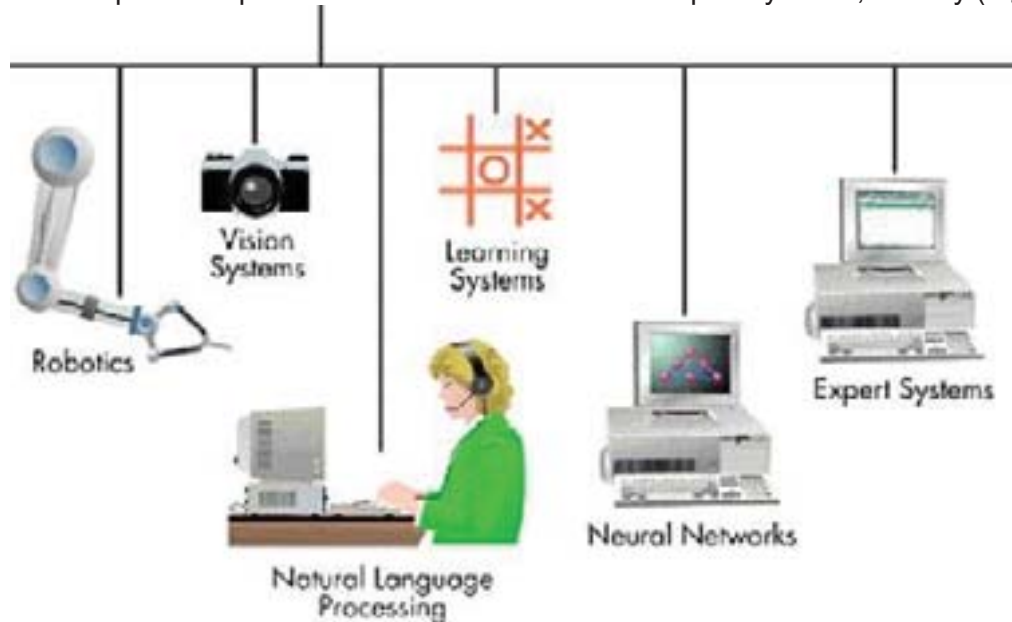The scope of AI spreads from the Robotics to the Expert systems, namely (Fig.1):

Fig. 1: Artificial Intelligence scope

- Robotic systems – designed to automate the rule-based tasks in the way of which it is done by humans
- Vision systems – the ability of the computers to identify objects and actions in real images
- Natural language processing – the ability of the computers to understand written text
- Learning systems – the ability of the computers to discover and predict events, using trial and error methods
- Neural networks – designed to implement the learning process, mimicking human's brain activity
- Expert systems – designed to collect the expert knowledge (in certain domain) inferencing answers to problems

The two main paradigms are in the fundamentals of the AI theory [3] :

- Symbolic paradigm, behind which are models that use organized structures of symbols, which explicitly represent aggregate information. In the basis of this paradigm are processes of information (knowledge) representation and its processing (inferencing). The most popular tool exploiting the symbolic paradigm is the Expert system.
- Connectionist paradigm, which is based on the parallel models, consisting of large number of uniform processing elements (neurons) interconnected in a network. In fact this paradigm has been inspired by the biological neural networks.

Both paradigms are providing means to process incomplete, approximate and uncertain information.

In the present paper the focus will be on the practical aspects of the Experts systems (ES), Neural networks (NN) and Robotics usage in processes of the CH study, conservation and protection.

3. Expert system approach to furniture design

The ES technology, which enables informal knowledge operation, has been proposed in order to facilitate the processes, connected with the elaboration and decision making during the study, restoration and management of the CH. [1,2, 3].

Production systems as formalism, allowing greatest flexibility in compiling the knowledge base, is used as knowledge representation method. Furthermore, the knowledge base composed of production rules is modular, so rules can be easily added or modified, which facilitates the system setting process. Thus the system can be developed, starting from solving themain task and then completing and summarising it.

Moreover setting and testing, detecting errors and debugging become relatively easy.

So briefly the advantages of the ES are as follows:

1. Operates with uncertain, incompleteand informal knowledge;
2. Operates with expert knowledgewithout volume limitation;
3. Improves the decision-makingefficiency (fast and objective);
4. Excludes errors, omissions andinconsistencies in decision making;
5. No special knowledge is required fortheir use and construction;
6. Easy and convenient updating,modifying and upgrading.

To enhance the expressive power ofthe conclusions from the knowledge describing rules, credibility factor has beenintroduced, which reflects the preferences of the consulting expert.

For the realisation of the system, introduced in the present work, an ES tools
- Rmes have been used, described in [4].

Rmes is an „empty" ES, i.e. a program making logical inferences from rules, entered by the user in the knowledge base through production rules formalism including credibility factor.

The Rmes database includes the following components: a base of rules, which can be certain or uncertain, i.e. to include a credibility factor; a base of constraints, including a list of collective exhaustive conditions (certain or uncertain); a model base, including precise mathematical models or a model built on uncertain relations; a graphic base, including a list of graphic files, corresponding to rules or models.

The applicability of this approach and the uncertain knowledge processing technology with the help of Rmes ES has been illustrated with the following example: selecting material for chair production [4].

It is assumed that the ES, advising the user (developer or chair designer) about the material to be chosen, will evoke in him associations for additional conceptual options for the prospective chair.

According to the ES development stages described, the process starts with task formulation and conceptualisation, within which a meaningful analysis of the subject area has to be made, the goals, concepts and their interrelations have to be identified.

c) transformability; d) recyclability;

e) ecologically oriented; f) lightness

Shape: a) curved shapes; b) straight forms

Surface: a) glossy; b) matte; c) with texture

Colour: a) natural; b) painted The range of possible materials for

chair production includes: 1. Pine wood;

2. Beech wood; 3. Walnut; 4. Glass;

Plastic; 6. Steel; 7. Aluminium

Based on the analysis the interrelations between the requirements and the material selection target can be represented by the diagram on fig. 2.

Fig. 1: Conceptualisation of material-decision-making process for a chair

The choice of material depends on the intended purpose of the chair and this relation is described with logical OR function (in the chair specification the intended purpose can be only one: either for eating, OR for work, OR etc.).

The dependencies between the material and the other requirements are described with the logical function AND, because the chair has to meet the requirements set in the specification for price AND for shape, AND for style, AND etc. Each of the requirements options can be logically OR or AND related. For example, the price requirements options - mass, luxury, unique, are in logical OR relation, because the chair with respective intended purpose can be OR mass, OR luxury, OR unique. As for the engineering requirements, they are in logical AND relation, because according to the specification the chair (regardless its intended purpose) may be necessary to meet the requirements AND for technology, AND for ecology, AND etc.

The interrelations thus defined between the target and the requirements determine the structure of the database, which has to be filled-in with the rules – the knowledge for material decision-making choice for the designed chair.

The method used to gather the relevant knowledge is that of interviewing experts in the subject area, in our case - furniture designers. This is the most delicate part of the ES building process, because the verbal knowledge has to be extracted and then formalised. Due to the subjectivity of the extracted knowledge there is a probability to get conflicting and inconsistent information, which will have to be removed at the stage of ES testing.

According the developed conceptual scheme the expert interviewed fills-in tables with the dependencies between chair materials and requirements, assessing at the same time these dependencies with credibility factor (from - 1 to 1).

The extracted knowledge is represented as set of production rules written in the knowledge base, as follows:

IF<conditions> **THEN** <conclusion>, **CF**

Where: <conditions> are the the logic variables, which can be TRUE or FALSE.
<conclusion> is a logic variable, which value is derived from the evaluation of the condition part of the rule.
CF is a certainty factor, which is representing the credibility of the knowledge and can obtain the following values:
CF=1 – the condition is absolutely true
CF=0.5 – the condition is probably true
CF=0 – the condition is not defined
CF=-0.5 –the condition is probably false
CF=-1 –the condition is absolutely false.

Once the knowledge base is being filled-in, the ES is ready to be tested and then used. The rules verification is performed with the help of a certain number of test examples developed by the expert, which have been previously estimated and for which reliable results have been obtained. These results are the criteria for checking the accuracy of the developed ES.

The ES works in a dialogue mode, in which the user (developer/ designer) has the task to enter the requirements for the chair, according to the assigned task. For the specified requirements are that the chair should be:
for kids;
with back;
contemporary style and mass type;
-technological, ecological and lightweight;
with straight shapes, smooth surface and natural colour.

The ES gives the following recommendations (with credibility factor between -1 and 1) for the material that should be used for the chair production
Pine wood   (-0.3)
Beech-wood   (-1)
Walnut   (-1)
Glass (-1)
Plastic(0.7)
Steel (-1)
Aluminium   (-1)

The interpretation of this result is as follows:
The most preferred materials for chair with the characteristics set above are plastic (0.7) and pine wood (-0.3).
The materials rejected by the system are beech wood and walnut, glass, steel and aluminium.

It should be noted that this result is obtained within a couple of minutes, most of the time being spent by the user for entering the requirements. In this sense "simulating" different options for material selection with different requirements takes a negligible time, whilst allowing for more complete investigation.

4. Case study: Expert system supporting the choice of shaping

Same approach and tools has been used for supporting the decision for choice of the arms of chair shape [6].

Here the differences in the knowledge base construction and conceptualization will be highlighted.

The process of the conceptualization is illustrated by Fig. 3 and 4, where the interdependencies between requirements and the targets for the arms of the chair are presented in graphs of dependencies.
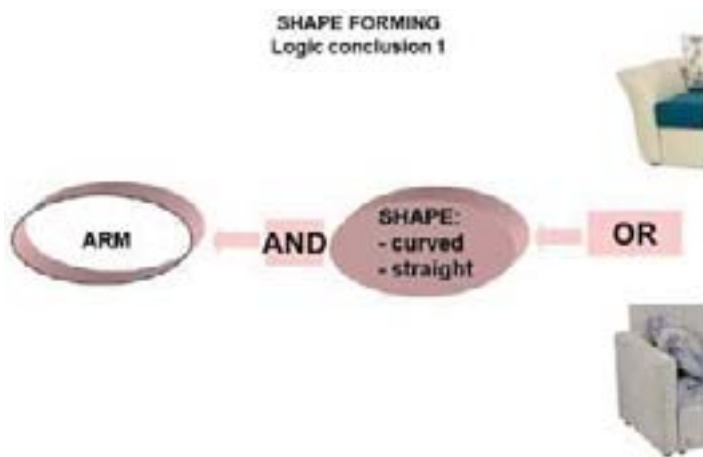
Fig.3. Interdependencies of the shape requirements

As the problem, which has to be solved concerns the shape formation, the knowledge base has to include a graphical base. This base consists of graphical file, representing digital models of different shapes, forming the chair elements (thearms in this particular case). The processof inferencing a certain model of the arm shape is governed by rules of the followingtype:
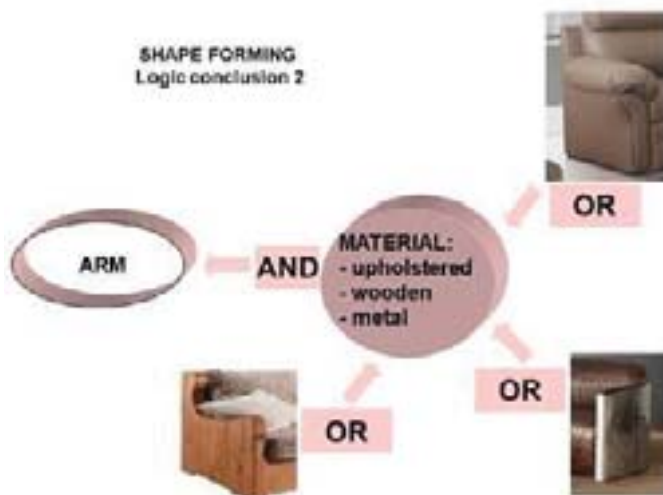

Fig. 4. Interdependencies of the material requirements

Graphics: (Rule   Number,   Modelname.bmp"),

where:
- Rule Number is a integer number of the rule, to which the Model name file is
- Model name.bmp is a name of the file, which will be activated to represent a certain shape

if the Rule is 'fired",
            i.e. its conclusion is True.
In this way the use of artificial intelligence technologies, and particularly the ES technology, allows a certain degree of
"automation" in the design process.

5.   Neural Networks approach

As it was already mentioned the artificial NN consists of a large number of processing units (neurons), which are working in parallel and coupled with weighted connections. Each neuron convert the input signals X by multiplying them with the weights W and thereafter summing. Then by using the specificoutput function the neuron is producing an output signal Y, which is propagated to next connected neurons (Fig.5). Thus the principal of the NN operation is a propagated activity of its neurons. The neurons are located in layers (the first is input layer, the last is output one and intermediate are hidden).
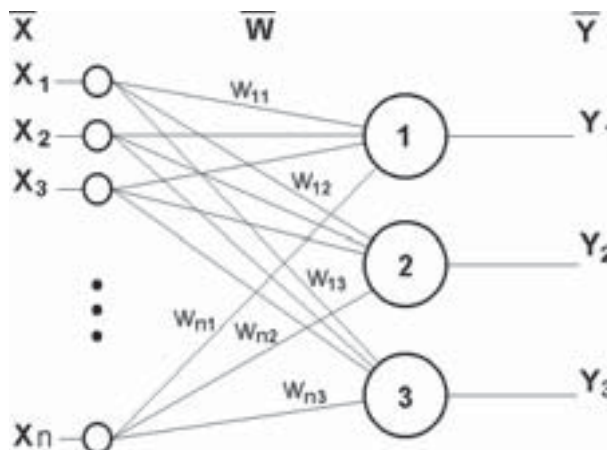

Fig.5. One layer Neural network

The knowledge in NN is presented by the weights of the connections between neurons.
The NN is operational only after it is trained by learning, which is a process of modification of weights of the connections and biases of in order to perform some task.

6.   Case Study: Neural Networks for Clustering

Clustering is applicable in many areas. It iswidely used in data mining, in which we analyze large data sets to identify similarities within subsets of the data.

It is used in city planning, when town councils apportion regions of the city into areas of similar home type and land usage.It has also been used to organize a quick access to a large bibliographic data bases to find a needed information.

We will illustrate how NN will solve the taskfor Forest cover in wilderness areas (following [7]). To collect information about the type of forest cover in such areas is expensive, as it require on-site observationor estimation of remote data. With the helpof a NN the task of separating regions withdifferent forest cover types will be solved by clustering independent data. These independent data can indicate the forest cover type, but they are easily obtained.

There are 10 independent variables, from which the NN has to derive the regions with 7 forest cover types. The 20000 observations of the 10 variables, which were considered for the cells of 30x30m.The Self-organized featured map architecture of NN with a supervised learning method has been used to perform the clustering of the independent variables. The NN consists of 150 neurons mapped in 15x10 in hexagonal configuration The result of clustering is shown on Fig.6, where with different scale of the grey colour the different forest cover types are presented.

Fig.6. Hit histogram of the trained NN

7.   Robotics

The increasing popularity of the robots, assisting humans in their everyday life is an inspiration factor for their usage in the processes of study and popularization of CH. Successful examples of such applications are presented in [8] and [9].

Here we will just mention one more possible application of the recently developed service robots - to be used as guides – assistants for disabled people, who are visiting museums/galleries.

8.   Internet Of Things for protection of Cultural Heritage

In [10] the application of IOT has beendiscussed in depth. Different approaches and components has been proposed to contribute to the process of preservation, restoration and management of the CH. Here we will provide an idea of a complex approach of IOT contribution for protection of artefacts and their surveillance and tracking (Fig.7).

Fig.7. IOT for protection of the artefacts in museums and art galleries

The artefacts in the museums are tagged with contactless electronic identifiers (forex. RFID labels), which presence is controlled by the gate and local readers, connected to the cloud-based tracking system. This systems is monitoring in areal-time the status and position of the artefacts and visitors as well (Fig.7). Additionally such a system will be able to monitor the temperature and the humidity in the museums rooms in order to predict (by deep learning of data collected in the cloud) and avoid stress conditions for the artefacts.

9. Conclusions

"Automation" of some elements in the design process by using the AI approaches inevitably results in better performance. The use of decision-making systems, based on expert knowledge in a specific design subject area, enhances the design quality, as it is based on knowledge provided by the most qualified specialists
(experts) in the field. From the user's point of view the expert systems do not require additional or specific knowledge in the field of artificial intelligence, which makes their application easier. The specificity of the expert systems, that additions and modifications can be made to their databases even after the latter have been put into operation, guarantees the use of up to date knowledge. Notwithstanding the undeniable advantages and conveniences, provided by the expert system and neural networks, a particular attention to the problem of input knowledge testing (verification) should be paid in order to ensure the correctness of the conclusion in the development process. The application of the IOT technology and robotics in the processes of management,   protection   and popularization of the cultural heritage is undoubtedly useful and effective as making them smart and automatic.

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Influence of the Smart Home Technologies On The Interior Design Principals

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Abstract

The features of the smart interior design are considered: area minimization, modes of operation, used materials and environmental changes.
A completely new services, provided by the smart interior are discovered, such as prevention of wrong actions, prediction of future actions and personalized services. Based on the above the extraction of new interior design principals (focused on the kitchen design) are concluded.

Keywords: Smart Home Technologies, Interior Design, Digital Interior, Internet of Things

1.   Introduction

The penetration of the Internet of things (IOT) and smart home technologies introduces a new smart interior design, which is a synergy of creative and technical solutions, that should integrate smart materials, furniture, electronic devices, and environment for more comfortable lifestyle of the habitants. [1,2]
The statistics shows that between 28 and 75% of the interior designers are interested in different aspects of smart home technologies, which is affirmed by the fact that in 2018 the market of the smart home devices has grown with 31% and reached about 640 millions of shipments. [3] In the same study it is shown that the majority of the consumers (68% and over) are interested in the technical aspects of the smart home technologies and their applications in the kitchen (Fig.1).
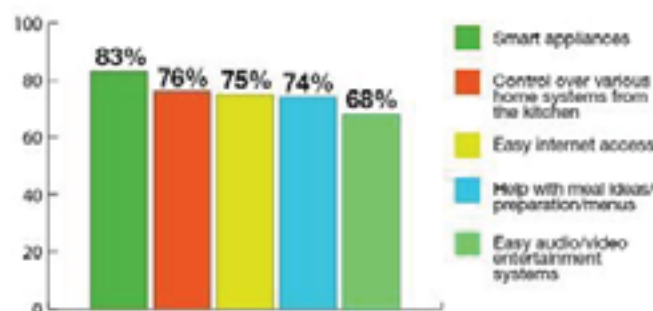

Fig.1. Customers interest in smartsolutions

In fact the influence of the smart technologies on the design principals could be compared with that, done by Taylor's way of thinking, organization and management at the beginning of XX century and first of all it concerns the kitchen design principals, as the kitchen along with the home energy management systems is the primary target for application of novel smart technologies.

On the wings of the digital revolution the modern interior and specifically the kitchen design is approaching toward a "digital interior".

2.   Smart interior design (scope)

The first definition of smart building, done in 1981, determines it as building for "productive and cost-effective environment through optimization of four basic elements: structure, systems,   services   and management, and the interrelationship between them to meet the occupants' needs" with emphasis on the technological solutions [4]. The European Intelligent Buildings Group proposed that a smart building is based on design environment that   maximizes   the   effectiveness   of buildings   while   enabling   efficient management of resources that results in minimizing life costs of facilities, tilting the spotlight towards the occupant's needs to be served by technology [4].

Both definitions emphasize on the technological aspects, which nowadays means a massive implementation of IOT and Artificial Intelligence (AI) – based furniture and devices, that communicate with the habitants in the nanotechnology materials environment, providing for them a sustainable, efficient and comfortable life.

3.   Smart interior design features

The process of introduction of the digitalization in the interior components opens the window to a new, sometimes unexpected possibilities in the design. Starting out from the above definitions and already large number smart homes projects and studies [5,6,7] the following features of the smart interior design could be derived:

•   Communication

This feature is on the base of the implementation of digital solutions in the interior. Through communication channels (WiFi, Bluetooth, RFID etc) the habitants could control the smart environment of furniture and appliances. Also through communication the other features are provided.

•   Integration

Communicating devices and furniture are easy to be integrated functionally, thus providing a higher level of effectiveness and comfortability.

•   Transformation

This capability of adaptation of the space is an "old dream" of the interior designers. The new stilled furniture and devices, which communicate and could be integrated simplify the task of living space adaptation (transformation) to save energy, improve acoustic and comfort.

•   Green solutions

One of the important contributions of the digital technologies is that they provided the possibility to incorporate the green solutions in the smart homes. Green solutions are an attribute of the smart home and interior design, which target is to improve the energy and water consumption efficiency (smart faucets, smart rainwater tanks, HVAC systems etc.)

4.   Smart interior design trends

The   features   of   the   smart technologies and the digitalization that penetrates   in   the   interior design generate a new understanding of the smart home structure, interior, activities, materials to be used and interaction with the environment.

•   New space planning

In fact the abilities to communicate, integrate in combination with the miniaturization of the electronic part of the "digital" furniture, devices and appliances leads to reconsiderations of

the dedicated living spaces in the interior. First of all it concerns the kitchen, where the influence of the smart appliances is a most strong. The

new smart appliances, which are remotely controlled and integrated with others leads to minimization of the kitchen space on the account of the other living spaces or its distribution among them. In other words there might be alternative solutions in space planning – customized, which implementation is simplified by the already mentioned features as communication, integration and transformation (adaptation).

•   New ways of control and operation The digital furniture and appliances "assume humanization" of the interface with the habitants. These includes gesture and mimic control, natural language interface etc. On the top there are a possibility to have appliance –to – appliance interaction. All these abilities will also influence strongly on the flow process and micro-motion transfer in the kitchen and the movement in other living spaces.

•   New materials
As everything smart the used materials should provide a proper environment to support on one hand the functionality of the smart appliances and on the same time to improve the comfort and sustainability. New nanomaterials as shape-memory, sound and electric non-reflective and energy effective etc. materials are already available and in use.

•   Environmental interaction
Smart homes, due to the deep digitalization and thus a new way of living style will influence on the social and economic interaction of its habitants with the environment. A lot of traditional services will be not required or at least not obligatory such as cleaning, home delivery, medical surveillance, while others will be a must, such as digital ones.

5.   Smart interior design services

The implementation of the smart technologies in the interior design creates a completely new services, provided by the smart (digitized) furniture and appliances separately and integrated in a system. These services are an effect of the synergy of the exploitation of the IOT and AI technologies in the interior design. Embedded in the furniture and appliances the IOT components provides the information basics for AI systems to take and support the decision making for relaxing and productive habitant environment. As such the interior acquire new abilities, that provide in turn the following unique services:

•   Personalized services
These are services, which are based on the installed IOT wearable and fixed sensors and robots provide personalized support of the habitant activities (for ex. sensors follow the habitant and provide walking lighting, proper air conditioning, serving by a robot etc)

•   Preventive services
These are services that monitor and check for wrong and dangerous actions, that are or can be done by the habitant, guest or not authorized person. These include alarming if such a situation may occur and disabling of the wrongly used/activated device or appliance.

•   Predictive services
The AI technologies provides the ability to predict possible actions by learning the habitant's behaviour. Thus the smart furniture and appliances could be able to fulfil in advance needed operations/actions that will facilitate the habitant and save his/her time.

•   Advising services
Another AI technology – decision support systems, implemented in the smart furniture and appliances could successfully advise and resolve everyday home situations, which need special care or actions (for ex. nursing elder people, care about children etc).

6. Case study: Smart design, focused on kitchen design

Studying the history of the kitchen design it visible that the leading idea was to save the time of the women and optimize their efforts.
Starting from C. Frederick optimizations of the micro-motions in the kitchen (fig.2),
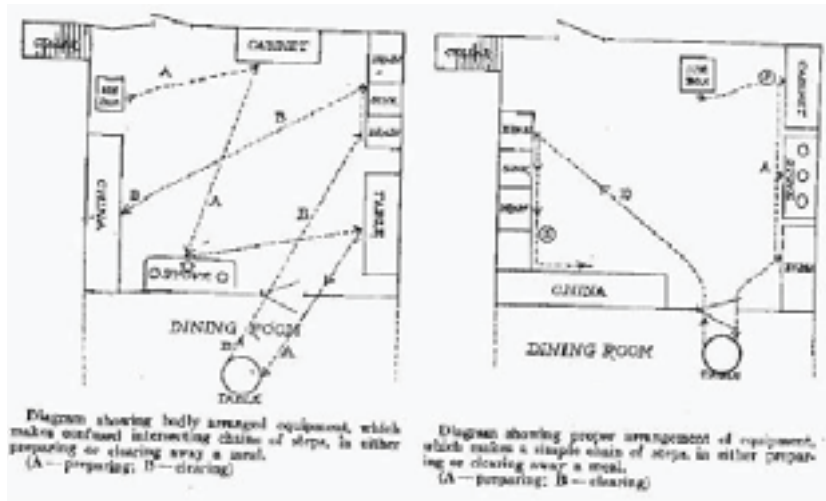
From The New Housekeeping by Frederick 1

Fig.2. C.Frederick kitchen

passing through the classic Frankfurt kitchen, then through European standards for kitchen egronomics all efforts were directed to motion and operation optimization. And this task has been solved by minimization of the kitchen area and optimization of the furniture and appliances layout.
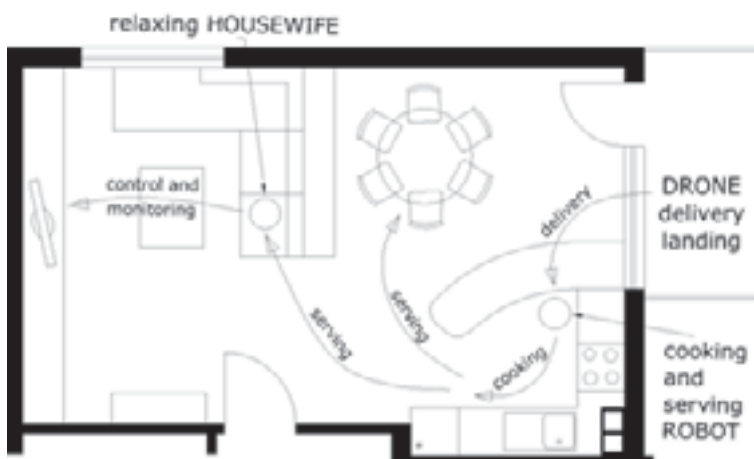
Fig.3. Smart kitchen example

Using the above discussed advantages of the smart interior design a model of kitchen planning (layout) is presented in fig.3.
Thanks to the freedom and flexibility, provided by smart furniture and appliances a semi-open kitchen layout is designed, where a cooking robot is operating with specific appliances. The drone-based delivery provides the kitchen with products. This robot is also serving the dining room, from where, by the help of mobile phone, observing on the monitor the

housewife controls the process, while she is taking rest or meeting guests. This control/monitoring function could also be managed remotely from the office, where she is working.

7.   Conclusions

The Digital and Information revolutions undoubtedly give birth to the smart interior design. Smart furniture and appliances starting to appear on the market, which needs designers' efforts to integrate them in a new projects, using their advantages in the name of more relaxing, comfortable and sustainable living.
The potential of AI, IOT and robotics are not limited to the discussed functions. With the further development of the technologies these functions will be enriched, thus saving habitants more time and improving their comfort of living.

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The Role of Images in the Safeguarding of Cultural Heritage in Times of Conflict

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Abstract
This paper examines the critical role of images in documenting and safeguarding cultural heritage amidst the ravages of conflict. With a historical perspective that traces back to the 19th century, the study emphasizes the evolution from traditional artistic depictions to the more precise methodologies of photogrammetry and digital imaging technologies. These advancements not only enhance the accuracy of documenting architectural and cultural sites but also allow for the effective communication and reconstruction of heritage sites that have been affected by war. The integration of digital technologies, particularly digital photogrammetry, has proven essential in preserving the tangible and intangible aspects of cultural heritage, providing detailed and scalable visualizations that support restoration and public dissemination efforts. This fusion of art, history, and technology underscores the importance of multidisciplinary approaches in the preservation of heritage and offers a forward-looking perspective on the potential of digital methodologies to reshape cultural heritage conservation and appreciation in conflict zones and beyond.

Keywords: Documentation, Photography, Collective Memory, Photogrammetry, Reconstruction

1.   Introduction
The challenging historical moment we are currently navigating, marred by conflicts that touch even regions close to us, calls for profound reflection that transcends cultural, political, and territorial borders. This demands a clear, impartial stance from the academic and scientific community. The daily unfolding of these grim events should heighten our awareness of the severe consequences that every armed conflict brings, affecting human lives as well as social and economic conditions. Furthermore, the destruction of monuments and architecture, often following these conflicts, signifies the loss of collective memory for places and cities. Cultural Heritage is indeed a synthesis and expression of the communal and identity-forming sentiments of a people, who, through monuments, sites, and artworks, materialize and manifest their ideas, traditions, and civilization. Identifying strategies to protect this heritage therefore entails promoting collaborative actions, bolstered by a synergy of knowledge and expertise, to strengthen these communal sentiments and rekindle a sense of belonging to a place, which is fundamental for the correct process of safeguarding cultural heritage.
Turning our attention to the contributions that the area of Drawing can offer in this perspective, it is crucial to underscore the fundamental role that imagery, in its broadest interpretation, can serve primarily as a historical source in the processes of documentation and visualization of monuments and places [1], with special focus on those heritages most at risk due to their locations in conflict zones (fig. 1).

Fig. 1: Images of the devastation caused by warfare on architectural heritage.

Fig. 2: The city of Dresden depicted on a postcard from 1915 on the left, and photographed after the bombings of World War II (1945) on the right.

Whether it be an artistic sketch, a technical drawing, a map, a photograph, or a digital model, the image itself stands as a testament to a reality, crystallized and immutable, captured at a specific moment through marks that explicate its distinctive aspects and features, imprinted on a graphic or infographic medium. In this sense, the image allows for the documentation of buildings and cities, preserving over time diverse types of information that then become etched in memory. As Mario Docci and Diego Maestri noted a few years ago in the renowned *Manuale di rilevamento architettonico e urbano* the visual data possesses an extraordinary evocative power which "is based on the ability of our memory to store images more effectively and stably than products of other perceptions. Moreover, our brain is capable of associating a visual perception, such as that derived from observing a photograph, with other information previously stored in our memory. The perception of an architectural object is thus the result of a vast experience that includes, beyond visual observation, tactile sensations, measurements made while moving in relation to the object, measurements derived from acoustic experiences, as well as historical, critical, and technical considerations made on it: the greater the number of existing information in memory deposits, the greater our knowledge of such an object" [2, p. 233] (fig. 2).

2.   Places and Monuments in Graphic Documents and War Imagery
In considering the role of the Drawing disciplines as a fundamental tool for reading, describing, knowing, and visualizing urban spaces and sites experiencing the devastation of war, we will undertake a brief overview of key milestones in the evolution of tools and systems for graphically documenting these realities.

Fig. 3: Pablo Picasso, *Guernica*, oil on canvas (1937). Museo Nacional Centro de Arte Reina Sofía, Madrid.

However, for the sake of brevity, we will omit the substantial corpus of artistic war illustrations produced over the centuries, which rarely depict architecture and monuments. Instead, these illustrations often focus on battles or siege scenes, sometimes with urban or rural landscapes in the background, better conveying the artist's emotional world and the sentiments of an entire people (fig. 3). To witness a gradual process of "objectification" in the graphic narration of war, we must await the advent of photography, which, in the absence of personal data and information selections—except for those deriving from the choice of framing—marks a turning point: with this technique, reality is captured in images that document everything within the camera's view [3]. From this point on, "the representation of conflicts employs photography as a new medium; although the low sensitivity of photographic materials at the time required long exposure times that prevented the capture of combat and generally any fast-moving actions" [4].

The first photographs from a war zone were taken in 1853 by Hungarian Karol Szathmari (1812-1887) to document the Russian invasion in Wallachia-Moldavia; about a hundred shots were taken, but unfortunately, they were lost. Thus, the first actual war reportage that has survived to this day was by the British photographer Roger Fenton (1819-1869). Appointed in 1854 as the official photographer of the Crimean War for the British Crown, Fenton produced many images as the troops advanced to document the military campaign. His photos clearly reveal the intrinsic propagandistic value: the shots were intended to validate and strengthen the government's actions. What is particularly interesting for our discussion is that alongside soldiers, regiments, and tanks, the landscape and places where these events unfolded also began to appear in the photographs (fig. 4).

Between the second half of the 19th century and the early 20th century, the narrative of war became more faithful, almost adopting a journalistic approach. War began to be portrayed "live", without filters, thus conveying the rawness of the military events. For instance, this is evident in the reportages of Felice Beato (1832-1909), who in 1857 documented the British suppression of the Indian Mutiny and in 1860 the Anglo-French military expedition in China during the Second Opium War. Or in those by American Timothy O'Sullivan (1840-1882), who documented the American Civil War (1861-1865), showing the horror of the conflict captured on the lifeless bodies of soldiers killed or the desolation of places made unrecognizable by war destruction. Even more emblematic are the photos by Hungarian Robert Capa (1913-1954) (naturalized American), still considered one of the greatest war photographers today: his shots document the major conflicts of the first half of the 20th century, including the Spanish Civil War (1936-1939) and World War II (1939-1945). In these, following the allies, he visually narrated some key moments, such as the victory of the troops in Sicily, the liberation of Naples, and the landing in Normandy, which he photographed before fainting from tension.

Fig. 4: Roger Fenton, photographs of the Crimean War (1854-1855).

Fig. 5: War Narratives Through Images. On the left: Felice Beato, Second Opium War in China (1860). In the center: Timothy O'Sullivan, American Civil War (1861-1865). On the right: Robert Capa, World War II, Normandy Landing (June 6, 1944).

The photographs taken on this occasion, though "slightly out of focus", were published in *Life* magazine and resonated widely, acquiring significant symbolic value and demonstrating the photojournalist's deep emotional involvement (fig. 5). More or less in parallel, photography was also used to document the effects of war on cultural heritage. A pioneer in this trend was Stefano Lecchi (1803-1866), an Italian painter and photographer, an early member of the Roman School of Photography, and an experimenter in modern photographic printing techniques, capable of producing multiple positive prints from a single negative. Already known for documenting significant monuments and sites in Italy—including the Tower of Pisa, the excavations at Pompeii, and many Roman architectures—depicted in what might be called "travel postcards", Lecchi later created a series of photographs that narrated the conflicts recorded in Rome during the Second Roman Republic. After the siege by French troops supporting the Papal States, which claimed control, the city—liberated on July 3, 1849, by Garibaldi's forces and patriots from all over Italy—was captured in images that document not the war event as it occurred, but the traces it left behind (fig. 6). The ruins and the city, with its rubble and marks of enemy attacks, often testify to the irremediably lost ancient splendor. In this sense, the photographs become symbols of an endangered memory, including not only well-known monuments and places of the eternal city but also lesser buildings linked to significant war episodes, thus able to narrate the various phases of the city's attack and resistance.

Through the technical medium most suited to him, Lecchi thus organizes a narrative and visual account: the historical chronicle of events corresponds to a precise sequence of images, a selection of places and monuments that mark the main stages of the conflict. He thus "constructs his own narrative of events and situations. In the photographs, he records, documents, fixes what was before everyone's eyes: the works of defense, the marks left by the combat, the magnitude of devastation. Lecchi's primary aim is documentation. He employs a style […] devoid of pedantry, spectacle. Missing are martial poses and an aestheticizing approach based on captivating images. His documentation is meticulous with extreme attention to details" [4]. This attention is also evident in the choices of framing, which often favor the details of buildings, at the expense of recognizing their location. Moreover, in many cases, these are captured from various camera positions, offering "all-around" images of the building, around which the observer can almost turn, thus following the photographer's visual path (fig. 7).

Fig. 6: Stefano Lecchi, photographs of Roman monuments damaged during the conflicts of 1849. On the left: Villa Corsini, Casino de' Quattroventi. On the right: Villa Borghese, Orangery.

Fig. 7: Stefano Lecchi, various angles of the same subject (1849). Rome, Villa Spada at San Pancrazio, in a frontal photograph (on the left) and a side view (on the right).

3.   Measuring and Describing Reality through the Image

From the second half of the 19th century, photography not only documented reality but also offered new possibilities as a tool for measuring and graphically describing the existing reality [5]. It is worth noting that already in 1839, just a few years after the appearance of the first image impressed on a photosensitive plate, French intellectuals and scholars began to grasp the enormous potential inherent in photography. In that year, Jean François Dominique Arago (1786-1853—a physicist, astronomer, professor of analytic geometry, and member of the French Academy of Sciences— argued that "photographic images, being subject to the rules of geometry in their formation, allow, with the help of a small number of data points, to deduce the exact dimensions of the most elevated, most inaccessible parts of buildings" [6, p. 6]. In the same year, Louis Gay-Lussac (1778-1850)—a physicist, chemist, and professor at the École Polytechnique in Paris—praised the rigor of the information contained in a photograph, stating that in it "the perspective of any object is reproduced with mathematical accuracy; nothing escapes the eye and the brush of the new painter" [7].

These premises, taken up and strengthened by the insights of French Colonel Aimé Laussedat (1819-1907)—a professor at the École Polytechnique, military engineer, and cartographer—led in 1851 to the definition of a geometric-descriptive process, initially for measuring through images, which would later be named "metro-photography", subsequently refined over time and known as photogrammetry. The first applications concerned the field of topography, but soon photogrammetry, applied to architecture, demonstrated its utility in the realm of architectural surveying and the representation of cultural heritage. In 1899, Laussedat published a work entitled *La Métrophotographie*, in which the author explains how this art of taking measurements with the help of photography can also be used to illustrate how to utilize views of monuments or landscapes to reconstruct "photo-maps" of such objects (fig. 8).
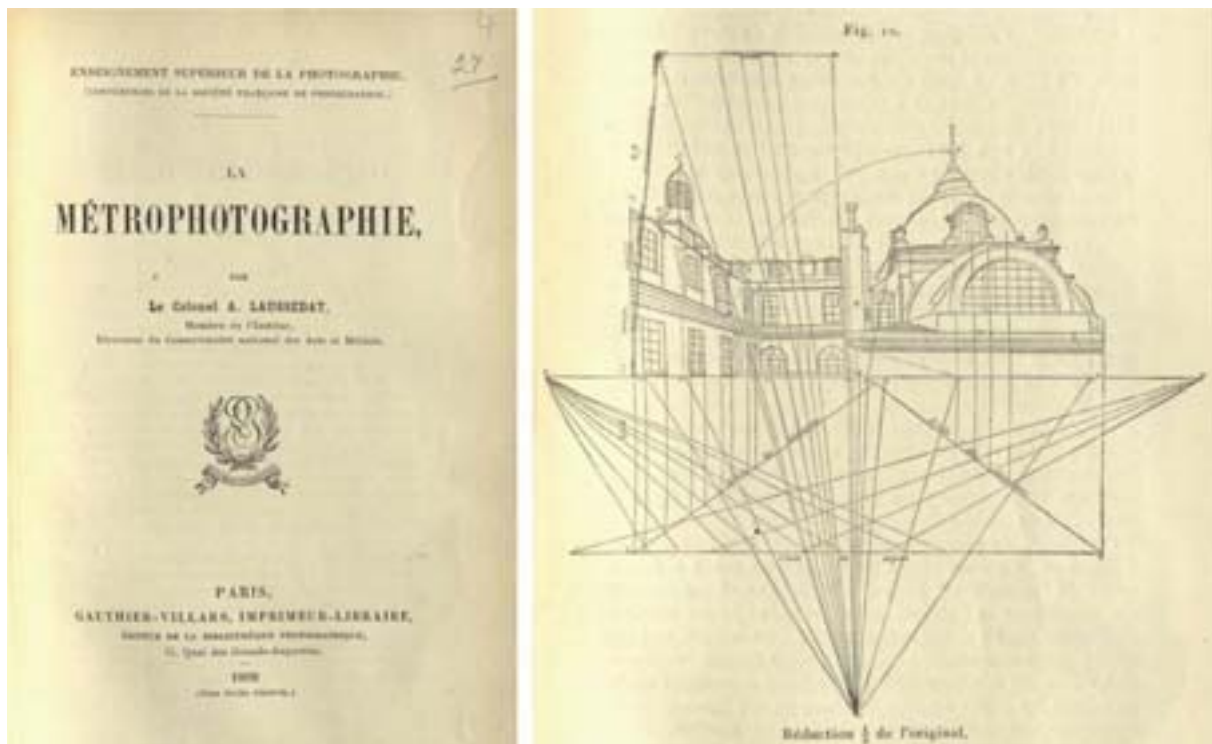
Fig. 8: On the left: Aimé Laussedat, frontispiece of La Métrophotographie, Paris 1899. On the right: Aimé Laussedat, graphic diagram of perspective restitution for the plan reconstruction of the Penthemont monumental complex from the drawing produced with the *camera lucida* [7, fig. 12].

Based on the congruence between the photographic image of an object and its perspective—with necessary simplifications and provided that the center of view is the central point of the lens and that the main visual ray corresponds to the camera's axis—photogrammetry utilizes the projective principles that govern the formation of perspective images to interpret photographic images [8]. By retracing the rigorous geometric procedures that underlie perspective drawing, photogrammetry thus becomes a valuable tool for retrieving measurements (both linear and angular) and shapes of photographed objects. Photography then gains a precise instrumental value in the context of cultural heritage surveying, serving not merely as a support element—for noting, documenting, visually recalling certain aspects—but as a base from which to derive metric and morphological information.

From this point, the debate becomes quite heated, involving the academic world across Europe. Numerous international congresses on photogrammetry were organized in the early 1900s, with proponents of "graphic metro-photography"—which relies on perspective restitution procedures from single frames—on one side, and supporters of "stereo-photogrammetry"—which had developed in the meantime and uses pairs of appropriately oriented photographs to exploit binocular vision less prone to interpretative errors from a single frame—on the other.

The importance of this technique in the architectural field, rather than just in topography, becomes evident, also due to a graphical approach that relates to applications of Descriptive Geometry, commonly used by architects and engineers involved in the representation of structures. Moreover, the importance of this procedure for documenting objective data and for the architectural surveying of buildings, including those no longer existing but for which iconographic evidence remains, is reinforced. In 1930, Henri Deneux (1847-1969), the architect called to reconstruct the Cathedral of Reims after the bombings of World War I, wrote in his work *La Métrophotographie appliquée à l'Architecture* that photogrammetry, certainly useful for surveying inaccessible parts of buildings and monuments in our cities, reveals enormous potential if used to restore information and data of buildings partially or totally destroyed "using photographs taken before their destruction" (fig. 9) [9, p. 3].
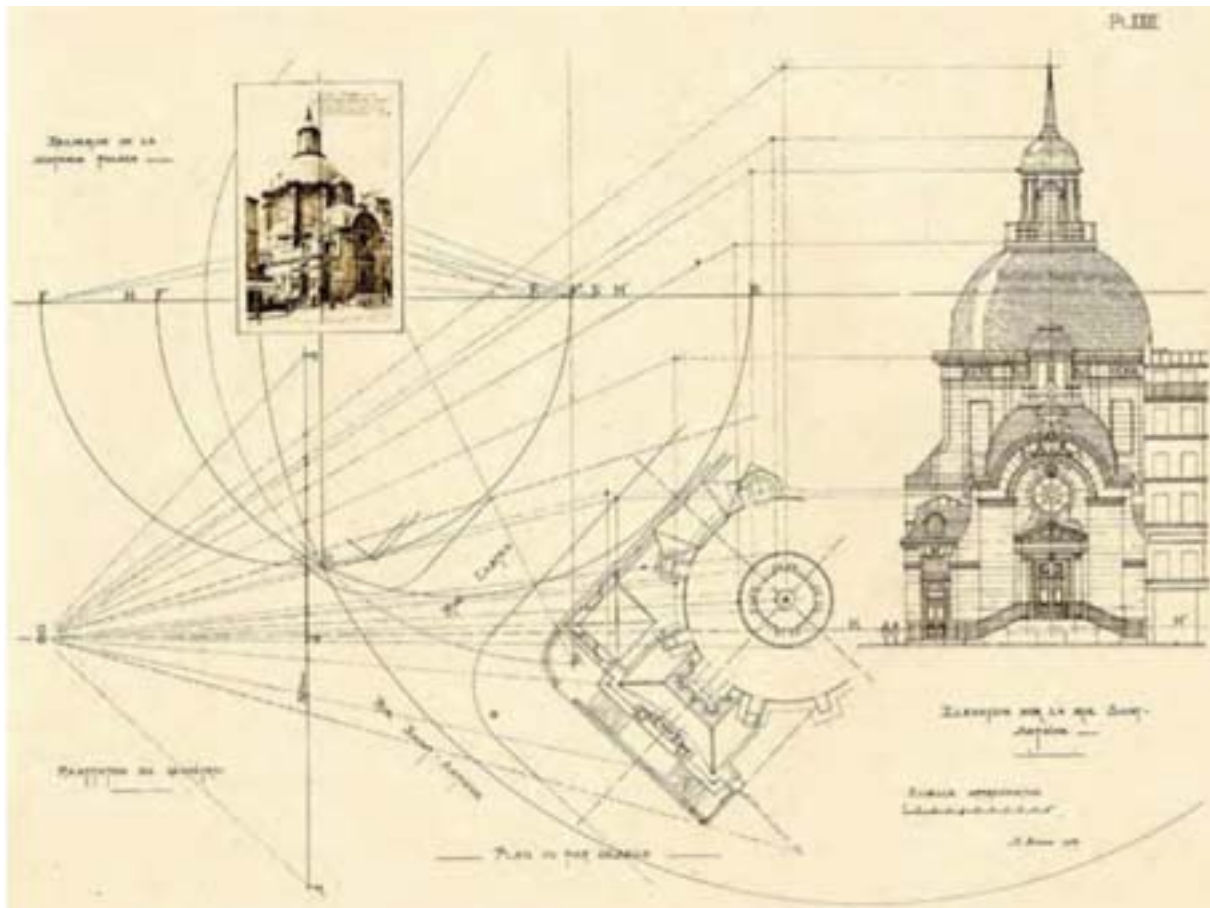
Fig. 9: Henri Deneux, application of the perspective restitution process from a photographic image of the Temple du Marais in Paris, plate XXIII. (Image sourced from [9], published in [5, p. 22]).

This would soon lead to the establishment of photogrammetric archives in almost all European countries, where images of the most important architectural and archaeological monuments were catalogued, and to the spread of teaching these disciplines in schools of architecture and engineering. Only after World War II, however, did this method of indirect surveying take on a fundamental role, as it became clear that "an unlimited field opens up for photogrammetry in the surveying of monuments. The drawings of these buildings, created using photogrammetric methods, hold interest beyond the architectural profession; they enable documentation of a nation's architectural heritage [10] and can serve as a basis for future restorations of damaged or altered buildings" [11, p. 78].

In this sense, rigorously perspective painted images can also serve as documentary bases [12]: to cite just one particularly fitting example for this discussion, the urban views of the city of Warsaw painted in the mid-18th century by Bernardo Bellotto, the nephew of the more famous Canaletto, were crucial. These views, obtained using the camera obscura, meticulously and with photographic precision, documented the urban spaces and architectures of the Polish capital, which was completely destroyed by Hitler's troops in 1944. Without entering into a merit judgment on the method used, it should be noted that the absolute fidelity of the 18th-century views allowed the urban form and its monuments to be reconstructed as they were and where they were, precisely by virtue of perspective restitution processes based on photogrammetric approaches (fig. 10).

Fig. 10: On the left: Bernardo Bellotto, *La Chiesa delle monache benedettine dell'Adorazione perpetua del Santissimo Sacramento,* oil on canvas (1778). Royal Castle Museum, Warsaw. On the right: the church destroyed by the bombings of 1944 (top), then reconstructed using a photogrammetric approach based on the painted image (bottom).

4.   Conclusion

The rest is history in the making. Alongside traditional methods of restitution from photographs, which work on inverse applications of perspective and more generally appeal to the projective principles underlying image formation, increasingly sophisticated infographics processes have been adopted [13]. While classic algorithms and constructs that manually or through photogrammetric infographics procedures yield photo maps and orthographic images to scale of the object remain valid, digital photogrammetry hardware and software are increasingly asserting themselves. These tools allow the creation of three-dimensional models of complex places and buildings, measured and detected based on information drawn from photographic images taken from various angles [14].

The ability to manage data and parameters—through the collimation of points deducible from photos and correctly distributed in the digital space according to the measured coordinates—specifically enables the reconstruction of the object's structure in three dimensions in the form of a point cloud, thus providing numerical models that can be converted into polygonal models. However, the task is not just to restore the geometry of the detected shape: the digital models also contain and return other information related to the quality of surfaces—such as material, lighting, and color components—to graphically describe, with great objectivity, the texture of the envelopes that make up the model.

Naturally, the advent of digital technology has brought further and fundamental advancements in the field of documentation and knowledge of cultural heritage, even that which is most fragile because it is located in war-torn territories. If drawing is traditionally the graphic tool used to describe reality rigorously and scientifically, it should be noted that the possibilities offered by representation in terms of communication and dissemination of Cultural Heritage are now very convincing, thanks to the establishment of increasingly high-performance infographics techniques and procedures. The digital transformation, which fully involves the field of historically significant built heritage, has indeed redesigned the ways of interaction between architectural and/or urban space and its users, codifying new models of knowledge of the represented reality (fig. 11). Indeed, the data and information conveyed with virtual or immersive images, which have a strong visual impact, facilitate the process of cultural appropriation of the cultural heritage: the tendency of infographics to generate products that reach an increasingly broad and not exclusively technical audience triggers cognitive phenomena that go beyond the simple measurement of space, to reveal intimate and profound aspects of the investigated reality. Far from being a mere process of data storage, processing, and sharing through information

technologies, digitality then becomes a catalyst for a change in the vision of the paradigms and systems underlying the management of Cultural Heritage.

Concluding with some final thoughts on the role of the image in the digital age, it should be noted that the possibilities for consumption through innovative methods offered by new technologies, also connected to the visualization of tangible and intangible aspects (fig. 12), facilitate the process of the community's appropriation of Cultural Heritage, redefining the way in which the community perceives and participates in the narrative and history of art and architecture, and transcending traditional boundaries of space and time [15]. Not only that: digital technology can make cultural heritage accessible, even with reference to episodes of difficult access because they are in areas at risk due to the spread of wars, or in extreme cases no longer existing, because they were partially or completely destroyed by those wartime events. In this sense, digital transformation cannot be merely a regulatory compliance, but must be understood as a challenge, technological and beyond, to bring cultural heritage closer to full enjoyment in its physical, digital, and cognitive dimensions [16].

Fig. 11: Innovative Methods for Visualizing and Communicating Tangible and Intangible Aspects of Cultural Heritage.

Fig. 12: Real-time visualization of the probability of damage in war territories and estimation of damages on buildings and population. Image generated by the application "The Gaza Damage Proxy Map" available at the link https://ee-ollielballinger.projects.earthengine.app/view/gazadamage (accessed on April 15, 2024).

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The Use of WebGIS in Emergency Planning for Seismic, Volcanic, and Geochemical Risks: The Experience of the Health Sector Plan of the Campania Region for the Campi Flegrei Area

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The *Campi Flegrei* area, located in the northern part of the metropolitan city of Naples, is characterized by a unique geological and volcanic complexity. The presence of an active supervolcano and numerous geochemical phenomena necessitates meticulous planning and coordinated emergency management to ensure the safety of the population and the protection of the environment. In this context, the use of the Web Geographic Information System (WebGIS), which allows for the integration, visualization, and analysis of geospatial data interactively and accessibly, has become essential to make healthcare planning and emergency management even more efficient.

The Presidential Decree of the Council of Ministers No. 390 of February 9, 2015, outlined as healthcare planning objectives the relocation of patients housed in healthcare or socio-health facilities requiring evacuation, the continuity of healthcare services for residents or domiciled individuals in the red zone, and the protection of animal welfare, with the support of the State Forestry Corps. Specifically, the annex to the aforementioned decree, titled "Guidelines for updating emergency planning for volcanic risk in the red zone of the Vesuvian area," includes the Healthcare Sector Planning, detailing the objectives and activities of each institutional actor based on the distinct risk scenarios related to the "red zone" and the general intervention strategy.

The Presidential Decree of the Council of Ministers of June 24, 2016, titled "Provisions for updating the emergency planning for volcanic risk in the Campi Flegrei," adopted the following normative guidelines. For the preparation and updating of respective emergency plans aimed at the precautionary evacuation of the red zone population, the guidelines already established by the Unified State-Region Conference with the decree of February 2, for the red zone of the Vesuvian area, published in the Official Gazette No. 75 of March 31, 2015, apply. In compliance with the aforementioned national decree, the Campania Region, with Resolution No. 506 of August 1, 2017, assigned the emergency planning in the red zone of the Campi Flegrei to the Directorate-General for Health Protection and Coordination of the Regional Health System. Additionally, with Resolution No. 325 of July 16, 2019, it appointed the regional health coordinator for emergency health within the role of the head of the Territorial Operations Center 118.

Following continuous seismic events from bradyseism in the Flegrean area, the President of the Campania Region ordered an operational meeting for updating and enhancing the emergency health planning for evacuating healthcare and socio-health facilities as well as veterinary structures in the risk area.

In this perspective, with a decree from the Directorate-General for Health Protection and Coordination of the Regional Health System (protocol note 0466889 of October 2, 2023), the

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Director-General of ASL Napoli 1 Centro was appointed as the coordinator of the Working Group. The Director-General, through his designation (protocol note n.243483 of October 3, 2023), appointed the "Campi Flegrei Area Working Group" (GdL.ACF) and defined the activities to be carried out in three distinct phases:

Phase One Activities: Surveying all healthcare and socio-health facilities (including residential care facilities for the elderly) within the territory of competence, specifying the number of active beds by discipline and intensity of care, the maximum number of patients that can be accommodated, and any other necessary information to prepare alternative care solutions in case of need.

Updating emergency planning activities, particularly for the Internal Emergency Plan (P.E.I.) and the Evacuation Plan (P.EVAC).

Phase Two Activities: Assessing the seismic vulnerability of buildings intended for healthcare and socio-health activities.

Phase Three Activities:Drafting the Plan for the Reallocation of patients/guests of the surveyed healthcare and socio-health facilities.

Meanwhile, considering the intensifying bradyseismic phenomenon, the Legislative Decree No. 140 of October 12, 2023, titled "Urgent measures for the prevention of seismic risk related to the bradyseismic phenomenon in the Campi Flegrei area" (Official Gazette No. 239 of October 12, 2023), was approved.

The planning tool aims to define urgent measures to address the effects of the evolving bradyseismic phenomenon in the Campi Flegrei area within the territories of certain municipalities or parts of municipalities in the Metropolitan City of Naples, also through simplified procedures and other acceleration provisions. These activities were made possible thanks to the technical-scientific support of the Special PNRR Office of ASL Napoli 1 Centro, which created the plan structure through the drafting of thematic maps in a WebGIS environment, georeferenced with a dedicated database of the acquired multiple information and data.

All collected data relating to healthcare facilities within the territories of ASL Napoli 1 Centro and ASL Napoli 2 Nord (detailed first and second-level information) were integrated into a WebGIS system. The update and integration of thematic maps in a WebGIS environment with an attached database for the survey of structures - concerning the entire territory of competence in the metropolitan area subject to the Campi Flegrei risk - support strategic emergency planning activities.

All public and private authorized healthcare facilities in the red and yellow zones of the Campi Flegrei eruption risk, and similarly for the Vesuvian Volcano risk, which affects a small part of the city of Naples (Ponticelli) under the competence of ASL Napoli 1 Centro, as well as numerous municipalities in the Vesuvian area (the entire territories of San Giorgio a Cremano, Portici, San Sebastiano al Vesuvio, Cercola, Massa di Somma, Pollena Trocchia, Sant'Anastasia, Somma Vesuviana, Ottaviano, San Gennaro Vesuviano, Palma Campania, San Giuseppe Vesuviano, Poggiomarino, Terzigno, Boscoreale, Boscotrecase, Trecase, Pompei, Torre Annunziata, Torre del Greco, Ercolano, and partially Nola and Pomigliano d'Arco) under the competence of ASL Napoli 3 Sud, always with the coordination of ASL Napoli 1 Centro, were included in the WebGIS environment.

In the first phase, based on the requirements of the following national regulatory provisions:
- D.P.C.M. 390/2015, which decreed the update of emergency planning for the precautionary evacuation of the "red zone" population in the Vesuvian area;
- D.P.C.M. June 24, 2016, which defined the volcanic eruption risk scenario;
- D.L. 140/2023, bradyseismic and geochemical risk,

the localization and georeferencing of healthcare and socio-health facilities in the Campania territory, with particular attention to those within the administrations of ASL Napoli 1 Centro and ASL Napoli 2 Nord, which are most affected by the volcanic risk from the Campi Flegrei, as already outlined in the "Campi Flegrei Civil Protection Plan," were carried out. For each identified healthcare facility, a database was created - based on the facility's data collection sheet - containing specific information in terms of disciplines present in the facility, the number of active beds by discipline and intensity of care, and the facility's contacts.

Following the localization of the facilities, the "areas," meaning the constraints defining the volcanic risk zones of the Campi Flegrei, were reported. Specifically, the high-risk areas,

indicated as the "red zone," and the medium-risk areas, indicated as the "yellow zone," were documented.

Fig. 1: Delimitation of the Campi Flegrei Volcanic Risk Area

Subsequently, healthcare and territorial structures located within these areas were identified to assess their degree of vulnerability. For each of these structures, a Patient and Personnel Relocation Plan (P.Ria.P.P.) was developed in relation to the aforementioned volcanic risk, to be implemented in case of an emergency.
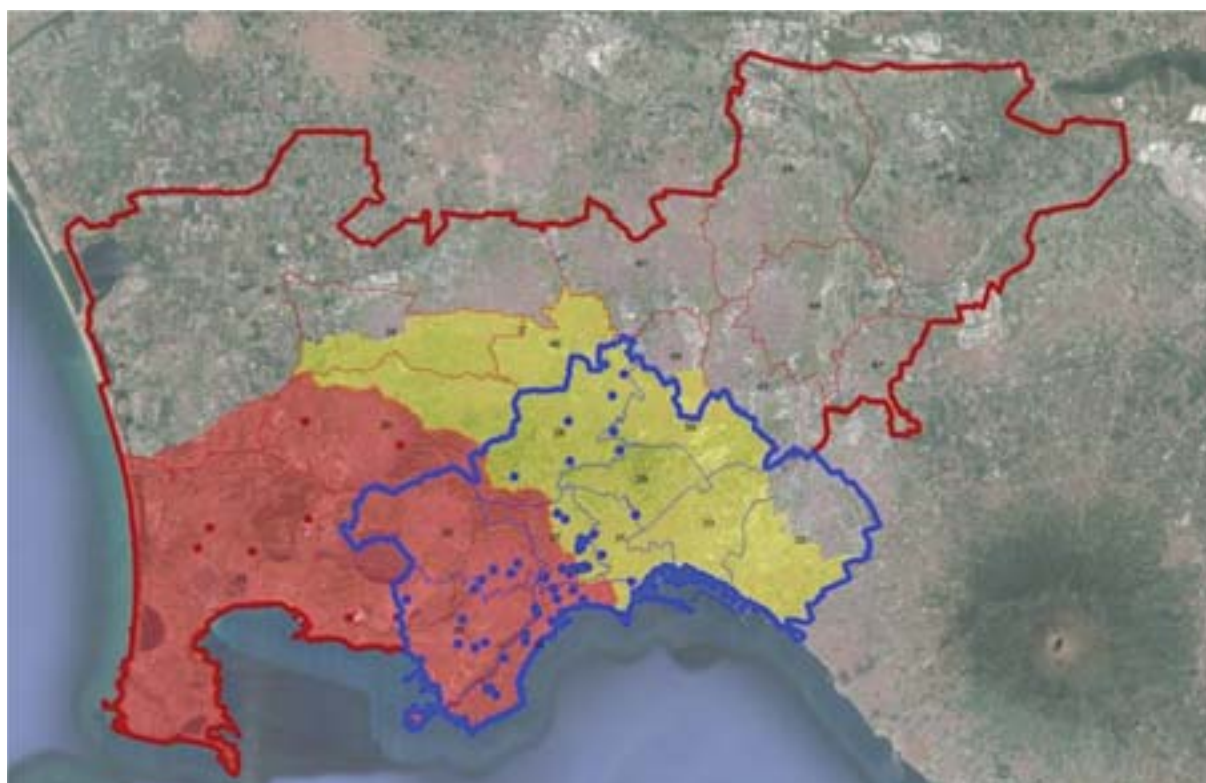

Fig. 2: Identification of Volcanic Risk Zones in the Campi Flegrei Area with Administrative Boundaries
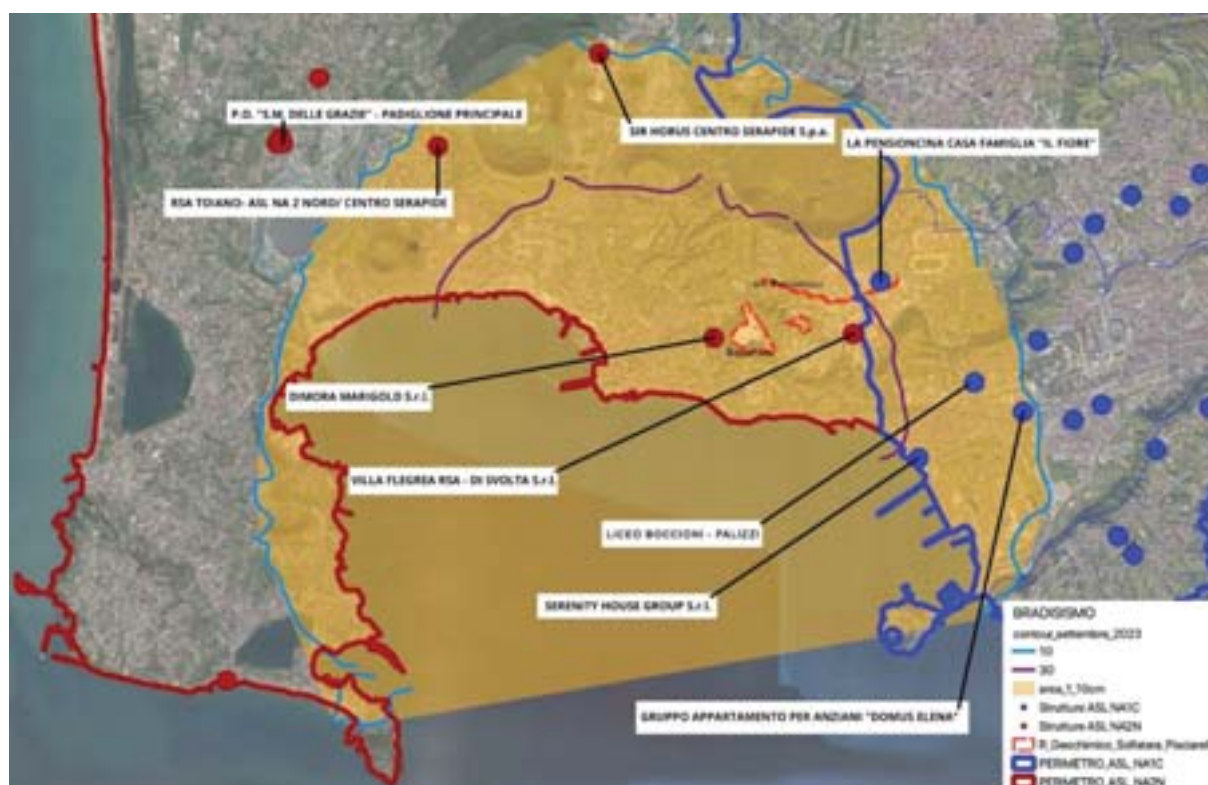
Fig. 3: Delimitation of the Intervention Area for Seismic Risk from Bradyseism

Similarly, for the same administrations of ASL Napoli 1 Centro and ASL Napoli 2 Nord, a survey of veterinary structures was conducted. A relocation plan for animals (P.Ria.A.) was developed to ensure the protection and welfare of both livestock and companion animals.

The georeferenced identification and location of healthcare and territorial structures within ASL Napoli 1 Centro and ASL Napoli 2 Nord were updated according to the determination of the intervention area under Article 2 of the Legislative Decree No. 140 of October 12, 2023, titled "Urgent measures for the prevention of seismic risk related to the bradyseism phenomenon in the Campi Flegrei area."

Additionally, a preliminary identification of the Solfatara area and Via Pisciarelli was conducted to mitigate the geochemical risk associated with the fumarolic activity present at the site. This was done to verify the presence of healthcare structures within the aforementioned area.
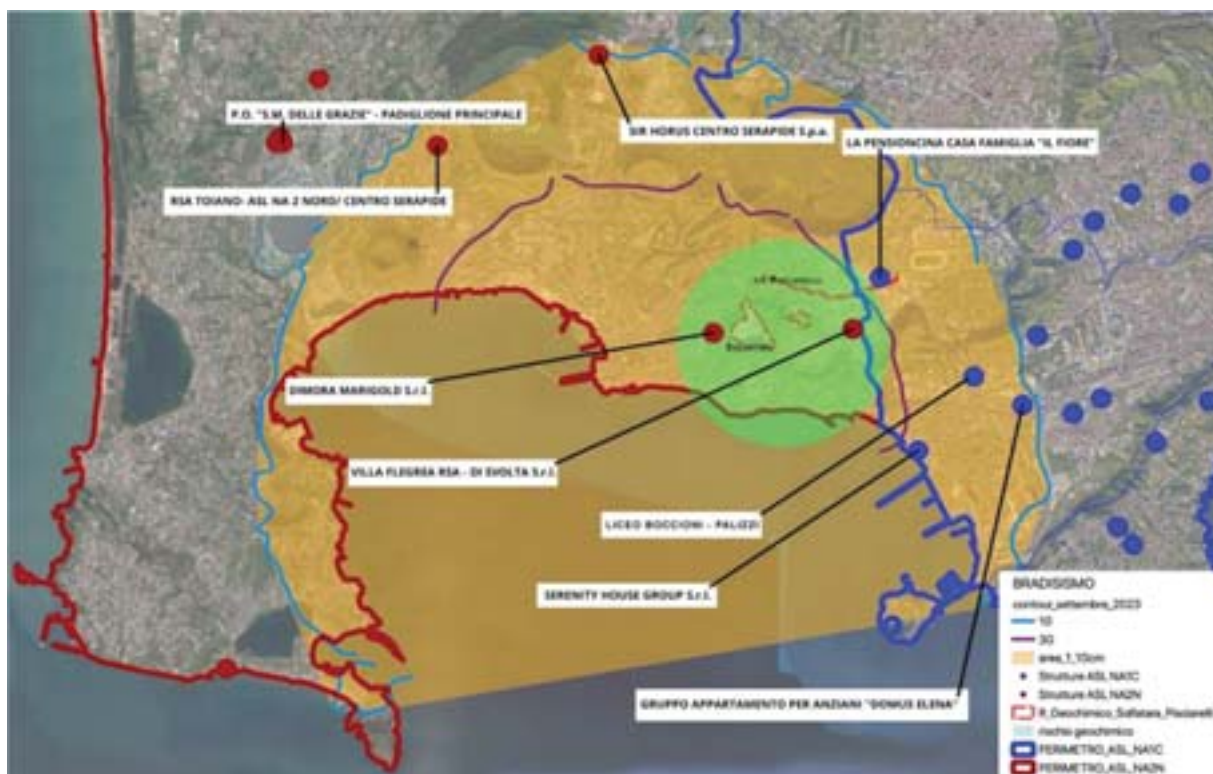
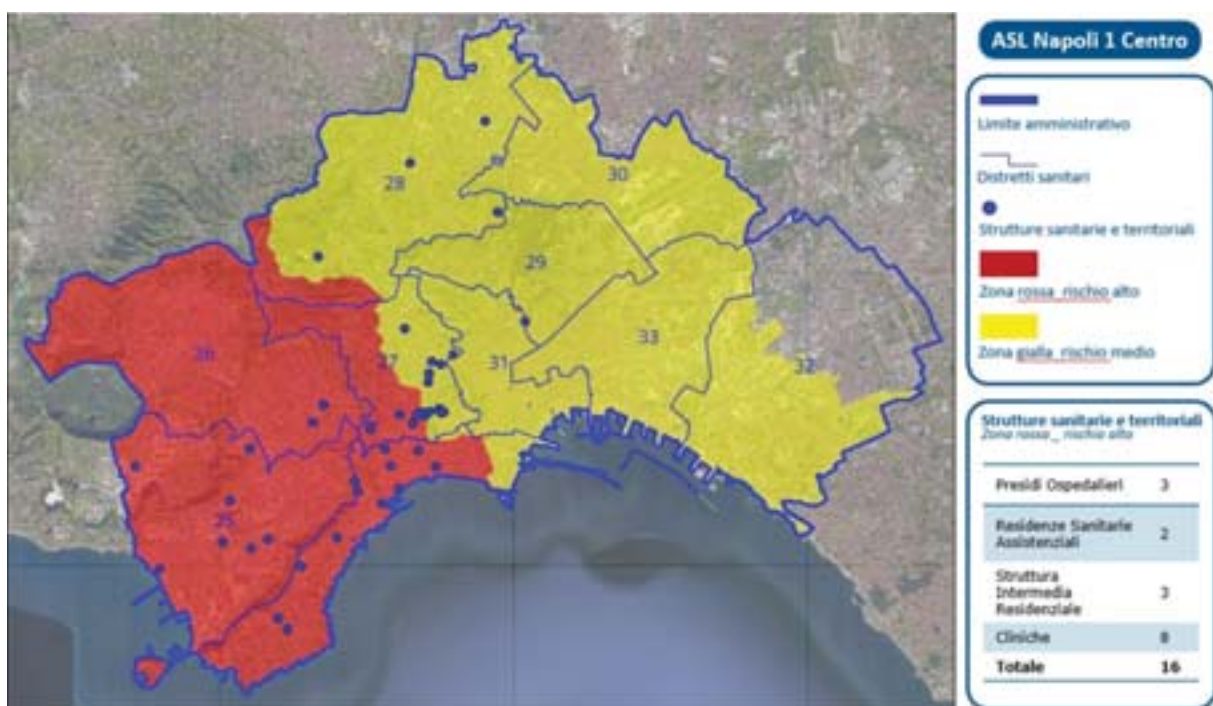**Fig. 4**: Identification of Geochemical Risk Areas in Solfatara – Pisciarelli

Fig. 5: Healthcare and Territorial Structures Located in the Campi Flegrei Volcanic Risk Areas_A.S.L. Napoli 1 Centro
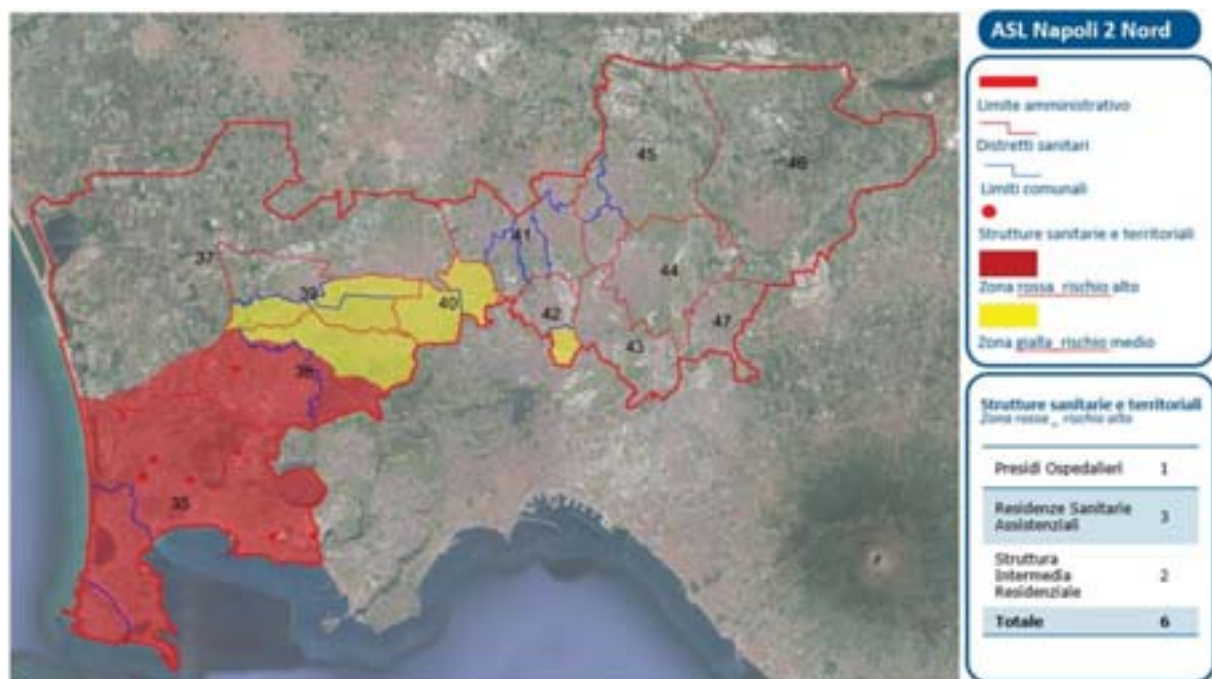
Fig. 6: Healthcare and Territorial Structures Located in the Campi Flegrei Volcanic Risk Areas_A.S.L. Napoli 2 Nord

The Health Sector Plan of the Campania Region, approved by Regional Government Resolution No. 96 on February 29, 2024, for the Campi Flegrei area, represents an exemplary case study of WebGIS application in emergency planning. This tool allows for real-time monitoring of natural phenomena, assessment of risk scenarios, and effective coordination of operational responses among various involved parties. Additionally, WebGIS facilitates the communication of critical information to citizens and healthcare operators, enhancing local community awareness and preparedness.

Through the analysis of this experience, the present work aims to illustrate the potential of WebGIS in managing emergencies related to seismic, volcanic, and geochemical risks, highlighting the benefits of integrating innovative technologies into civil and healthcare protection plans. The adopted methodology, challenges faced, and results achieved provide valuable insights for other regions with similar risk situations, such as the Vesuvian area, which applies the same experimental model for healthcare emergency planning.

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