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CONNECTING HERITAGE
SHARING THE HERITAGE PERSPECTIVE
ACROSS DIFFERENT DOMAINS

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a cura di
**Julia Nerantzia Tzortzi,
Maria Stella Lux**

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Proceedings of the 3rd YADES Conference and Summer School. 29-30th May 2023, Fondazione Riccardo Catella, Milan, Italy.

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FOREWARD

MAGUELONNE DÉJEANT-PONS¹

I would like to congratulate the Editors of this book Prof. Julia Normandia Tzortzi and Maria Stella Lux, “Connecting Heritage. Sharing the heritage perspective across different domains” prepared in the framework of the YADES project.

A number of high-quality authors have come together to provide concrete answers, considering the use of new technologies, to two key questions in a changing world: ‘Architecture and Landscape of Historic Centres’; ‘Urban Planning and Adaptation Strategies’.

I would like to take this opportunity to remind the importance given to landscape thanks to the impetus of Prof. Julia Nerantzia Tzortzi.

I met Prof. Tzortzi 20 years ago in Athens when she was Deputy Chair of the prestigious Panhellenic Association of Landscape Architects (PHALA). She participated to several conferences of the Council of Europe, and we were pleased to invite her to give a presentation at the 21st Council of Europe Meeting of the Workshops for the implementation of the Council of Europe Landscape Convention on “Landscape and education” held in Tropea, Italy, in 2018. Our collaboration continued during the 2nd YADES Summer School when I was invited to present as keynote speech and to follow the YADES project.

Congratulations on the achievements and responses to the challenges ahead. This book makes an important contribution to the establishment of sustainable development policies addressing their environmental, cultural, social and economic dimensions.

Maguelonne Déjeant-Pons



¹ PhD in Law, Lecturer, Former Head of the Spatial Planning and Landscape Division and Executive Secretary of CEMAT/Landscape Convention, Council of Europe.

FRANCESCA COLOMBO²

According to global trends highlighted by the United Nations-Habitat, by 2050, there will be a significant global migration towards cities, with 68% of the population moving from rural areas. Ensuring the sustainable development of cities and improving the quality of life will be a priority.

Urban planning, participatory approaches, culture, and the sharing of perspectives across disciplines are central themes for designing the city of the future that can effectively address environmental, social, and cultural challenges. It is important to read in-depth works on these themes and to witness the liveliness of the debate that animates such important issues.

Having engaged with these themes for over 20 years as a cultural manager, I firmly believe that cultural values must be placed back at the heart of urban development strategies and Cultural Institutions should finalize their work also for a common social impact. Cities need to be resilient, fostering communities equipped to navigate contemporary challenges and deliver lasting social and cultural impact. Urban regeneration projects hold immense potential. By prioritizing culture, green public spaces, the unique identity of places, and the active participation of local communities, these projects can become catalysts for education, social cohesion, and a stronger sense of belonging.

This is what I strive to advance through my current professional journey as General and Cultural Director of BAM – Biblioteca degli Alberi Milano, the innovative public-private partnership between the City of Milan, Fondazione Riccardo Catella, and COIMA, for the management of a public park in the heart of Milan, which I have been managing since its start-up phase and public launch in 2019. A public space that we care for its maintenance, security and cleaning. A contemporary agora with a rich and vibrant cultural program of more than 200 free events a year that we create for the citizens and for their wellbeing.

Congratulations to Prof. Julia Nerantzia Tzortzi for her passion, commitment, and the outstanding work she has done. I hope her efforts, along with the continued effort of all of us, will inspire policymakers and institutional leaders to fully integrate heritage considerations into the decision-making process, shaping a future where vibrant cities and resilient communities thrive.

Francesca Colombo



HELENI PORFYRIOU³

The term Heritage is borrowed from legal terminology and may be described as a property inheritance, something that is inherited, passed down from previous generations, together with the related notions of responsibility and “holding in trust”. Cultural inheritance is extended to encompass ideological, immaterial elements (referring to ideas and feelings) that the inherited property is accompanied by. In other words, the term Cultural Heritage (CH) holds together property and ideology. No social idea can exist without its physical manifestation (whether it be land, objects, food); similarly, the apparent dichotomy of CH, of property and ideology is unreal. CH cannot be divided: The objective property value and subjective cultural value are intrinsically related. This is the reason why CH is politically contested, why it can be owned, and why no group can afford to preserve all its heritage in the style that it might wish.

As scholarly debate has revealed, cultural heritage is cognitively constructed, as an external expression of identity, operating in a range of ways and levels. It is a social fact. Heritage is the cultural authority of the past, as well as a selective construction of individual and corporate identity. Heritage is also part and parcel of that complex of beliefs and actions that emerged and developed in Europe, around 1500 and 1750, and that engage particular notions of the nature of history, the force of scientific reason, the rights of the individual, and the rule of law. Though outcome of a specific historical and cultural context, CH, like many other European notions, have spread over the world, but we must remember that it is not native to most cultures and is not by any means necessarily the only or the best way of constructing a relationship of identity on the crossover between past and present.

Once aware, therefore, of this complex understanding of CH (as property and ideology) and of its multiplicity of forms according to time and space, we can clearly imagine the difficulties countries like China (which since last century didn't base its organization on property and more specifically on private property) encountered (both in practical and ideological terms) and still have in appropriating and employing CH. Or the opportunities, always in China, Vernacular and rural heritage offered initially to the “New Socialist Countryside” policy, promulgated with the 2006-2010 Five Year Plan and more recently to the Rural tourism development. A development, which together with other actions brought Chinese rural population by 2020 to overcome absolute poverty level, and sometimes even promoted sustainable solutions.

Historic cities in western countries have been the more representative battle ground of the evolution of the idea of Cultural Heritage: initially in late 19th century, CH was legally comprising only monuments and historic buildings, then gradually the area around them -- their context/ambiente -- was comprised, up to the first “urban conservation” laws of the 1960s in UK and France. This process was followed by the extension of the conservation from the physical context to the functional and social one, up to the intangible; and further extended from the urban to landscape and ending to the more recent Historic Urban Landscape concept of 2012. This evolution of the concept of CH from the single monument to the whole city and its social, historic landscape seems to reflect society's changing needs and understanding of heritage. Often, however, the outcome of the legislation attempting to preserve historic cores has mummified them, musealized them, when, on the other hand, contemporary society is moving fast, and urban growth is exponential. So, at times we have a two-pace development.

The Chinese example (again) I would like to mention, clearly shows urban heritage as a battle ground of opposing ideas of development. It refers to the late 1980s introduction of urban conservation by prof Ruan

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Yisan, in the water towns of the area (South of the Yangtze river) around Shanghai⁴. The fast urban development China was undergoing in those years (immediately after the opening of the country to international commerce) was destroying towns and cities at an exponential pace (you forgot your jacket in a restaurant... and the day after, while going to pick it up, there was no restaurant anymore). Industrial development (accompanied by extensive demolitions, new infrastructures and house building) was the way to catch up with the world. Ruan Yisan proposed, as an alternative to this development the tourist development of these traditional towns, saving them from destruction and protecting them, maintaining their population and giving them a viable economic alternative through tourist industry. Initially his plan worked, but since 2000 mass tourism changed their fate in museum villages with no inhabitants and with entrance tickets to visit them. Tourist industry won, but the attempt showed a path to urban conservation from inside, promoted by social cohesion and considered as a viable economic solution.

Nowadays heritage tourism is the panacea for any cultural heritage asset valorization (archaeological site, monument, museum, cities or landscapes, ethnic minorities or intangible assets). But many historic cities, sites, museums are flooded by people, having huge problems of management, gentrification or residents' dislocation. In parallel, many other sites are falling in decay, are abandoned and they desperately try to attract tourists. It seems impossible to balance the two opposing forces of heritage viability (particularly of small urban heritage sites and historic towns) and of tourist industry.

The personal experience I am presenting here is a PNRR project (that is a project utilizing the European Recovery Plan funds) we won in 2022 in the context of a national bid promoted by the Ministry of Culture in order to socially and economically revitalize Italian small (with less than 5 thousand inhabitants) historic towns.

Our project regards the small town of Grotte di Castro, in the Lazio region. The project is a 4 years' one. The actions we put forward are closely interrelated and regard the town's revitalization by actively motivating and involving its approximately 2000 inhabitants in: the process of recognizing their town's assets (economic, social, cultural), expressing their desires, participating in the solutions we propose (adding their own), and promoting new economic activities; with the aim to leave the town and the town council, when the project will end in 2026, with at least a couple of cultural activities and new economic resources which the local community and stakeholders will have to run, in order to continue the process of sustainable revitalization we are expecting to have promoted.

We identified the cultural assets of the territory in the Etruscan necropolis, its water culture and related artefacts, and the well-preserved historic town in a picturesque hilly setting. We started organizing a network of itineraries, both in physical and digital terms, around these assets distributed in the territory and we linked them both to the major tourist routes of the region and to the cultural events we planned and organized (conferences, laboratories, workshops, tours, digital sources and infrastructural works)⁵.

Cultural assets, economic assets (identified in a similar manner and interlinked with major networks) and social participation are the three cardinal points of the project's success, which has been elaborated by architects, town planners, sociologists, managers, economists, historians, archeologists, landscape planners, and experts in accessibility, as well as in digital humanities. The town council is the project manager. Multi-disciplinarity, public-private collaboration, active local participation ... and a lot of enthusiasm are therefore its, hopefully successful, ingredients.

Heleni Porfyriou



⁴ H. Porfyriou, *Urban Heritage Conservation of China's Historic Water Towns and the Role of Professor Ruan Yisan: Nanxun, Tongli, and Wuzhen*, "MDPI – Heritage", 2(3) 2019 <https://www.mdpi.com/2571-9408/2/3/149/htm>

⁵ <https://www.ispc.cnr.it/en/2022/11/02/scenari-nuovi-per-borgo-e-territori-antichi/>

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INTRODUCTION

JULIA NERANTZIA TZORTZI, MARIA STELLA LUX¹

What is heritage? It has come to be said in the far reaches of a long debate that “everything is heritage” and indeed observing the evolution of this concept over the last century it seems that even the ambition of international bodies such as UNESCO is to widen the concept of heritage. But beyond definitions, in actual practice heritage is the meeting ground of many humanistic and scientific disciplines that are dealing with the material and immaterial aspects of this complex concept.

From the conservation and restoration of historic buildings to their reuse with new functions, from the discourse of identity to the debate on inclusion, from the protection of historic centres to the need of adapting them to climate change and new social demands.

The YADES project has approached the topic of heritage from the technical-scientific perspective of assessing and mitigating climate-related risks. The 3rd Conference and Summer School of the YADES project is the continuation of a path of exploration and discussion which aims at broadening the audience and including more perspectives. The 1st Summer School organised by the National Technical University of Athens (YADES project coordinator) was held in Athens in 2021 and was focused on the identification of methods for Cultural Heritage risks assessment. Then, we organised in Politecnico di Milano the 2nd Summer School in 2022, trying to explore the relevance of the inclusion of the landscape perspective in the heritage discourse. Following the progress of the project, the 3rd edition became a significant moment of synthesis, where we decided to create an opportunity to meet across different perspectives and professions working in the same field.

In particular, restricting the field of action to historic city centres, i.e. areas in which a large part of the material urban heritage is concentrated and which are generally protected as the expression of a city and living culture that is layered over the centuries, we decided to articulate the debate around three main thematic areas: architecture and landscape of historical centres; urban planning and adaptation strategies; risks evaluation and decision-making.

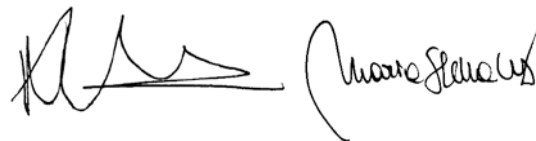
In proposing this research hints for the YADES conference, we invited the authors to reflect on some relevant questions. For instance, with the aim of reducing the gap between theoretical research and the practical reality of design, it is worth to investigate how the theme of identity and the understanding of cultural value can become the basis of architectural/landscape design both for intervention on the existing heritage and the integration of new design features in historical contexts. Furthermore, widening the focus to the urban scale, we could ask whether and to what extent the ongoing adaptation processes to face the increasing risks of Climate Change are able to effectively include historic centres as well. This question is not easily answered and highlights a critical aspect, namely the apparent conflict between the needs of preservation and conservation with those of innovation and adaptation. The way to the solution, we believe, may be the one indicated by UNESCO and ICOMOS, which have highlighted the role of cultural heritage in its tangible and intangible aspects in contributing to urban resilience and community preparedness. However, the practicalities of implementing this guideline and the specificities of different cases remain to be explored and discussed. The goals of the 3rd YADES conference and of this volume then include the purposeful discussion on how to include cultural value in risk assessment and how to include the heritage perspective in decision-making processes. This necessitates once again an active and participatory discussion on the guiding principles we choose as inspirational, in light of the evolution of international debate. On the other hand, it also requires delving into the practical details of the subject matter, understanding the actual mechanisms of operation within our society and the processes that characterize it, and proposing strategies appropriate to the specificities of each context.

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The debate structured along these guidelines is enriched by the valuable experiences, case studies, and reflections contributed by all the authors who participated, whom we sincerely thank. We extend our gratitude to Maguelonne Déjeant-Pons, Francesca Colombo, and Heleni Porfyriou who provided enthusiastic support for our work, as well as to Biagio Guccione, Domenico Chizzoniti, and Dimitra Babalis, who participated as keynote speakers at the 3rd YADES Conference and wrote the prefaces to the two sections comprising this volume.

Looking forward to continuing this lively discussion on heritage.

Julia Nerantzia Tzortzi, Maria Stella Lux

The image shows two handwritten signatures in black ink. The signature on the left is more stylized and abstract, while the signature on the right is more legible and appears to read 'Maria Stella Lux'.

PART

I

**ARCHITECTURE
AND LANDSCAPE
OF HISTORIC CENTRES**

DOMENICO CHIZZONITI¹

How is it possible to preserve, transform and enhance the urban environment related to a whole city in the late 20th century, considering the role of architecture and landscape as the main essence of historical centers, and at the same time incorporate ideas which in the past have tended to be the result of a readable and coherent growth of the urban framework.

It is clear that merely a concern for appearances – the form and feel of a place or of a building – has not been a matter of significant interest in the process of reconstruction, as operators are pushed and trained to think of the idea of cities in terms of use, density and diagrammatic functions.

There are some attitudes in the specific process of reconstruction we focus on, for instance, in the conflict in the Middle East region that has been a dominant theme over the past half-century.

Historic cities have been destroyed in the war conflict, but their inner-core spirit and religious culture are deeply rooted in the heritage that survived the war, and re-establishing the relationship of dialogue with the past is beneficial to urban revitalization.

There are a few principles or attitudes, we may encounter, in the association between the role of architecture and that of the landscape of historical centers. The factor of density, clearly carried out at Cambridge Academy under the oversight of Sir Leslie Martin, who showed that a given site could be developed with the same amount of floor area in several different ways. A more precise way of making this comparison between what Martin called the “pavilion” and “hollow square” forms is to say that the “hollow square” form places the same built space on the same area of land in exactly one-third of the total height of the “pavilion” form. It follows, of course, that there is no need to build high in order to achieve high densities. In the case of the traditional middle-Asian town, with its “hollow square” forms or courtyard houses, usually not more than

two stories high, the research carried out by Leslie Martin is a remarkable example of reconsidering the “atmosphere” of the high-density framework without height. In some current practices of reconstruction, the role of the historical landscape recreates a coherent guideline in a context recently deprived of its urban identity. It appears, as well, that a quick and controversial act of reconstruction produced an inappropriate height of new blocks, introduced into a traditional low-rise historical settlement, with severe penalties such as the infringement of privacy, the destruction of the microclimate and the defeat of the historical landscape.

Another aspect to be preserved, regards the purpose of introversion between the two main factors of this framework of continuity and contiguity. In the case of the courtyard assignment, used widely in every kind of building throughout the Middle Asian world, inevitably produces urban conditions enduring partitions in the urban blocks, and all the construction seems to be connected and merged with each other. This, in turn, produces a peculiar urban scale and character, as well as space between and within buildings – streets, alleyways, small squares courtyards and patios – readily appreciated as collective space. Moreover, the unbroken wall on the public side and the courtyards on the private side, with the internal spaces facing inwards onto these, also help in achieving a form of privacy by protecting both internal and external areas from the irradiation of the sun.

Consequently, the aspect related to the informality assessment of public space and the formality of private space, in these typical towns, include an aggregate of formal private courtyard space, with the streets as informal spaces along the natural lines of communication. As a paradigmatic example, the tortuous streets of old Aleppo are the result of this organic process, helped along no doubt by the need for surprise in defense. The same aspect can be encountered in the case of old Mosul, where both the tortuous street and the rectangular courtyard of mosques, madrassas, khans and houses are essential contrasting elements of the settlements, basic aspects of historical landscape, and original distinctive factor of the urban formality. Finally, the tendency of modern development is to isolate and crystallise the use of space, in distinct and specialized patterns of use. Uses, on the contrary, which were traditionally combined and integrated into one structure, are individually provided with their own separate facility, while constructions of similar use, say industrial or cultural, tend to be grouped together. This tendency results in specific Western cultures, where even the

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housing results itself separated into the different income groups, or into public and private sectors. Yet in the Middle East, there are many prototypes, such as the souk, as the most developed example of integrated functions. The souk is of course the physical expression of a particular culture, and the extent to which the souk maintains its vitality and remains the basis of city life is a measure of the strength of that culture. "In a healthy society," says T.S. Eliot, "... the artist, the poet, the philosopher, the politician and the labourer will have a culture in common, which they do not share with other people of the same occupations in other countries." (Essay On Poetic Theory- Tradition and the Individual Talent) The souk traditionally embraces all these occupations.

This view looks at the topic of post-war architectural reconstruction in an urban regeneration context. The reconstruction of cities needs to face an idea about the balance between development and enhancement, conservation and transformation. The approach aims to revitalize collective memory through strategic points for pre-war community life in the context of purposeful and deliberate destruction. This approach tries to keep the balance between tradition and modernization, memory and oblivion, reconstruction and conservation. The use of local techniques, materials and architectural features deciphered in contemporary projects are a sustainable proposition to build a renewed future for the city.

BIAGIO GUCCIONE¹

CONNECTING HERITAGE is an evocative and ambitious topic, as evidenced by the contributions published in this section. All of them together provide a rich mosaic of solutions arising from diverse situations. The essays published here move in two directions: on the one hand, they offer methodologies of investigation and solutions grounded in reality, while on the other they experiment with innovative tools to achieve our objectives, such as the digitization of the material cultural heritage discussed by Mandilara and Potamias. In addressing the preservation of the historical heritage, we are all aware that this heritage is now used by a society that has lost the cultural and economic features of the period during which it was created. Therefore, it is imperative to identify new paradigms. The first example, presented by Grigoriadou and Kouveli, addressed is a case of industrial archaeology: the Tobacco Factory in Kavala, Greece. This site not only holds intrinsic value but also represents the identity of the area, affecting the landscape through tobacco cultivation. It is crucial to safeguard this site and find suitable reuse tools to preserve the cultural identity of the city's inhabitants.

The same topic is tackled by Li and Cantini in an urban center far from Greece, in China, but with the same objectives. The outcomes, as reported by the presenters, seem encouraging: "While absolute space disappears and abstract space is created following the intervention of the government and the operators who are the 'new people of Jieshou', they are also producing spaces of difference in their daily lives. In the eyes of the visitors, these operators are already locals, and have become a resident group in the village". This novel approach may lead to positive outcomes. There are no recipes or protocols applicable to all realities; this might be the most suitable approach for a Chinese city.

The main theme here is the management of urban greenery. The papers address every facet: from urban green systems to the restoration and use of historical green spaces. Occasionally, the worn-out dichotomy between conservation and development emerges. In the landscape architecture perspective, this dichotomy does not exist. We recognize only the evolution of the landscape, whether urban or rural. Thus, the restrictions currently in place serve little purpose, as they only provide a false sense of security. Instead, we should focus exclusively on the "rules of transformation." Everything must be designed, planned, and managed. Even the most precious historical park, which we all agree should remain untouched, cannot be preserved by mere restriction but by active management. We know that frequent use, even the most respectful, can cause damage over time. Conversely, degraded areas must be planned and managed to prevent deterioration from worsening.

This approach is consistently present in the papers published here. For instance, Maria Stella Lux, after examining the surviving historical gardens in central Milan, concludes by saying that "There is a need for an advancement of planning instruments to regulate both public and private engagement in the conservation of existing green assets and foster synergies for the extension of this heritage. Last, citizens and the collective awareness of the value of Urban Green Heritage have played in the past and continue to play a key role in the recognition and protection of this common good".

The contribution of Dimelli, Petrou, Tzermia and Chimonaki shifts study of the green system in two historical Greek centers (Chania and Corfu) and adds another objective, namely the transformation and reuse for social purposes. "The historic cities of Chania and Corfu serve as the central hub of a continuously expanding urban area. Over the past few decades, the city has experienced a surge in tourism activities, which have had a detrimental impact on its environment, leading to the migration of its residents to the suburbs. The challenge at hand is to re-plan the area with principles that promote social cohesion and preserve its historic elements. Additionally, it is crucial to prioritize residential land use and foster its coexistence with other urban functions to a greater extent than currently exists".

Last, the intervention proposed by Hasbini for the urban system of Piazza Duomo in Milan is a meticulous operation, akin to restoring a jewel with the same care and craftsmanship. It is no coincidence that the conclusions urge proceeding with great caution: "Enhancing the green environmental per-

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formance of these building envelopes may be feasible by adding – subtly – green roof, green walls, as well as water planes. Adopting green restoration techniques is mandatory to express sustainable continuity and to enhance the environmental conditions of this space, scrubbing carbon dioxide and other pollutants. The secular building envelope plays an

important role in addressing climate change issues, mainly in urban areas with dense fabric”.

In short, these studies highlight the complexity of the theme and show that the preservation of our heritage does not have one-size-fits-all solutions. Instead, it requires careful, diversified studies and innovative methodologies tailored to each case we face.

1.1 The Archeological Museum of Cyprus in Nicosia

Architectural and landscape design proposal

J.N. TZORTZI¹, M. VISCONTI²

Introduction

Today's megacities are becoming multiethnic and multicultural, and therefore it proves essential that museums in these cities are equally present and highlight museum collections that express this multiculturalism and transnationalism of megacities. Cities are turning to their architecture and cultural heritage to find their identity. This change is leading to the formation of globalized landscapes, with a dipole of tradition on the one hand and a dipole of innovation on the other. In these globalized landscapes, it is possible to observe the presence of cultural clusters, i.e. islands, in the heart of the city (Gosbondini, Beriatos, 2006, Economou, 2003).

Furthermore, it has been discussed for decades how museum institutions can address their old dilemmas and new sociocultural challenges not only in the field of critical museology but also for other specializations (Hooper-Greenhill 1992; Bennett 1995; Witcomb 2003; Anderson 2004; Edwards et al. 2006; Chambers 2014; MacDonald 2015, 2022; Oswald and Tinius 2020).

As a key element of the "creative city", museums play an important role in urban politics and cultural tourism (MacLeod 2002; Mathur 2005; Michels et al. 2014, Baldwin, 2024).

As an institution in each country, it is recognized that museums are not just warehouses, but organisms that help to protect, manage and promote cultural heritage. As for archaeological museums, the state considers the establishment of museums as a means of disseminating and protecting antiquities, preventing the sale and export of collections abroad, enriching European collections, but also as

a means of preventing people from destroying them (Voudouri, 2003).

This paper presents our proposal for the new Cyprus Museum submitted to the international architectural competition organized by the Cyprus Ministry of Transport. It is an innovative multidisciplinary approach that includes architectural, landscape, bioclimatic and structural initiatives for the design of the Cyprus Museum.

The project, which involves the repurposing of a museum complex, is an example of a holistic approach to complex issues such as cultural heritage, sustainability and the preservation of the collective memory of the Cypriot landscape. To understand better the proposal, we are giving below a short history of the existing Cyprus Archeological Museum.

History of the existing Cyprus Archaeological Museum

The Existing Cyprus Museum in Nicosia is the oldest museum in Cyprus and became a model for the management of archaeological museums in the provinces. The Cyprus Museum was established in Nicosia in 1882 by a British decree at the request of all residents of the island to create an archaeological museum to protect the archaeological heritage, illegal archaeological excavations and antiquities smuggled from the island by third parties (Karagiorgis, 1985)

In 1905, with the implementation of the first archaeological law, passed in Cyprus during British rule, the process of erecting a new building specifically designed to house the public collection of antiquities began (Gaber 1989, Karagiorgis 1985, Merrillees 2005). It is a large neoclassical building, whose construction started in 1908 and finished in 1924, with architectural plans by Nikolaos Balanos provided by the Archaeological Society of Athens. With successive expansions, additions and conversions, in various periods of time, it reached in 1972 (Figure 1) its current form consisting of fourteen rooms surrounding an inner square-shaped central hall. The museum was dedicated to Queen Victoria and at the time was a modern institution with collections displayed in an ordered and as scientific as possible (Karagiorgis 1985).

Until 1935, the museum was managed by a committee (the Cyprus Museum Committee) chaired by the British High Commissioner, whose deputies were the Archbishop, the Kadi and the Mufti, while the members were elected by the subscribers of the museum (De Sousa Sandos, 2018, Karagiorgis, 1985, Dikaios 1934). The newly formed museum management committee was operated in two rooms of the government offices of the General Secretariat. According to Merrillees (2005), the prevailing situation was far from what we imagine when we think of the word museum. In 1889, the museum's collection was transferred to a house in Victoria Street within the walls of Nicosia, where it organized (Gaber 1989, Merrillees 2005). Financially, the mu-

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Fig. 1 - Front view of the Archeological Museum.
Source: Authos.



Fig. 2 - The central room of the existing Cyprus museum.
Source: Authors.

seum relied mainly on ticket sales, replica sales and small donations.

Finally with the beginning of the next century the need for more effective management of monuments, archaeological sites and the museums themselves became increasingly urgent, leading to pressure from various professional associations and even public opinion both in Britain and Cyprus (Karagiorgis 1985, Du Plat Taylor, 1963), Dikaios 1961). With the issuing of the Antiquities Act of 1935, the regulation of museums was abolished and the museum became an official state institution, under the Cyprus Antiquities Authority.

In 1960, the famous archaeologist Vassos Karagiorgis took over the management of the museum. It turned out that the Cyprus Museum received most of the results of archaeological investigations carried out under the Antiquities Act in 1964. During his tenure as Director, archaeological excavations in Cyprus experienced an unprecedented development and continued even after the Turkish invasion of 1974 (Meskell, 2006). In 1985, the museum became the living cell of the Cyprus Antiquities Authority, promoting excavations in the four largest archaeological sites on the island (Palaipafos, Nicosia, Limassol, Larnaca) and other parks on the island (Karagiorgis, 1985).

Today, all the excavated materials are collected in the museum (Figure 2), which manages and highlights the cultural heritage of Cyprus. The museum's collections seem to present the history of Cyprus in a specially designed space. It covers the island's history from the 9th millennium BC up to the early Byzantine period (Table 1). In particular, the design of the ceramics and sculpture rooms allows visitors to intuitively understand the development stages of art in various eras (Karagiorgis, 1985). Karagiorgis also stated in 1985 that the hall of ceramic folk sculpture was designed to allow visitors to visually observe the artistic stages of various periods, and

the uniqueness of the museum is that all the collections are entirely from Cyprus.

On display in the Museum's exhibition Rooms are major highlights of Cypriot archeology and history, as well as ancient objects that allow the visitor to take a glimpse into everyday life in ancient Cyprus. The Cyprus Museum annually hosts periodical exhibitions on many interesting themes of ancient life.

- The Cyprus Museum seems to highlight various cultural objects in its collection. Three main are:
- The statue of Emperor Septimus Severus: 2.08 meters high bronze statue, Roman sculpture from the 2nd century. It was discovered in Kyslia in 1920 by a Swedish archaeological team, who commissioned an experienced foreign restorer to maintain it.
- The statues of the Horned God: Bronze statue from the Sanctuary of Eingomi. It probably represents Apollo Kereatis, whose cult came to Cyprus with the Achaean settlers. It dates back to the end of the 12th century BC. It is dated
- The two thousand clay statues found in the sanctuary of Agia Irini (Figure 3) on the northwest coast of Cyprus (Raddato, 2016). The figures date back to the 7th and 6th centuries BC and are displayed as they looked when they were found. They show priests wearing bull masks, sphinxes, minotaurs, centaurs, bulls, and warriors on chariots. The monumental work from 1927 to 1931 was the result of systematic work by four young Swedes under the direction of Einar Gjerstad (Gjerstad et al, 1935, Göransson, 2012).

According to Meskel (2006) museums contribute to the effective management of cultural heritage by fully highlighting the history of the region by expressing the memory of the past and the concerns of the people. Building on this concept the Nicosia Regional Tourism Development and Promotion Association (ETAP) decided that the need of a new

PERMANENT EXHIBITIONS Required Area: 4.000 m²			
No.	Period	Qty.	Objects
1	Early Aceramic Neolithic Period	50	Animal bones and stone tools
2	Neolithic Period	300	Stone-flint, serpentine, diabase, andesite, picrolite, obsidian, animal and human bones, bone tools, shells, jewellery of dentalia ceramics
3	Chalcolithic Period	300	Lithic, bone, ceramic, jewellery of shell, picrolite and copper
4	Copper – Metallurgy - Trade	500	Objects
5	Early Bronze Age	200	Objects of gold, copper and clay
6	Middle Bronze Age	75	55 Ceramic objects, 10 gold pieces of jewellery and 10 clay figurines
7	Ceramic Production	100	Objects
8	Late Bronze Age	810	300 Ceramic objects, 100 copper, 80 cylinder seals, 50 clay figurines, 50 inscriptions, 20 pieces of alabaster, 10 pieces of glass, 20 of bone, 150 pieces of gold jewellery, 10 pieces of gold/ silver, 20 of faience, lamps, stone vessels and tools
9	Aphrodite and her cult	100	Objects will be displayed
10	Cemeteries, Cypro-Geometric Period	300	150 ceramic objects, 30 bronze, 100 pieces of gold jewellery, a ceramic lamp, 20 clay figurines, mortuary assemblages
	a. Cypro - Archaic Period	723	150 ceramic objects, 100 statues, 20 bronze statuettes, 120 scarabs, 30 glass amulets, 40 pieces of gold jewellery, 10 ceramic lamps, 30 bone objects, 20 inscriptions, 200 clay figurines, 3 funerary stelae.
11	b. Cypro - Classical Period	569	200 ceramic objects, 30 statues, 10 bronze statuettes, 50 bronze objects, 50 pieces of gold jewellery, 10 alabaster objects, 10 inscriptions, 60 clay figurines, 10 funerary stelae and sarcophagi, salamis necropolis: 60 objects specially arranged for T. , 79 (bed and thrones and bronze cauldrons From Both Periods: 500 coins, 10 silver and 10 glass objects
12	Excavation of the Swedish Mission	400	Clay figurines from Agia Irene sanctuary
13	Hellenistic Period	196	50 Ceramic objects, 30 statues, 3 bronze statuettes, 20 bronzes, 32 pieces of gold jewellery, 40 clay figurines, 4 funerary stelae/ sarcophagi and 17 statues from the salamis gymnasium
14	Roman Period	257	44 Ceramic objects, 20 statues, 5 bronze statuettes, 15 bronzes, 40 gold pieces of jewellery, 20 ceramic lamps, 50 glass objects, 15 bone objects, 13 inscriptions, 30 clay figurines, 5 funerary stelae
15	Lampousa Treasure	10	Gold and silver objects
16	Early Christian Period and occurring changes with advent of Christianity	28	14 Pieces of gold jewellery, 2 mosaics, 6 ceramic lamps, 6 inscriptions

Table 1 - Permanent Exhibitions in Cyprus Museum.

archaeological museum is vital and is expected to become a reference point and attraction for thousands of tourists.

Aims and objectives

On 2016 the Cyprus Ministry of Public Works of the Ministry of Transport, Communications and Con-

struction, on behalf of the Republic of Cyprus announced the International Architectural Competition for the Construction of the New Cyprus Museum trying to attract architects with extensive experience in museum design.

The site where the new Cyprus Museum will be built is the old General Hospital (Figure 4), in adjacent to



Fig. 3 - Agia Irini clay votive figurines, 7th – 6th century BCE, Cyprus Museum, Nicosia, Source: Authors.



Fig. 4 - The area of the old hospital where the New Archeological Museum is located (picture included in the competition file) and the call of the International Competition. Source: Republic of Cyprus, Ministry of Transport, Communication and Public Works, Department of Public Works, 2016.

the City Gardens, the existing Cyprus Museum and the House of Representatives. According to the brief of the competition (Cyprus Architects Association, 2016) “the new museum site will become a cultural destination for local and foreign tourists, by highlighting the antiquities collection and offering to the visitors a unique opportunity to travel through time

to understand and study the history and rich ancient culture of Cyprus” (Figure 5).

The estimated construction costs (excluding the planning, supervision and maintenance costs of the project) are estimated in €144 million. The architectural competition required participants to demonstrate boldness and imagination in their design, innova-

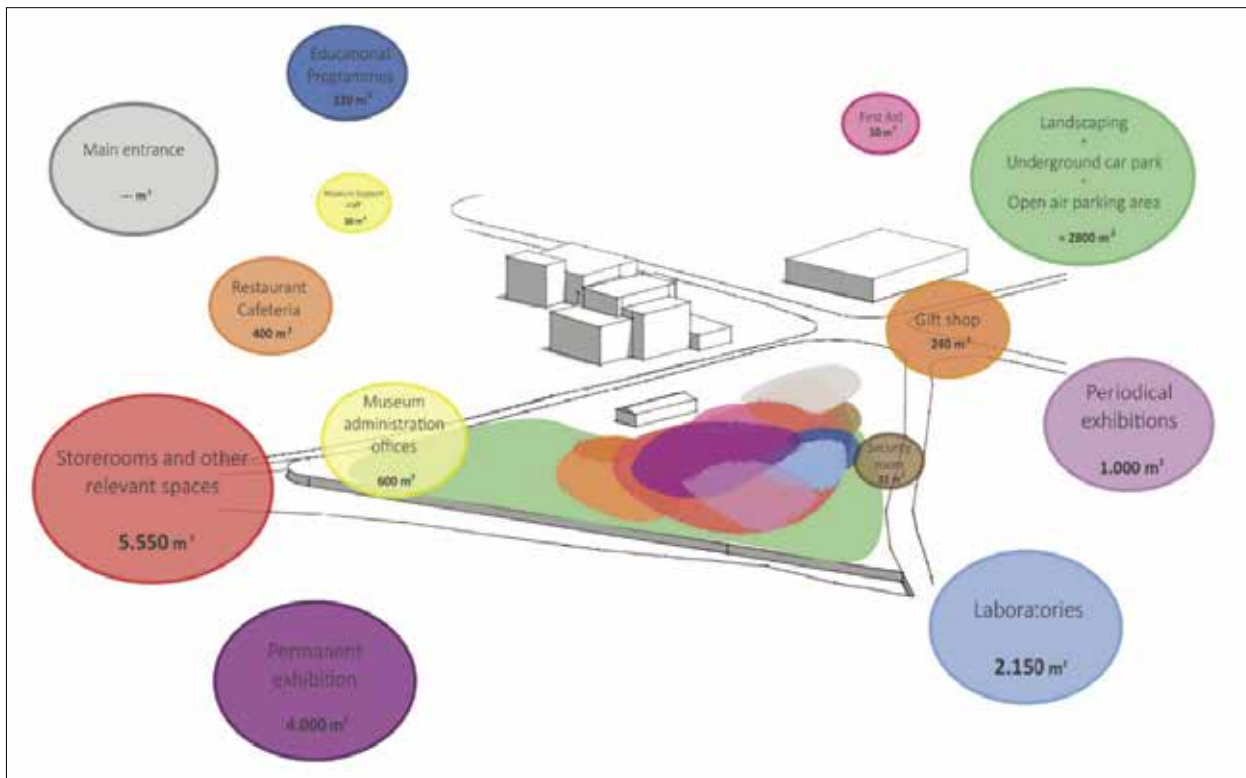


Fig. 5 - The location of the New Cyprus Museum and the Existing Museum with the surrounded area. Source: google earth modified by the authors.

tive approaches to meeting the needs of the museum, flexibility in the structure and the use of modern technologies to improve the energy efficiency of the building (Cyprus Architects Association, 2016).

The goal identified by the Ministry was to create “a modern, timeless public building that would, over time, become a reference point for the region”. The aesthetics of the new museum had to be unique and of a high standard. The interior design, development, structure, construction, connections and distribution of the spaces on each floor and between them had to ensure maximum functionality, easy access regardless of physical condition, aesthetic comfort and user-friendliness (Cyprus Architects Association, 2016).

Proposal description

Architectural principles

A subliminal presence of historical culture upon architectural form is one of the prominent aspects of our project. As a result of this intention the building represents an organic whole driven both in plan and facade from the reminiscence of three well known historical elements (Figure 6). More specifically the shape of the museum’s curvilinear footprint repeats one letter of the ancient Cyprian alphabet, ancient Cypro Sillabic Script, (Steele, 2013) while its urban volume reminds the nearby fortified wall’s diamonds and the sinuous pattern of outer sun protection evokes the concentric ancient geometry of iron age painted pottery (Figure 6).

This concept idea developed through several sketch designs on each floor. The main ones are presented in the following figures showing the basement floor

(Figure 7), the ground floor (Figure 8), the first floor (Figure 9), the second floor (Figure 10).

The building is entered from the nearby pedestrian walkway which links to the existing museum and the surrounding areas while the proposed green area is linked with the green area that surrounds the Pedieos river (Figure 11). This curvilinear envelope, drawn in a “crescent” shaped formula as well as natural lighting are main design features of the proposal (Figure 12), which integrates building and landscape architecture as well as indoor and outdoor spaces into a unified concept (Figure 13). The collection, housed inside a multilevel exhibition space, together with visitors amenities, represents a *comprehensive picture of human presence in Cyprus*. Digital 3D prints reproduce the world widespread joint *Agia Irini* characters (Papantoniou, Bourogiannis, 2018), scenically displayed on the main entrance (Figures 3, 13). The visitor’s route is a three-dimensional loop, going up from the lobby to the exhibition levels by overlapping stairs (Figure 14). Upper floor is a peculiar double height space accommodating big historical findings. Two lateral wings, designed as a natural completion of the main glazed volume, host administrative offices, conservation laboratories, Department of Antiquities and the library, while underground floor contains store rooms, conference hall and car park.

Landscape principles

Landscape design is an extension of inner exhibition spaces (Figure 15) and it will give shape to outer areas. By recalling the island’s original natural environment, the proposal landscape design embodies



Fig. 6 - The location of the New Cyprus Museum and the Existing Museum with the surrounded area. Source: google earth modified by the authors.



Fig. 7 - Cypro Syllabic Script Image is applied as metal sheet perforating pattern. Source: Mary Harrsch, Bichrome Pitcher Cyprus Archaic Period, Photographed at the Los Angeles County Museum of Art, Los Angeles, California, modified by the authors.

a theme that runs central to the exhibition and architectural concept: the returning to a native place. The thread of the sacredness of the tree to certain gods (e.g. the Olive tree sacred to the goddess Athena, the Oak tree to Zeus) has also been considered, therefore most of the proposed tree species relate to this concept (Tzortzi, 2010). The golden Oak (*Quercus alnifolia*), the national symbol of Cyprus was also widely used in the landscape design. More than one thousand years ago Cyprus region abounded

in forests, wetlands, meadows and traditional cultivations, that's why proposal's outside spaces will gave home to trees, shrubs, and herbaceous plants representing 100 original species endemic in Cyprus (e.g. *Bosea cypria*), in Ancient Greece (e.g. *Acanthus mollis* the plant that is represented in the Corinthian columns) as well as in Greek Mythology (e.g. *Myrtus communis*, *Punica granatum* where scarred to the goddess Aphrodite or Venus. (Figures 15, 16, 17). The central square is left open for circulation with a



Fig. 8 - The urban volume reminds the nearby fortified wall's diamonds for the lower sheltered facade of the building, providing both natural sunlight control and burglar-proof safety. Source: google earth modified by the authors.

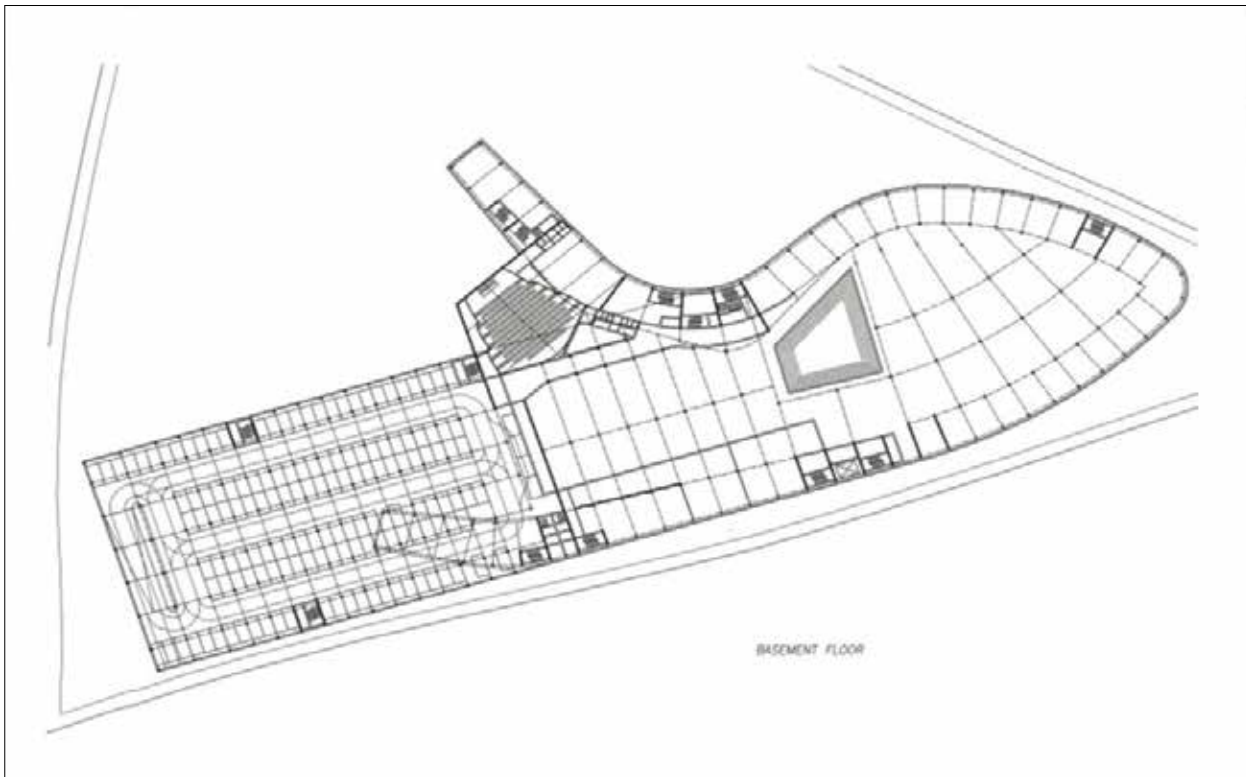


Fig. 9 - Basement Floor design during the first stage of the architectural competition.

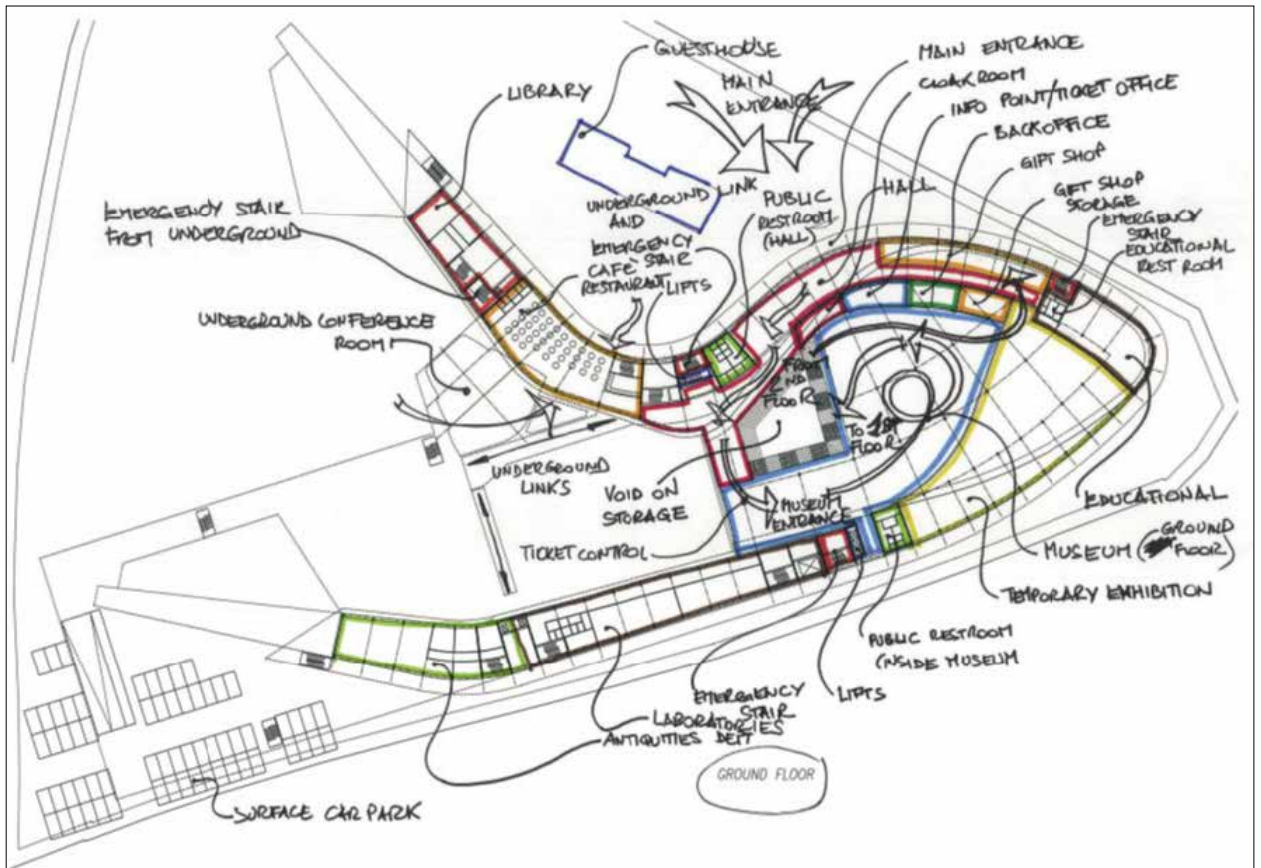


Fig. 10 - Ground Floor sketch design during the first stage of the architectural competition.

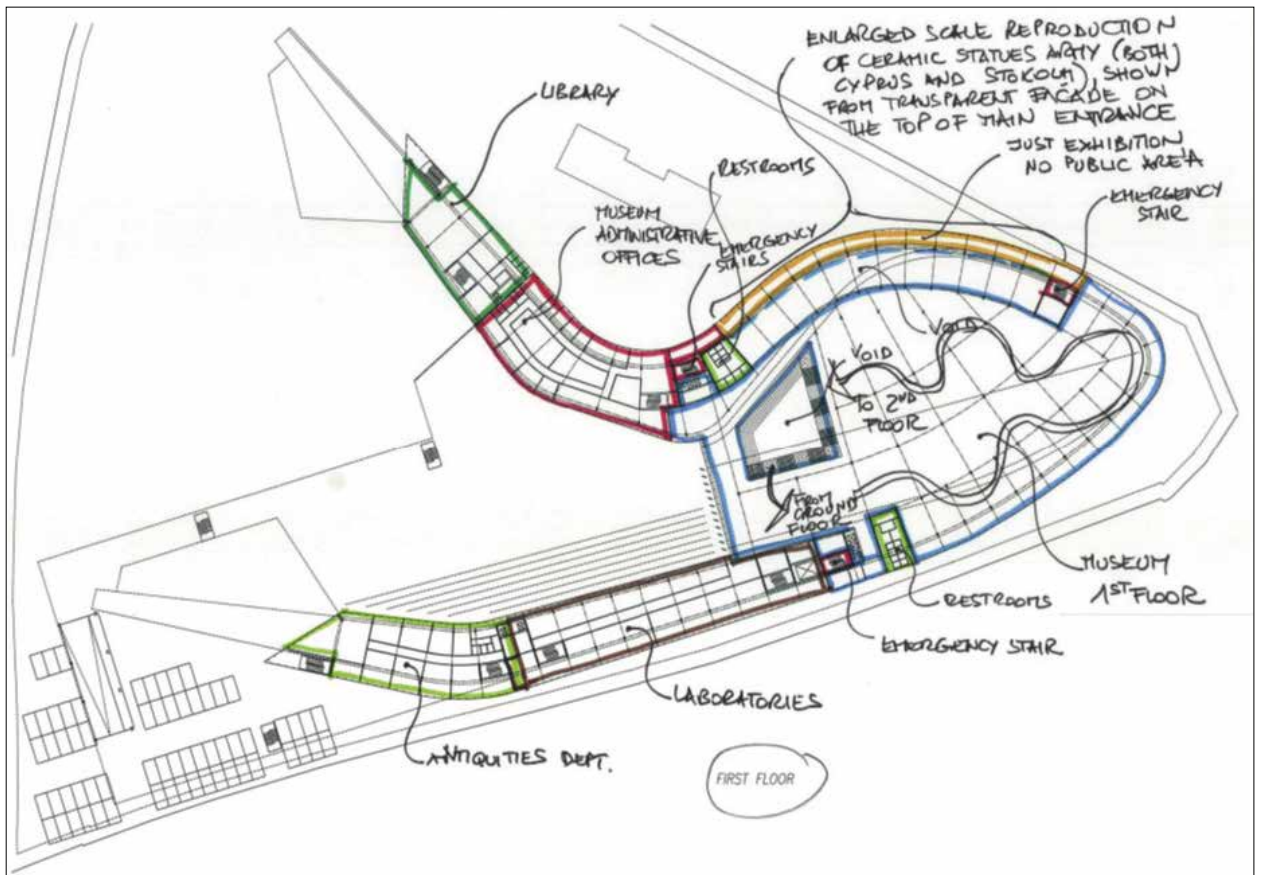


Fig. 11 - First Floor sketch design during the first stage of the architectural competition.

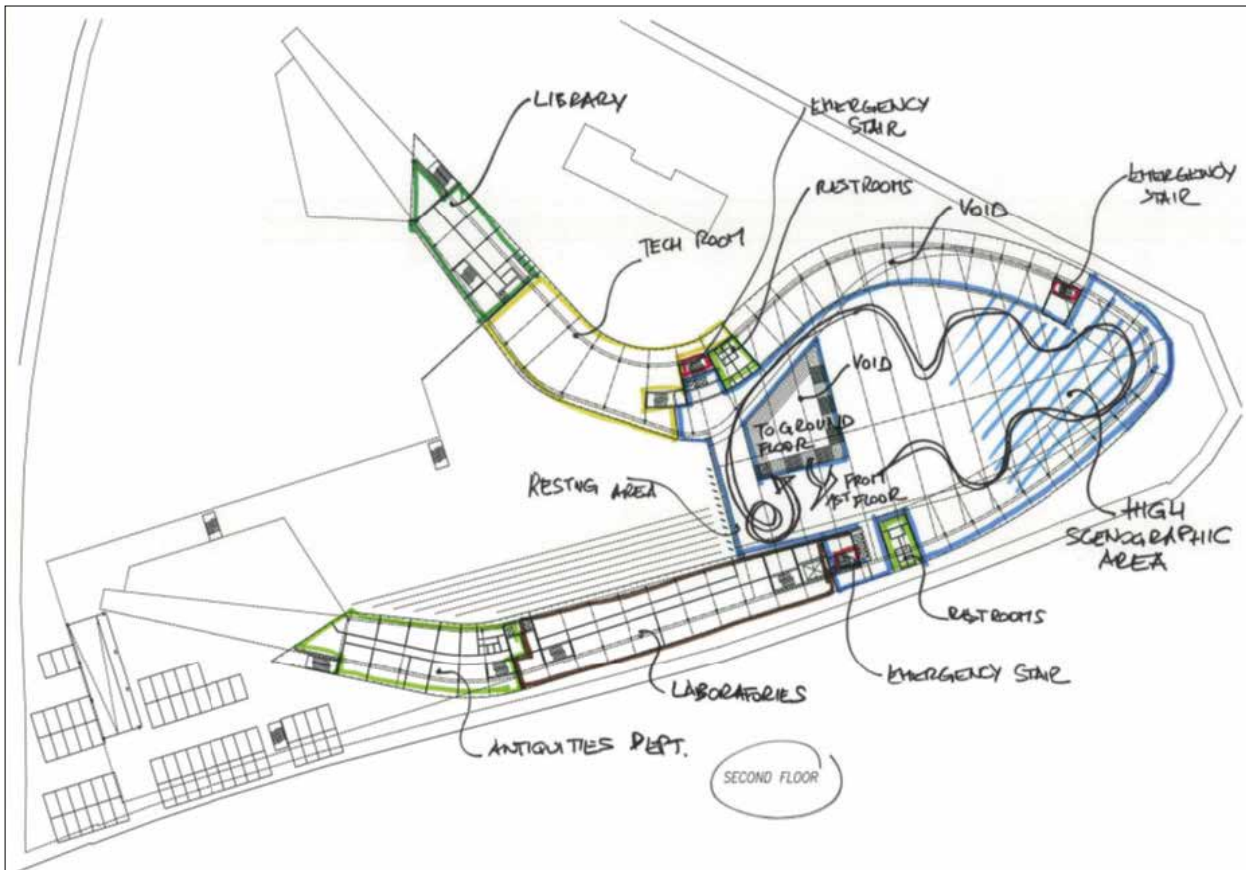


Fig. 12 - Second Floor sketch design during the first stage of the architectural competition.



Fig. 13 - The organic shape of the New Museum containing the reminiscence of relevant historical elements which linked with the existing archeological museum. Source: google earth and modified by the authors.

stone-rock garden designed in order to remind the natural stones of Cyprus (Figures 18, 19). The stones were used either as a playground area or as a sitting area for the cooling season. During the hot days the visitors will sit under the trees shadow.

Technical System strategies

Natural cooling, passive heating and renewable energy production inspired morphology and orientation of the building, while a careful analysis of both surrounding context and local climate has been undertaken to decrease summer cooling load and

heating energy consumption (Figure 20). Roof integrated photovoltaic panels, high performing batteries, widely sun shaded facades, LEED strategies will optimize energy efficiency and increase passive performance of the system (Figure 21). Controlled natural air flow will provide a consistent level of free cooling while transparent surfaces will increase inner winter temperature. Air treatment systems will adopt high performance heat pump to limit consumption in synergy with a specific low energy fan air recirculation to exploit inner latent heat. Flywheel effect will also allow outdoor pools to provide ener-

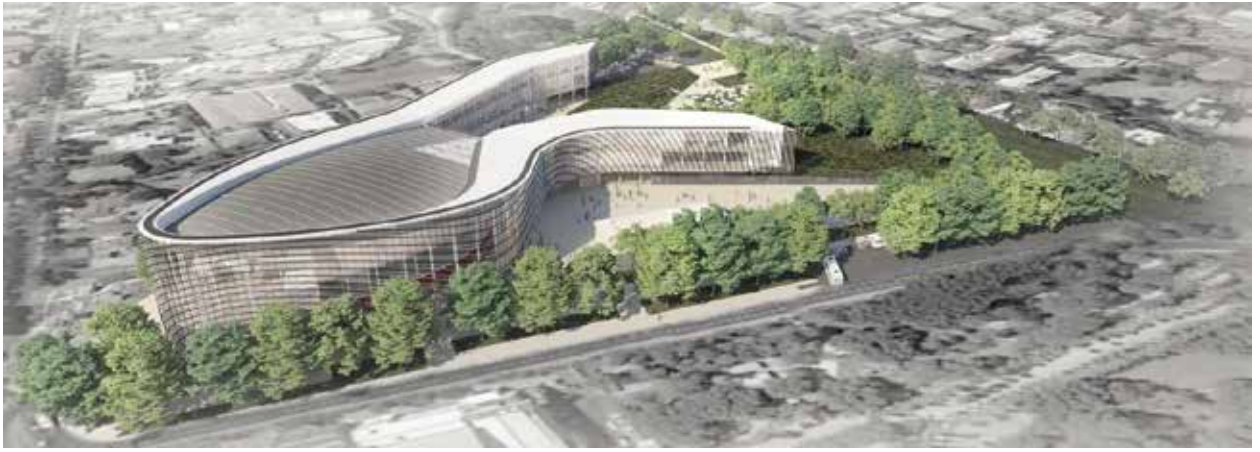


Fig. 14 - Concentric circles geometry projection on complex building facade surface generates solar shading tubular element patter. Source: authors.

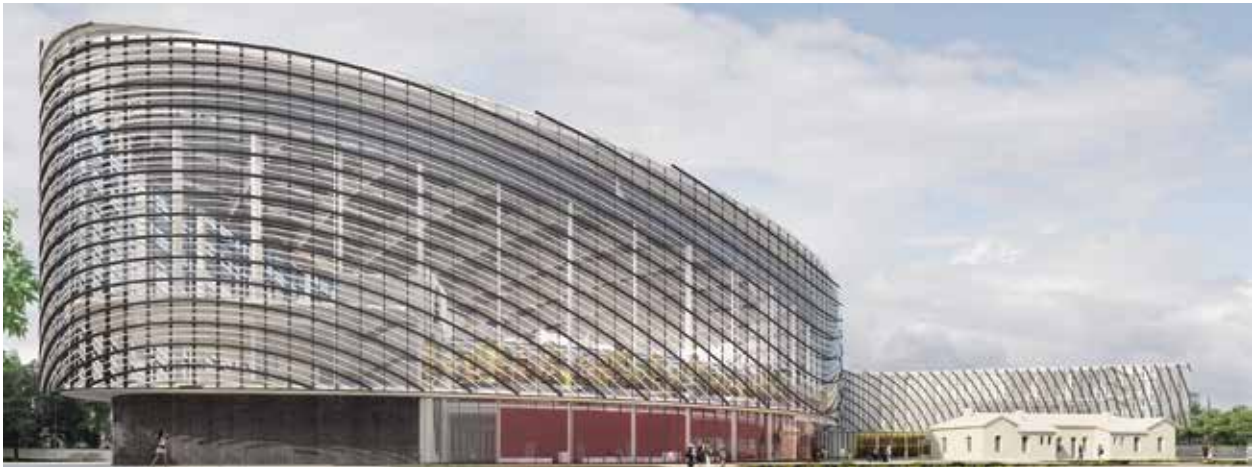


Fig. 15 - Digital 3D prints reproduce the world widespread joint Agia Irini characters. Source: authors.

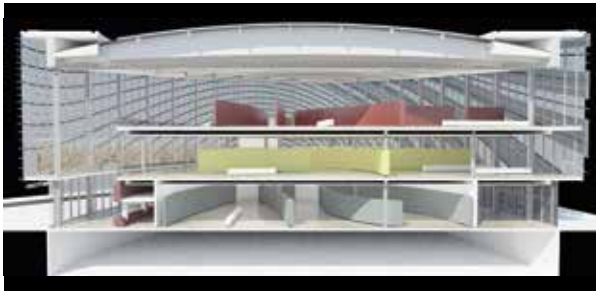
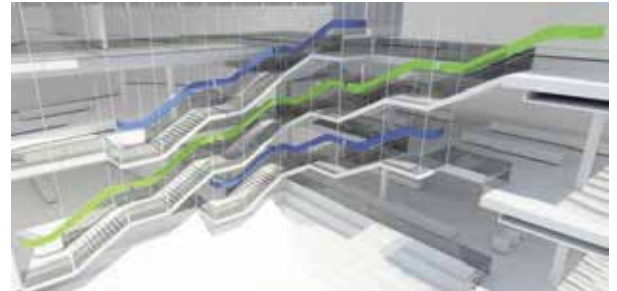


Fig. 16 - The three levels from the lobby to the exhibition levels. Source: authors.



gy reserve due to heat mass exchange cooling and the shady landscaping will protect from intense heat during hot and sunny days. The diagrams show that during Summer and Spring/Autumn seasons north side facade is shaded by building own shape and orientation and therefore it is just protected by sun light shading. The whole South facade and partially East and West ones are treated with high efficient sun shading due to direct sun exposition (Figure 22).

Structural concept

The underground structures consist of earth retaining perimetral reinforced concrete walls, large span beams and columns, resting on a mat foundation.

The above ground structures consist of steel CHS columns, infilled by concrete in order to achieve an optimal ratio between load carrying capacity and size, considering also fire strength issues. The floors consist of a partially precast reinforced concrete slab supported by I steel beams in order to optimize the carrying capacity and minimize decks thickness. Connections between I beam and CHS (Circular Hollow Section) columns might be achieved by laser cutting technique, allowing very simple and clean joints. The roof structure of the museum is made of parallel "arched" girders, supported at their end by a perimeter truss girder connecting the top of steel columns (Figure 23). Lightweight staircases for

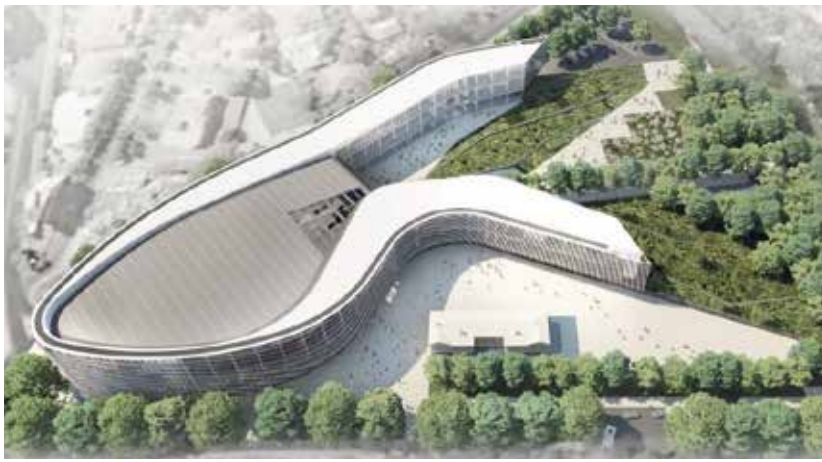


Fig. 17 - The landscape design of the museum is an extension of the inner exhibition spaces while olive tree (*Olea europaea*) was used in specific places as the tree of Athena Goddess. Source: authors.

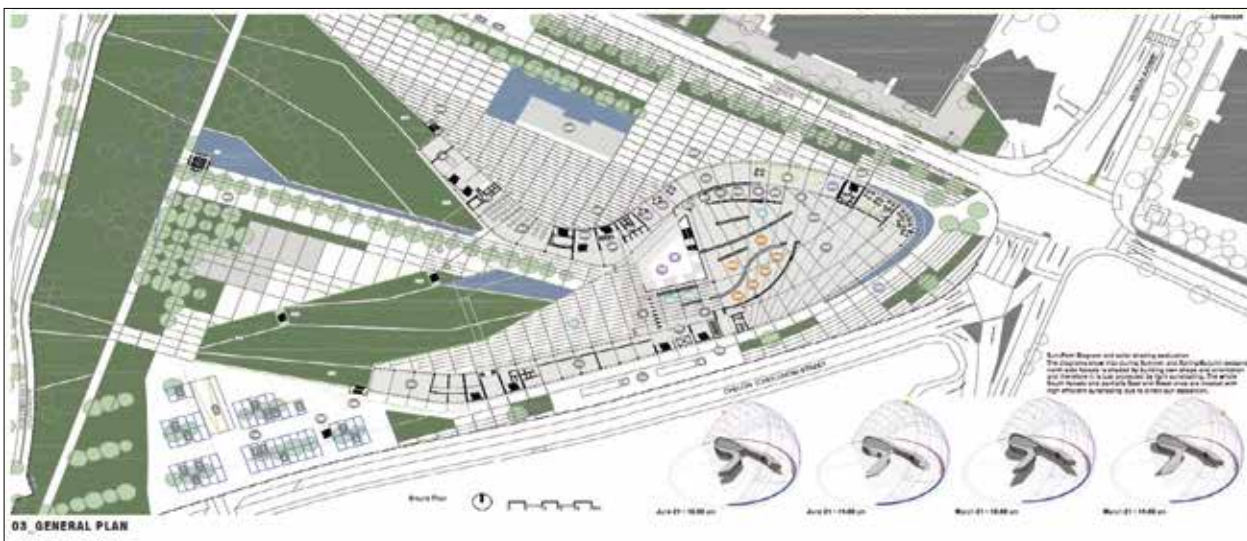


Fig. 18 - The planting plan of the museum, and the sun movement over the years. Source: authors



Fig. 19 - Planting list.

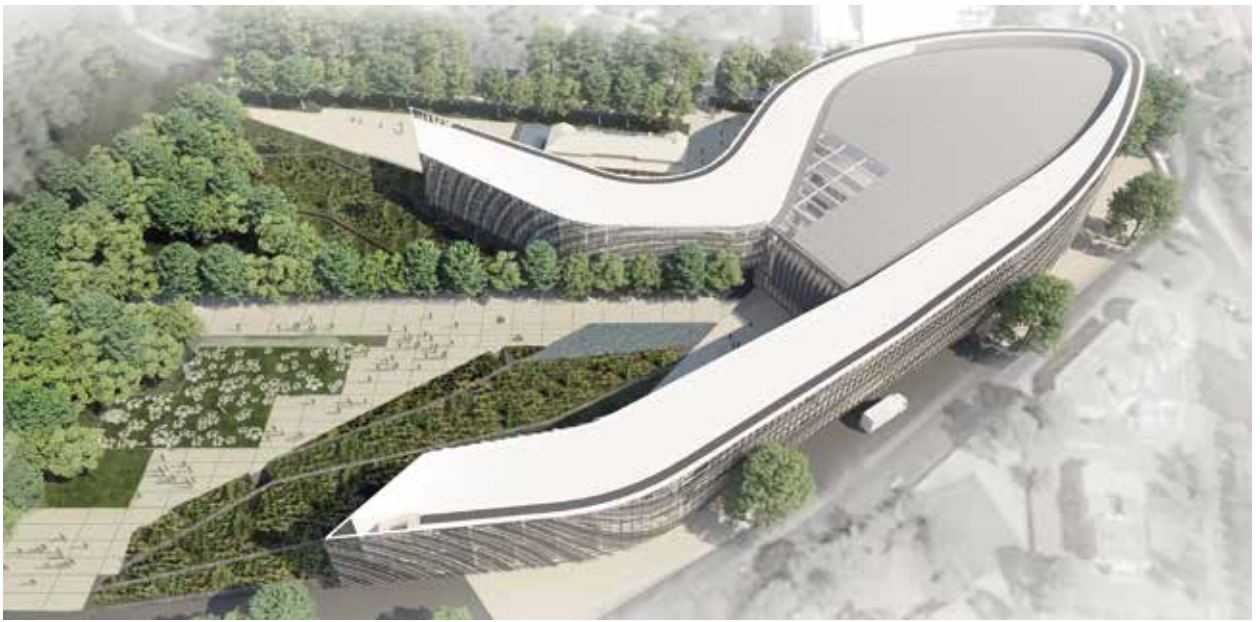


Fig. 20 - The vegetated area of the museum creates a shade to the visitors and a pleasant environment while in the middle there is an open area. Source: authors.



Fig. 21 - The natural stones placed into the landscape creating a seating area and playground | atmosphere while on the left we can see the aromatic mediterranean garden. Source: authors.



Fig. 22 - The bioclimatic design of the building resulted to the Natural cooling, passive heating and renewable energy production. Source: authors.

museum access are suspended to the roof girders. The latest forces resisting system is made by reinforced concrete cores positioned along the perimeter of the building. From the seismic design point of view, an optimal protection of the ancient artworks must be provided. Being the structure highly irregular in plan and elevation, base isolation strategy will be adopted in order to minimize seismic accelera-

tions to an acceptable value as it will be defined by specific analysis. The proposal carefully considered the two phase construction requested by the design brief process but while overall construction budget appear to be adequate, the shares for A (red) and B (orange) phases sound critically assigned (Figure 23). Safety escape and emergency routes follow the inner layout in complete integration.



Fig. 23 - The Roof integrated photovoltaic panels, high performing batteries, widely sun shaded facades, LEED strategies and proper planting design result to the energy saving and improvement of the cooling. Source: authors.

Narratives and exhibitions

The main concept is based to the ancient geographic tradition where the sea shapes the land, not the other way around. The central role played by the sea inspired the idea of presenting in the New Cyprus Museum the history of Ancient Cyprus as a story of the Mediterranean. Contrasting trends still exist between scholars who claim that the ancient history of Cyprus is the factual sum of different external relations, and those inclined to forge ahead with the identification of deeply interrelated Mediterranean mechanisms.

The narration of Ancient Cyprus, as conceived and exhibited in our proposal will reflect the history of the Cypriote Identity and Connectivity. These driving forces, that bridged the ancient Mediterranean countries together, still represent a crucial cultural aspect that strictly links together ancient communities with the contemporary society of Cyprus. Covering a wide artistic and technological range of productions, marked by great cultural diversification and encompassing a large chronological span of time, from Prehistory to the Late Antique period, the New Cyprus Museum stands as an ideal arena. What emerges in the planned thematic sections (TS) and chronological sections (CS) is the common fil rouge of the Cypriote Identity and Connectivity.

The entrance to and exit from the exhibition spaces will be respectively marked by two over-sized bas-relief reproductions of the front and back of the Aphrodite from Soloi, as an ideal tour guide-goddess for the visitor. On the ground floor a large space for periodical exhibitions is designed, along with the earliest chronological sections of the permanent exhibition (from Epipaleolithic to Prehistoric Bronze Age) and two thematic sections dedicated to the History of archaeological research and the History of the Cyprus Museum.

Four chronological sections are being presented on the first floor, from Protohistoric Bronze Age to the end of Cypro-classical period, together with three crucial thematic sections dedicated to 'Ceramic through time', 'Human representation through time' and 'Woman and Goddess in Cyprus: the cult of Aphrodite'. The three most recent chronological sections, from Hellenistic to Roman and Early Christian Cyprus, are being located on the second floor, along with two thematic sections (the impressive votive terracotta's from the Ayia Irini sanctuary and the Lampousa treasure).

The proposal aims to show the rich cultural permeability of the island in a wide interacting system, between territories lying next to the surrounding shores but also involving and affecting indirectly distant regions, with the circulation and diffusion of various cultural elements.

Conclusion

The proposal integrates building and landscape architecture as well as indoor and outdoor spaces into a unified concept. Architecture and landscape interact with each other. Each practice compines together materials, ideas, light and forms to bring concepts to life. At the core of landscape design is a deep understanding of process and time. While architecture may seem focused on the final building or product, both disciplines are intrinsically linked to the human experience.

According to Baldwin (2024) museums, the pillars of culture, serve as a fusion of historical narratives and tangible manifestations, guiding visitors on their personal odyssey. Our proposal addresses the social experience and the interface between landscape and architecture. The designs of galleries and exhibition spaces are functionally and spatially diverse. They present various scales and are spaces

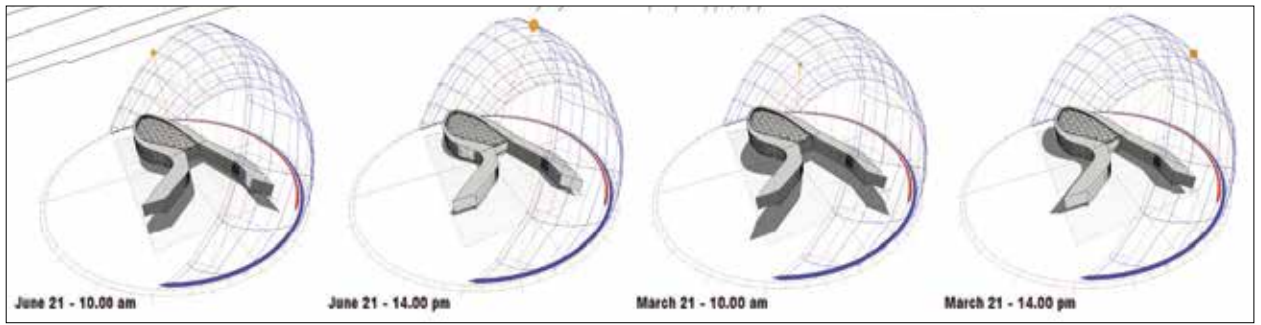


Fig. 24 - Sun-Path Diagram and solar shading evaluation. Source: authors.

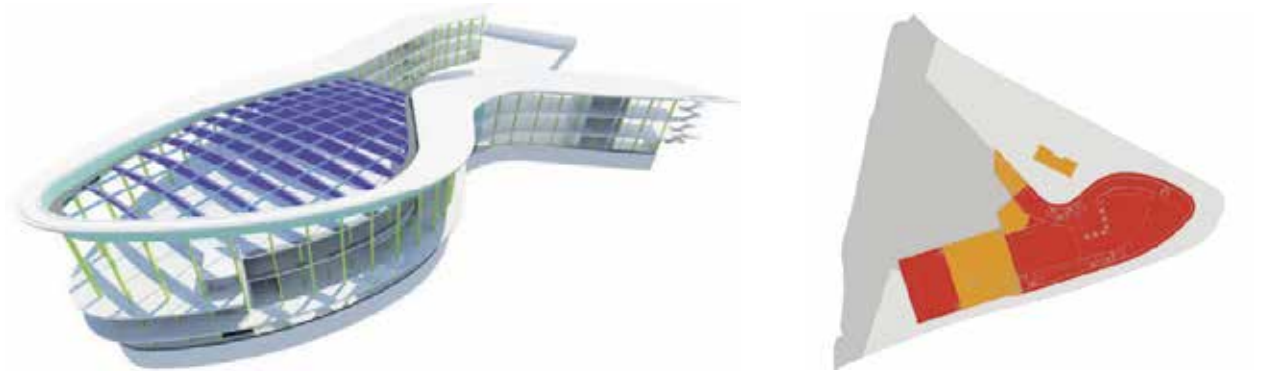


Fig. 25 - The Roof structure of the museum is made of parallel “arched” girders. The two phase construction process but while overall construction budget appear to be adequate, the shares for A (red), B (orange) and C (grey) phases sound critically assigned.

for breakthrough and discovery. The building and the landscape feed back into each other, merging into a whole and revealing a rich relationship from which nothing can be removed, the architecture, and the landscape by which the building is surrounded relate to each other. According to Prinz (2024) and, museum design itself becomes an aesthetic medium that provides space for ambiguity, complexity, and diverse perspectives. This sensual “relearning” highlights the in-betweenness and dynamics of formal relationships rather than fixed identities and uniform forms, and can contribute to a better understanding of historical

origins as well as current social conditions (Basu (2024, De Sousa Santos, 2018).

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1.2 Gardens tales for gardens future

Understanding urban green heritage in Milan historical center

M. S. LUX¹

What is the Urban Green Heritage?

The role of Nature within the urban environment is increasingly recognized as fundamental for balancing and counteracting the anthropogenic impact on ecosystem functioning, due to the intrinsic capacity for self-sustainability and cyclical functioning that is acknowledged within the natural components. Consequently, concepts such as Urban Green Infrastructure (UGI) and Nature-Based Solutions (NBS) have gained widespread acceptance in recent decades, redefining priorities and intervention methods in established urban environments (Pauleit et al., 2017). The notions of NBS and UGI aim to structurally integrate into decision-making processes for urban transformation the principles of balance between anthropic and natural components, ensuring that the equitable and widespread provision of ecosystemic benefits becomes prioritized in envisioning the city of the future (Benedict & McMahon, 2006). In these terms, the concepts of NBS and UGI project strongly into the future and are linked to medium to long-term strategic planning.

However, it is essential to reiterate that the foundational principle of both GI and NBS concepts is the principle of nature conservation, safeguarding existing (or often surviving) natural components within the urban environment. Therefore, before designing new ecosystems and reintegrating nature into cities, it is crucial to recognize the Urban Green Heritage. Although there is no precise definition of Urban Green Heritage, reference can be made to internationally adopted concepts. Since 1972, the World Heritage Convention (WHC) has expressed the need for protection and conservation of both cultural and natural heritage, with the latter defined as “the natural features consisting of physical and biological

formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view” (UNESCO, 1972). UNESCO also identifies the potential conflict between urbanization and conservation of natural heritage, emphasizing the need to protect “cultural and natural heritage as is threatened by serious and specific dangers, such as (...) large-scale public or private projects or rapid urban or tourist development”. The Operational guidelines for WHC implementation highlight the cultural relevance of the balance between anthropic and natural components, defining “Cultural landscapes” as the result of “combined works of nature and of man” and emphasizing how “they are illustrative of the evolution of human society and settlement over time” (UNESCO, 2008). In addition to these fundamental documents, it is necessary to consider the Florence Charter by ICOMOS, which in addressing the conservation needs of historic gardens defines them as an “architectural composition whose constituents are primarily vegetal and therefore living, which means that they are perishable and renewable,” and the Historic Urban Landscape approach promoted by UNESCO, which, “recognizing the dynamic nature of living cities (...), in order to support the protection of natural and cultural heritage,” highlights the need for a landscape approach to support “the integration of historic urban area conservation, management and planning strategies into local development processes and urban planning, such as, contemporary architecture and infrastructure development”.

Therefore, despite the lack of a precise definition of Urban Green Heritage, the evolution of the debate underscores the relevance of the balance between development and conservation, between dynamic transformation and preservation of cultural and natural heritage, to preserve the identity of places and support sustainable development. These considerations support the need to integrate NBS and UGI strategies, extending their scope of interest over a broader time frame, not only projected into the future but also mindful of the past history of cities. This contribution narrates the history of three gardens in the historic center of Milan, to support the understanding of Urban Green Heritage through the study of dynamic transformations and processes of increase or disappearance of urban greenery across different historical moments and urban planning policies.

Gardens tales of Milan

The reconstruction of a “green history” of the city of Milan includes all the histories of transformation, extension, or disappearance of the green spaces that in the past made the natural network integrated into the historic urban fabric. In this research, three out of the many stories that could be told are presented to highlight different destinies of urban green spaces and to raise some reflections. The follow-

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ing tales were reconstructed based on literature (De Biasi et al., 1990; Mezzanotte & Bascapè, 1948; Portaluppi & Semenza, 1927; Reggiori, 1947; Sierri et al., 1999; Vercelloni, 1989) and historical cartography (1814: Astronomi di Brera, "*Pianta della Città di Milano Pubblicata dall'Amministrazione Municipale. 2 Gennaio 1814*"; 1860: Brenna G., "*Pianta di Milano*", Vallardi; 1883: Allodi, P., "*Milano*", Vallardi; 1946: Comune di Milano "*CTC - Cartografia di Milano in bianco e nero*"; 1972: Comune di Milano "*CTC - Cartografia di Milano in toni di grigio*"; 2012: Comune di Milano "*Database Topografico 2012 del Comune di Milano*").

Since the Middle Ages, the city of Milan has been distinguished by the productive and functional character of its gardens. As early as 1288, Bonvesin del la Riva in his *De magnalibus Mediolani* meticulously describes the city's agricultural activities and dedicates a special paragraph to gardens and orchards within the urban walls. This text documents at the end of the 13th century "a cultural anthropological root that is grafted onto the history of mankind: that of plant cultivations, which recreate the eyes and tickle the nostrils, which fill man's sight with joy" (Vercelloni & Balzani, 1986, p. 19). In the case of Milan, the historical relationship between built and natural spaces can be observed by focusing on the scale of urban blocks, which are the defining element of the historic urban fabric and whose planimetric form "is endowed by its nature with characters of persistence" (Zucchi, 1989). Within the urban blocks, the voids represented by courtyards have been for centuries the space for private gardens and orchards. Historically linked to aristocratic villas or large religious complexes, private green areas in the center of Milan are configured as an actual system of punctual elements, but densely and homogeneously distributed throughout the urban territory.

Focusing on these private spaces, the transformations of three cases of particular historical relevance, namely the Melzi garden, the Guastalla garden and the S. Ambrogio orchard, were investigated.

The Melzi garden - a sad story

The Melzi garden was one of the most extended and beautiful aristocratic gardens of Milan until the mid XIX century. At the beginning of the XIX century the area is an agricultural land with few buildings along the main streets. In 1805, the Duke of Lodi Francesco Melzi d'Eril commissioned a villa for his family to the architect Giocondo Albertolli and the planting of a garden in the area nearby, while other aristocratic gardens were planted, such as that of the family Tagliabò-Bocchi. Rapidly, lush gardens with abundant vegetation grow thanks to an irrigation system directly connected to the urban canal system of the Navigli.

Starting from 1859, the new railway station was built nearby and, in order to directly connect the station to the centre, the area underwent numerous demolitions. In the 1860's, the Duke Lodovico Melzi d'Eril agreed to concede its land to the municipality and the opening of Via Principe Umberto (now Via Turati) heavily reduced the garden. Urban pressure progressively increased in the following decades, reaching its peak in the 1920's when Villino Borghi on the other side of via Principe Umberto was demolished and new huge buildings were constructed on the south side of the garden (in 1926 the first Montecatini building by Ugo Giovannozzi and in 1935 the second Montecatini building by Gio Ponti), which radically altered its exposure and daylight conditions, to the extent that the vegetation was irreparably damaged. Since the end of the XX century, with the advent of the car as a means of mass transport, the courtyards of Palazzo Melzi turned into a car park.



Fig. 1 - The Melzi garden in 1925 (left - picture by Emilio Sommariva) and in 1962 (right - picture by Ufficio fotografico Montecatini/Montecatini Edison/Montedison). Source: <https://www.lombardiabeniculturali.it/>

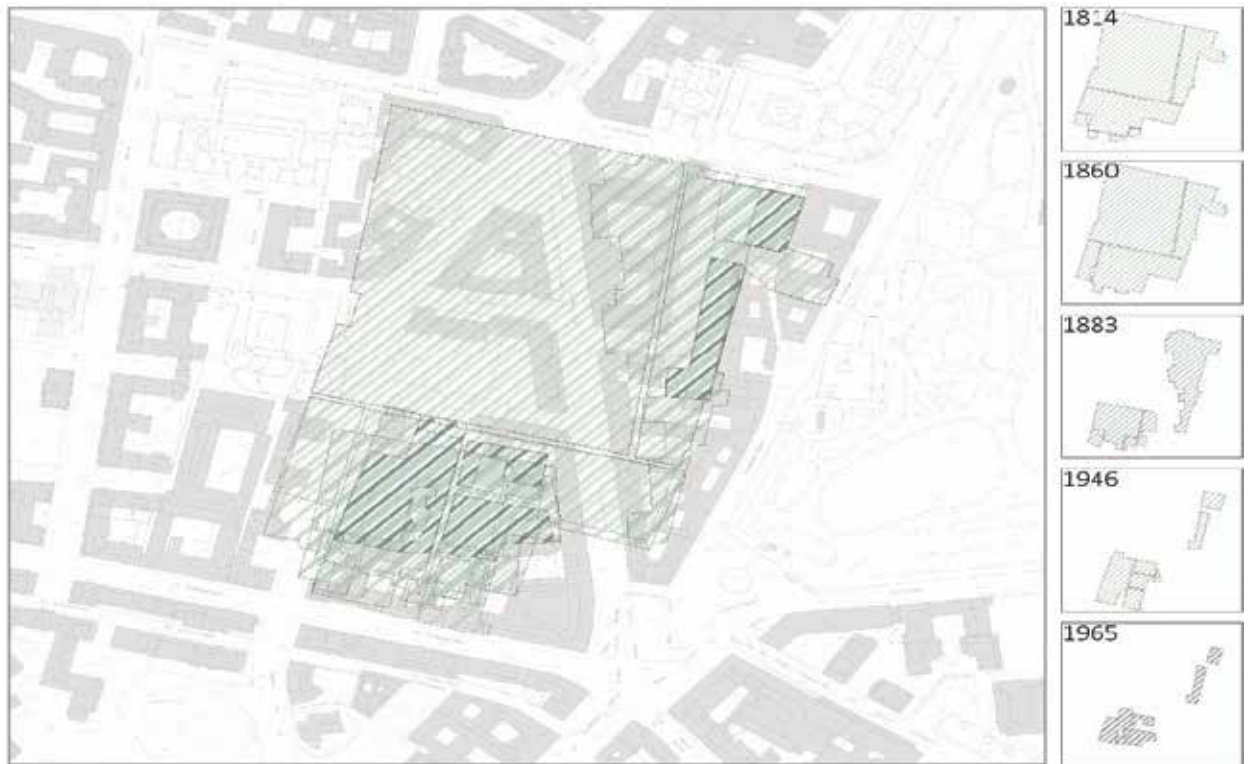


Fig. 2 - Layering of historical transformations of the Melzi garden in the XIX and XX centuries. Source: author.

The sum of the direct damages, which occurred due to the gradual removal of areas from the garden for building speculation, and indirect damages, due to the construction of high-rise buildings nearby, showed the prevailing of commercial and economic interests over the common interest and the recognition of the value of a garden. The history of its progressive reduction and destruction is relevant to highlight a pattern of slow disappearance of urban private green, which is still happening in other cases, due to the lack of protection, legislation gaps and low collective awareness.

Guastalla and Sormani gardens - different destinies

The Guastalla garden can be considered as the oldest semi-public garden in Milan and, despite its reduced dimension (18.000 sqm), it has a remarkable botanical richness with large monumental trees and a beautiful baroque fishpond. The garden dates back to 1557, when Paola Ludovica Torelli, Countess of Guastalla, founded a female college with an Italian-style garden. This first use also explains the presence of high walls to keep the privacy of the space inside. It is one of the very few gardens directly overlooking the inner Naviglio canal that has been preserved until today. Adjacent to it, on the north side, there was another historic aristocratic garden, that of Palazzo Sormani Andreani, which was redesigned as an English garden by Leopold Pollack in the second half of the XIX century. The direct connection of both gardens with the Naviglio of Via Francesco Sforza was providing water to feed

both the small river in the Sormani garden and the fishpond in the Guastalla garden. Although separate and different in function, the two gardens provided a green oasis in the core of the city of remarkable ecological and social value.

Any significant change occurred until the First World War. During the conflict, the Guastalla College was used as military hospital and the garden was severely damaged. Then, the urban transformations of the early 20th century, affected the Sormani garden with particular violence, almost erasing it, and threatened even the Guastalla garden. In 1926 the Sormani garden was downsized for the construction of private houses and the opening of Via Andreani and it continued to be reduced in the following decades and modified to its current configuration. Also the Guastalla garden was seriously threatened by the redesign hypothesis of the urban masterplan of 1934, which proposed to delete the historical layout and replace it with a new symmetrical garden in front of the Ospedale Maggiore, surrounded by single-family houses. This risk was averted thanks to the acquisition by the municipality, which put a brake on the speculative interests of developers. In this case, the acquisition by the municipality allowed the rescue of the latter and the preservation of what remained of the former. It meant for the Guastalla garden the beginning of a restoration project to improve its accessibility, while the Sormani garden was never opened to the public.

The orchards of S. Ambrogio

The third example concerns a large urban block



Fig. 3 - Layering of historical transformations of the Guastalla and Sormani gardens in the XIX and XX centuries. Source: author.



Fig. 4 - The Guastalla garden during winter 1926- picture by Emilio Sommarivo; the Guastalla College in 1943 after bombings of the Second World War - picture by Claudio Emmer. Source: <https://www.lombardiabeniculturali>

between Piazza Sant’Ambrogio, Via Cappuccio and Via Lanzone, in the western part of Milan’s historic centre. The area presents a complex historiographical palimpsest that includes traces of a Roman circus and proto-Christian religious structures, as well as the complex of Sant’Ambrogio, modified and enlarged several times with interventions by Bramante and others. The history of this area is connected to that of Guastalla since in the early decades of the 16th century, Countess Ludovica Torelli Pallavicino

established the first shelter for girls with the revenue from the sale of the Guastalla property. In 1608, Virginia de Leyva, the famous Nun of Monza who inspired Manzoni, was also confined here. At the end of the XVIII century, the area witnessed the impact of Napoleonic domination, with the change of the monastery’s use into a military hospital. After being restored to religious use in 1799, in the early 19th century, the main element of continuity through numerous transformations was the persistence of an



Fig. 5 - Layering of historical transformations of S. Ambrogio orchards in the XIX and XX centuries. Source: author.

extensive system of productive gardens. At the beginning of the XIX century, the entire inner area of the block (83'000 sqm) was occupied by vegetable gardens and orchards, once owned by the monks and later divided into different properties. Over time, the backyards of several aristocratic villas took the place of the orchards, but the area remained mainly occupied by greenery.

Due to the availability of space, speculative interest turned towards this area multiple times, proposing various allotment layouts to foster building speculation. The first proposal of the Urban Plan proposed by Ing. Cesare Albertini in 1933 hypotised the opening of three new streets, with the aim of creating a low-density residential area and a significant loss of green areas. This plan was only partially carried out, due to a strong opposition of the citizens, but it caused anyway a reduction in the area of gardens and orchards. In this case, the roles and responsibilities of public and private entities intertwine and exchange. On one hand, urban planning regulations endorsed, rather than limiting, the land consumption in the area, and some private owners supported this approach, seeing it as an opportunity for profit. On the other hand, the opposition from many other private owners allowed to preserve at least part of this green system.

Conclusions

These three garden tales highlighted some patterns of disappearance or preservation of private green spaces over the past two centuries: phenomena such as urban reorganisation, the rationalisation of the street network, and the devolution of private

property have determined different fates for these spaces in the past. The exclusion of private green spaces from the concept of commons and the absence of policies to census and protect private green spaces have made them particularly vulnerable to transformations driven by conflicting interests. It resulted that threats to the Urban Green Heritage can come from both public and private interests and that there is no a priori best management solution, as in the past both the private citizens and the municipal institutions acted alternatively as defenders of the green urban spaces. These tales can teach us that the higher value of the Urban Green Heritage in the present and future collective interest must be recognised and prioritised over other interests. Moreover, there is a need for an advancement of planning instruments to regulate both public and private engagement in the conservation of existing green assets and foster synergies for the extension of this heritage. Last, citizens and the collective awareness of the value of Urban Green Heritage have played in the past and continue to play a key role in the recognition and protection of this common good.

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1.3 The digitalization of the material cultural heritage

Aura and Culture Industry

I. MANDILARA¹, S. POTAMIAS²

Introduction: The Benjaminian *aura* of the work of art

At the beginning of the 20th century when the modern techniques for the mass reproduction and circulation of art first appeared, W. Benjamin sought to understand the positive and negative consequences that these technological advancements would bring upon the perception of art. Namely, he aimed at understanding the way, in which the perception of the original work of art would be affected by its multiplication, its mechanical mass reproduction and by the fact that it would possibly be displayed simultaneously to viewers remote from the unique and specific space-time of its exhibition.

In this context, Benjamin claims that every original work of art bears an ethereal, immaterial atmosphere, a kind of halo, an *aura* that lies in "its presence in time and space, its unique existence at the place where it happens to be" (Benjamin, 1999: 220). Briefly, the Benjaminian *aura* lies in the fact that the original work of art enables the perceiving subject, during its contact with the work's *Here and Now* (*Hier und Jetzt*), both to "be absorbed by it [...] enter into this work" (Benjamin 1999: 239) with all its essential forces – physical, sensorial, emotional and intellectual – and to «abandon itself to one's associations» (Benjamin, 1999: 238) for as long as the subject deems necessary and for as long as the work's assimilation demands. According to Benjamin, the perceiving subject is able to experience and by extension assimilate the original work of art in a true, i.e., essential and overall way, only through this relatively uninfluenced by time immersion in it and only by activating all of its essential forces.

However, according to Benjamin, the modern mass reproduction techniques, by operating in accordance with the law of image, speed and simultaneity,

destroy the *aura* of the original work of art. This means two things: On the one hand, it means that the original work of art, having been converted into an image in order to be mass reproduced and circulated, ceases to appeal to all of man's essential powers, not even to all of one's senses, and instead, is oriented towards only vision, thus transforming the contemporary perceiving subject into a "magnified eye" (Mumford, 1952: 65). On the other hand, it means that the perceiving subject, since it is being continuously *hit* by successive or even simultaneous images *like bullets*, since a cataclysm of thousands of technically reproduced images of works of art "periodically assail" (Benjamin, 1999: 238) it, is deprived of the necessary time to perceive, even only visually, each one of these images; since «no sooner has its eye grasped a scene than it is already changed [...] [and as a result] the spectator's process of association in view of these images is indeed interrupted by their constant, sudden change.» (Benjamin, 1999: 238). Thus, the loss of the *aura* means that the transformation of the original work into an image through the reproduction techniques aiming at its mass distribution, renders the perceiving subject unable to communicate with the work of art for as long as it is required with the whole of its essential forces, having as a consequence, the subject to be unable to assimilate the work in a thorough and overall way, and, hence, its aesthetic experience *withers*.

Nevertheless, along with the negative aspect of the technical reproduction of the works of art, Benjamin gives prominence to a positive, optimistic aspect. The technical reproduction of the works of art not only induces an *atrophy*, a withering of the contemporary aesthetic experience, but at the same time involves the possibility of a gradual democratization of art and culture in general. It involves the possibility for everyone on this planet – independently of class, race, gender or dwelling place – to come in contact with the past and present artistic creation and thus, to be aesthetically cultivated; and this, according to Benjamin, "changes the reaction of the masses toward art" (Benjamin, 1999: 234) in a crucial way. Now, the masses familiarize themselves with the artistic creation while the latter exits the realm of the sublime and becomes part of everyday life, rendering them able to understand, criticize and enjoy it.

However, in to letter to Benjamin, at the time when he was writing *The work of art in the age of its mechanical reproduction* (1936), T. Adorno expresses his doubt whether there is a possibility for the democratization of culture through the mechanical reproduction of the works of art. He supports that the destruction of the *aura* is followed only by the impoverishment of the aesthetic experience, by the transformation of the work of art into a relatively cheap commodity aiming exclusively at the entertaining the masses, and being completely indiffer-

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ent to their aesthetic cultivation (Benjamin, Adorno 2003: 127-134). Thus, for Adorno the loss of the *aura* means the incorporation of the work of art into the market apparatus, and more specifically the apparatus of the culture industry. It was only a year later when Benjamin's optimism about the democratization of art through its technical reproduction started to perish and he tended towards agreeing with Adorno's view while being increasingly concerned with what the rapid advancement of the mechanical reproduction had in store for art.

In the following piece we will attempt to detect the effect that the contemporary digitalization of the material cultural heritage, and more specifically of the works of visual arts of the past, has on their perception by the viewer, through the lens of Benjamin's and Adorno's critical observations. In other words, we will attempt to understand whether the present digitalization and digital distribution of the visual artistic creation of the past has a twofold consequence, as Benjamin had initially suggested, that of the democratization of culture and at the same time the loss of the *aura*, or results only in the *atrophy* of man's aesthetic experience, like he later tended to believe along with Adorno.

Digitalization, anaesthetization and culture industry

I. The digitalization of the works of visual arts presupposes their adaptation into a "special characteristic of the digital world, the total domination of visuality" (Schismenos, 2021: 32), at the expense of all the other essential human forces. This adaptation takes place through the transformation of past artistic works to a sum of "visual shapes and immaterial representations" (Schismenos, 2021: 32), a sum of directed and fragmentary digital images that are independent from the original – from the restrictions set by its physical nature – as well as from the perceiving subject – the way that one chooses to move in the real space and associate oneself with the work. However, according to Benjamin the work of art cannot be completely and essentially assimilated exclusively through vision. On the contrary, such an assimilation requires the mobilization and cooperation of all the perceiving subject's essential forces, each of which perceives different aspects of a work of art. For example, without the cooperation of the entirety of man's essential forces, one is not able to "hear the noise of the beast's hooves; in the 1976 triptych "in Bacon's bullfights". Again in Bacon, one is not able to "touch the quivering of the bird plunging into the place where the head should be, and each time meat is represented, [...] touch it, smell it, eat it, weigh it, as in Soutine's work" (Deleuze, 2004: 42). Moreover, to name a few more examples, the perceiving subject is incapable of experiencing, comprehending, sensing, realizing or imagining exclusively through vision the weight of the sacks of potatoes depicted by J. F. Millet, the warmth

of a landscape painted by Cézanne, "the generative force of a seed" (Deleuze, 2004: 57) rendered by V. van Gogh, the broken tones, the color gradations in a Rothko's work, *Guernica's* large dimensions, the *David's* size and volume, posture of body in space or hands delicate movements, or what D. H. Lawrence called *appleness of the apple* referring to Cézanne.

In other words, the digital reproduction of the past visual artistic creation renders the complete and meaningful assimilation of the works impossible, because such an attainment is unachievable without acquiring a live sense of the original, without placing oneself in space and directing oneself in relation to the work, moving in relation to the original, perceiving – sensorially, physically and mentally – and sensing its material qualities and its spatial dimensions. It is unachievable if one bypasses the *haptic function of vision* according to G. Deleuze, the vision that "discovers in itself a specific function of touch" (Deleuze, 2004: 155), or the *consciousness of one's fingers* according to M. Merleau-Ponty, that allows one to perceive the «certain fibrous or grainy style of an object» (Merleau-Ponty, 1964: 89). It is unachievable without the combination of the visual information with that of the other sensorial, physical and mental forces, in order to perceive the three-dimensional material existence of the original,³ without adopting a *look* that "gives us eyes all over: in the ear, in the stomach, in the lungs" (Deleuze, 2004: 52), without freely contemplating on each work in one's own time. Since the digitally reproduced work of art does not engage the collaboration of the perceiving subject's sensorial, physical, emotional and mental forces, its essential and overall assimilation becomes impossible, or put differently, it is impossible to truly conceive the original and hence the original is deprived of its content and is led to, what Adorno calls, its de-artisation.

Moreover, the fact that these images are directed, means that the lighting and the colors of the work of art, the observation distance and the features of the reproduction digital space – size, depth, focusing – are predetermined by the photographer's preferences, aesthetic perception as well as the technical means at disposal.⁴ Especially in the case of the digitally reproduced sculpture works, the camera angle and the frames offered in order to obtain as a spherical view of the work as possible are additionally predetermined. Put differently, the fact that these images are directed means that the communication of the perceiving subject with the original work of art is mediated by the aesthetic glance, views and

³ E.B. de Condillac calls this human ability *spatial seeing* (see Herder, 2002: 13).

⁴ At this point, we could add that a significant alteration of the original work's colors can be found in the digitally reproduced copy, sometimes intentionally in order to catch the eye of the viewer.

techniques of the photographer-director; a condition that raises an additional crucial obstacle to the *authentic* communication of the perceiving subject with the original as well as the physical space of its exhibition and, by extension, raises an obstacle to its essential and complete assimilation.

Consequently, one could claim that since the digitally reproduced creation of past visual arts does not allow the essential and complete appropriation of an original work by the perceiving subject, it does not function as a medium that leads to or strengthens the real contact and communication between the works and the viewer but, on the contrary, it functions as an instantaneous and easily digestible stimulus. That is, it functions as an ephemeral, not in-depth assimilable information – an information of everyday use and of easy access – that is extremely easily digestible since its perception does not require the mobilization and the cooperation of all the essential human powers or their in-depth cultivation as we have already emphasized. As so easily digestible, this information can be immediately consumed and its «value does not survive the moment in which it was new. It lives only at that moment.» (Benjamin, 2006: 366). Therefore, the digitalization of the visual works of art, by removing from the perceiving subject the ability to fully assimilate the original work, or, put differently, by depriving the original of its content, by de-artisizing the original, transforms it into simple and easily perceivable optical data that can be quickly, mass consumed at any moment and in great quantities.

Another crucial negative consequence that follows the insubstantial and incomplete assimilation of the original work of art is the following: wherever the contemporary man may be, he is constantly bombarded by a huge amount of digitally reproduced artworks and, since it is not possible for one to meaningfully and comprehensively assimilate them, one fails to organically and cohesively inscribe them in one's inner world. Since these images do not become an organic part of oneself, since they remain fragmented and incomprehensible by the spectator, they threaten one's inner cohesion and balance. Thus, contemporary man, in order to protect the unity of one's inner world, increasingly repels the images that swarm around and are constantly changing with immense velocity, or, put differently, one adopts an attitude of indifference towards such images.

Moreover, since contemporary man comes in contact only with the reproduction⁵, one is aesthetical-

ly cultivated on the basis of a false communication with the work of art, both the reproduced and the original one. The fact that one considers even the original as unable to be essentially and completely assimilated, one confronts it as a threat to the unity and balance of one's inner world and thus one is led to indifference towards it. However, indifference and avoidance of the art world, of the experience and communication with the *Here and Now* of the artwork, means that man ceases to cultivate one's essential powers and as a result they decay and man is *anaesthetized* (Buck-Morss, 1992: 3-41).

II. The question that is posed here is why contemporary society insists on the digital reproduction of the creation of past visual arts, assuming that digitalization obstructs the essential and overall assimilation of the original work of art, thus de-artisizing the original and anaesthetizing contemporary man. In our estimation, the answer to this question lies in what Adorno notes in the letter referred to in the introduction, but also in his theory about culture industry in general.

According to Adorno, mass reproduction techniques convert the works of art into easily comprehensible – of a kind of information and image – entertainment, rehabilitation and relaxation products for the working masses. Products that are indifferent to the aesthetic cultivation of the masses and aim only at their relief from the monotony, stress and fatigue of daily work.

A tour into the spectacular digital world of art, which does not require from the worker any additional to his working hours effort and strain – since it doesn't require the mobilization of one's essential forces – can entertain, relax, rest one from the strenuous and repetitive labor, it can free one – at least temporarily – from the unbearable pressure of the conditions of labor (Adorno, Horkheimer, 2002: 108), thus by *purging the affects*, relieve one from the miserable emotions caused by the daily working routine. Hence, one is rendered capable of returning back to work, mentally refreshed and in a good mood the next day. This means that the mass reproduction techniques are considered by Adorno as the crucial element, which, by de-artisizing the work of art, by transforming it into image and information, allow it to function as a medium of mental «recreation of expended labour power» (Adorno, 1991: 189), a medium of mental and emotional refreshment of the working masses. In our opinion, this is the main reason for the persistence in the digitalization of the past – and present too – visual artistic creation: the conversion of artistic works into mass consumable products by the culture industry; their conversion into digestible cultural products that aim at the entertainment of the masses, at their mental and emotional refreshment.

However, in comparison to the mechanical reproduction, digitalization bears two specific character-

⁵ This loss of contact with the *Here and Now* of the work of art is not only due to digitalization but also due to a series of socioeconomic factors, like the intensification of labor and the adoption of flexible work, the increase of labor time, wage reduction, the impoverishment of a substantial part of today's society, the state underfunding of the museums and other cultural institutions, the degradation of art studies.

istics that intensify society's urge towards it. The first of these has to do with the fact that through digitalization the products of culture industry can spread even more quickly and widely across the globe and be directed at a mass, universal audience. The second characteristic has to do with the fact that through digitalization, culture industry becomes capable of aligning itself with the demands of *flexible leisure* (Tyron, 2013: 11), with the fact that contemporary man's free time is intermittent. Put differently, digital reproduction attributes to the consumption of art a flexibility that the contemporary leisure requires, in the sense that it gives to the contemporary worker the possibility to consume art whenever one has some free time, completely or partly – depending on the amount of time available –, wherever one may be during one's free time (i.e. home, car, public transport, restaurant etc.) through a wide variety of audiovisual media. Thus, the reason why contemporary society insists upon and develops the digitalization of the artworks at an excessive degree is their conversion into comprehensible cultural products of mass consumption that relax and mentally revitalize workers, that spread rapidly to the vast majority of the workers globally and are attuned to the needs of *flexible leisure*.

Epilogue: Democratization or atrophy of the aesthetic experience

The mass and rapid spread of *Guernica* through its reproduction via the international press constitutes an emblematic example that confirms Benjamin's claim about the contribution of the mass reproduction techniques to the democratization of art. However, is it justifiable to claim that *Guernica's* mass reproduction, apart from the immediate and wide communication of the bombing of the city of Guernica, contributed to the aesthetic cultivation of the masses? Put differently, we could claim that the democratization of art is possible through the mechanically or digitally reproduced works of art, that is, through de-artisized artworks, through works that, as Benjamin suggests, do not *return the gaze* back to the perceiving subject that looks at them, works that do not allow the perceiving subject to truly experience and therefore assimilate them in a substantial and coherent way. If we define the democratization of art not as a process of providing

digestible information and superficial knowledge about the world of art, but as a process in which more and more people – without socioeconomic barriers – deeply comprehend artistic creation and wholly cultivate their essential powers, then the answer is negative. The digitally reproduced work of art, having destroyed the *aura* of the original, prevents the complete and meaningful communication between man and artistic creation and, by extension, does not cultivate man's essential powers and as a result can only contribute to a superficial and not to a profound democratization of art.

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1.4 The development of green public spaces in Greek historic centres

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Introduction

Historic cities constitute an important urban fabric which concentrates the cultural elements that have been shaped through the centuries. The historic city is a combination of places, shaped by its people's heritage values. During the last decades, processes as urbanization and climate change, the changing socio-economic role of cities and the development of tourism have changed the perception of urban heritage values to be protected. These processes create a complex and dynamic environment with growing interrelationships and a widening circle of stakeholder groups (Bandarin, & Van Oers, 2012). Historic urban conservation has been a significant focal point in the realms of planning, architectural discourse, and public policy. Over the past five decades, the matter of preserving urban heritage has taken center stage in urban policies, yielding both notable successes and failures. Today, there is an increasing consensus that the historic city should be regarded not solely as a collection of architectural monuments and supporting structures, but rather as a complex amalgamation of meanings, intertwined with its natural surroundings, geological composition, and metropolitan hinterland. Urban heritage conservation plays a crucial role in upholding social and communal values, essential for defining identity, facilitating education, and fostering economic development (ICOMOS, 1987). Within this framework, it is imperative to adopt an approach that not only integrates heritage into evolving social values, but also permeates the entire urban socio-cultural sphere with the added richness of that heritage. Although this process relies less on planning and public control and more on market dynamics, it remains vital to establish strong connections between the preservation of urban heritage, with its historical layers, and the management of development through integrated conservation. This approach can sustain the creation of high-quality spaces and

ensure the long-term viability of large-scale urban processes (Bandarin, 2006).

The public spaces located within historic centers today face numerous challenges (Moreno, Ortiz, & Ortiz, 2023). In overtourism historic areas, these spaces are often overcrowded, while in downgraded historic sites, they may be abandoned. Urban theorists contend that cities with cultural heritage pose particular challenges with respect to their meaning and materiality, and argue that the complexity of such cities necessitates careful consideration in the management of transformation initiatives (Bandarin, & Van Oers, 2012).

The current paper examines the challenges associated with greening urban spaces in Greek historic centers, with the primary objective of creating livable areas that combine sustainable pedestrian and cycling networks with green corridors and public spaces. It is focusing on regeneration proposals for public green areas of Greek historic centers. It analyzes the basic principles for these areas planning, and it proceeds with the use of two case studies to the proposal of green public spaces networks in two historic cities of Greece, Chania and Corfu.

Literature review

According to the United Nations Habitat, public spaces are defined as places that are publicly owned or available for public use, accessible to all individuals without charge and without a profit motive (UN Habitat, 2015). These spaces are open to all citizens, regardless of their ethnicity, age, gender, race, or socio-economic status, and are influenced by various social, economic, and legal networks that vary across different regional and cultural contexts. Public spaces serve as the central hubs for public life, activities, and events, and can range in size and form from small-scale public lots to expansive parks and urban forests. They encompass a wide range of areas, including traditional squares, incidental urban spaces, and emerging types of spaces. In economic terms, public spaces can be considered public goods (Dimelli, 2023).

Since the 1980s, public spaces have become the fundamental focus of regeneration and development projects. Scholars such as Gehl (2010), and Jacobs (1961) have employed empirical methodologies to assess both the physical (urban activity) and non-physical (human activity) factors that influence the social life of public areas (Gehl, 2010), (Jacobs, 1961). However, the methods used to diagnose and inform decision-making for contemporary public spaces are constantly evolving. Researchers and practitioners in urban planning now have access to new sources of information that offer a wide range of possibilities as cities evolve and public spaces face new challenges, such as those arising from the COVID-19 pandemic crisis.

As for the historic areas, the Charter for the Conservation Of Historic Towns and Urban Areas which was

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adopted by ICOMOS General Assembly in Washington D.C., outlined that (ICOMOS, 1987):

“...Qualities to be preserved include the historic character of the town or urban area and all those material and spiritual elements that express this character, especially:

- Urban patterns as defined by lots and streets.
- Relationships between buildings and green and open spaces.
- The formal appearance, interior and exterior, of buildings as defined by scale, size, style, construction, materials, colour, and decoration.
- The relationship between the town or urban area and its surrounding setting, both natural and man-made; and
- The various functions that the town or urban area has acquired over time.

Any threat to these qualities would compromise the authenticity of the historic town or urban area...”.

In European cities’ historic areas, urban regeneration has emerged as the primary strategy driven by public demands and the need to mitigate the negative effects of previous planning experiences. By adopting a human-centric design approach, historic centers can enhance their urban environments and increase their appeal while preserving their tangible and intangible heritage (Bernabeu-Bautista & Serrano-Estrada, 2023).

Currently, the sustainable management of historic cities is regarded as a strategic matter that aligns with the objectives of the Agenda for Sustainable Development 2030. However, the phenomenon of urban growth exacerbates the risks faced by historic cities and hinders their sustainable management. Additionally, the uncertainty surrounding the impacts of climate change further complicates the task of managing historic cities and preserving their architectural heritage. The escalation of extreme weather events, such as heatwaves and heavy rainfall, presents the primary challenges posed by climate change to the conservation of heritage buildings. This predicament is particularly troublesome in the case of earthen architecture, which is highly susceptible to adverse weather conditions (Moreno, Ortiz, & Ortiz, 2023).

In the Mediterranean region, public initiatives for conservation and regeneration have primarily focused on public spaces in historic centers over the past few decades. Some strategies involve providing diverse economic activities, businesses, and cultural facilities that positively contribute to the revitalization and economic growth of historic cities (Theodora, 2020). However, some examples demonstrate that urban renewal oriented towards tourism development has led to negative impacts (Muminović,

Radosavljević, & Beganović, 2020).

The planning of historic centres should prioritize sustainable development and historic conservation. In addition, policies and proposals should aim to enhance the quality of life for the area’s residents by promoting residential use (Bandarin, & Van Oers, 2012). The traditional approach to planning historic city centres has been largely based on regulations, which has resulted in general dissatisfaction. However, urban heritage can serve as a catalyst for urban rehabilitation, involving cultural and urban policies, as well as the interests of both residents and non-residents, and both private and public sectors. The policies implemented should be tailored to the needs of the stakeholders involved. Financing for this programme will be derived from partnerships between the private and public sectors, aimed at revitalizing the area (Dimelli, 2019). This will be achieved through the identification and implementation of strategies that promote cultural activities, which can serve as a comparative advantage for the area. To this end, networks and facilities must be created to cater to inhabitants of all ages and income levels. It is also essential to increase the area’s attractiveness to tourists without compromising its environmental integrity. Finally, all strategies must be implemented in a manner that avoids gentrification.

The historic center of Chania

The city of Chania (Figure 1) is situated on the remains of ancient Kydonia, a significant city during the middle Minoan period (3650-1070 BC) located on Kastelli hill. Throughout the Roman era, the city experienced growth through various renovations. Initially confined by the fortified hill of Kastelli, the city expanded around its Byzantine Wall during the Venetian takeover in 1252 AD, resulting in the construction of new areas for the lower socioeconomic classes. Concurrently, new fortifications were erected (Andrianakis, 1997). Chania was captured by the Ottomans in 1645, leading to a period of urban disorder and significant alterations to the city’s layout. The city’s most substantial growth occurred in the late 19th century when it served as the capital of Crete, forming the foundation for the establishment of the semi-independent Cretan state. During this era, the focus was on revitalizing public spaces as streets and squares. To connect the old and new road networks, substantial portions of the walls had to be demolished. Although the initial intention was to create open public spaces, this plan was abandoned due to political and social circumstances that favored the construction of new buildings in these areas. After Crete joined Greece in 1913, Chania became a typical provincial Greek city. Following World War II, a new plan was proposed to replace the historic fabric of the city with modern urban forms. This approach was initially implemented in certain parts of the historic city but was quickly abandoned. In 1965, the area enclosed by the



Fig. 1 - The city of Chania today. Source: Google Earth.

Venetian walls was designated as a historic monument. Since then, numerous plans for the city have been developed, but none has been legislated.

Today, the city's economy relies heavily on tourism and is continuously outgrowing its boundaries. While some of its downgraded zones are inhabited by low-income immigrants, other zones of the historic centre are well conserved because they accommodate tourists although urban heritage and its incorporation into overall urban development are not the focus of the existing urban strategies. The conservation of urban heritage and its incorporation into global urban development are not the focus of this plan. This explains why the concept of urban heritage is not contested and why it is presumed that its preservation is possible only with the upgrade of public spaces.

Currently, the historic centre of Chania is facing many problems, related to connections with "new" city, lack of green and open spaces, increased demand in parking areas, and concentration of land uses that are incompatible with housing.

The coastal zone experiences a significant influx of tourists, resulting in high levels of noise and traffic during the summer season. However, during the winter months, the area becomes less active as most tourist shops are closed. The residential areas are primarily concentrated in the degraded areas leading to the creation of a segregated zone for low-income residents, while in the western part of the historic centre, there is a lack of necessary amenities and services for the few remaining inhab-

itants. Additionally, the west and east moats act as barriers due to the absence of proper infrastructure, preventing connectivity with other parts of the city. Finally, the northern area lacks sufficient open spaces (Dimelli, 2022).

The existing green areas (Figure 2) are limited due to the compact form of the city, while the few available urban voids are mostly the zone of leisure activities expansion or informal parking areas. The moats are also used as parking zones, or abandoned areas where access is restricted due to the areas existing geomorphology. The proportion of built and unbuilt areas in Chania's historic centre indicates that the open and green spaces do not meet the Greek standards. This is not surprising, as most of the area was developed during a time when planning did not prioritize these principles. Public and open spaces which are limited due to the area's morphology are overcrowded during summer while many shops use them for their expansion. This way the public space is taken over, causes problems as the space available for pedestrians becomes increasingly restricted. This is a factor that downgrades the aesthetics of the historic environment. Public spaces are gradually becoming private, pedestrians' flows are impeded, and architectural features are hidden (Dimelli, 2022).

Today the few green areas are attractors of public life, while the inhabitants have been placing series of pots in the facades of their houses to make the area "greener". Although in 1978 a plan of Romanos and Kalligas proposed an archeological park (Andrianakis, 1997), where the city's antiquities would

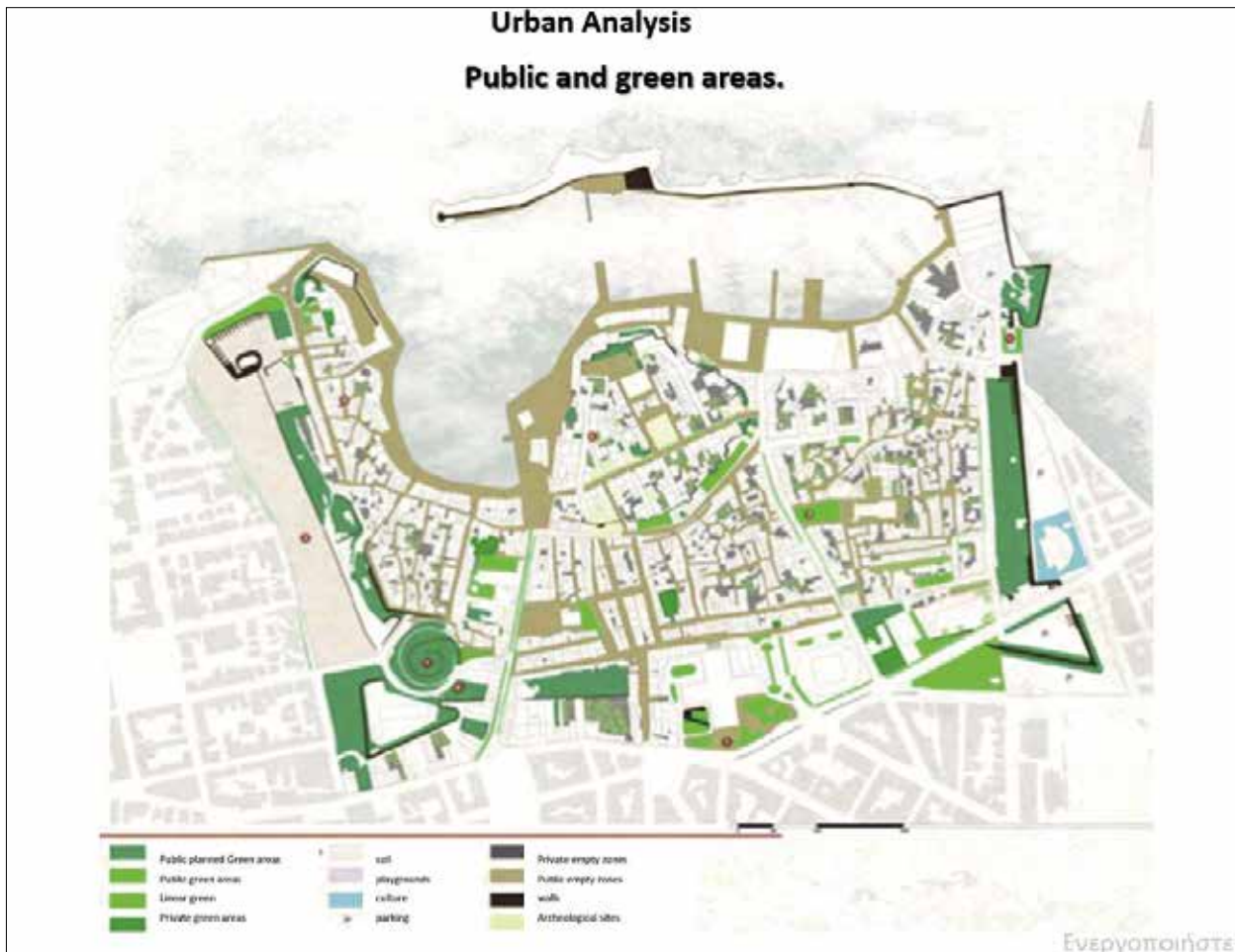


Fig. 2 - The existing public and green areas. Source: Petrou, 2017.

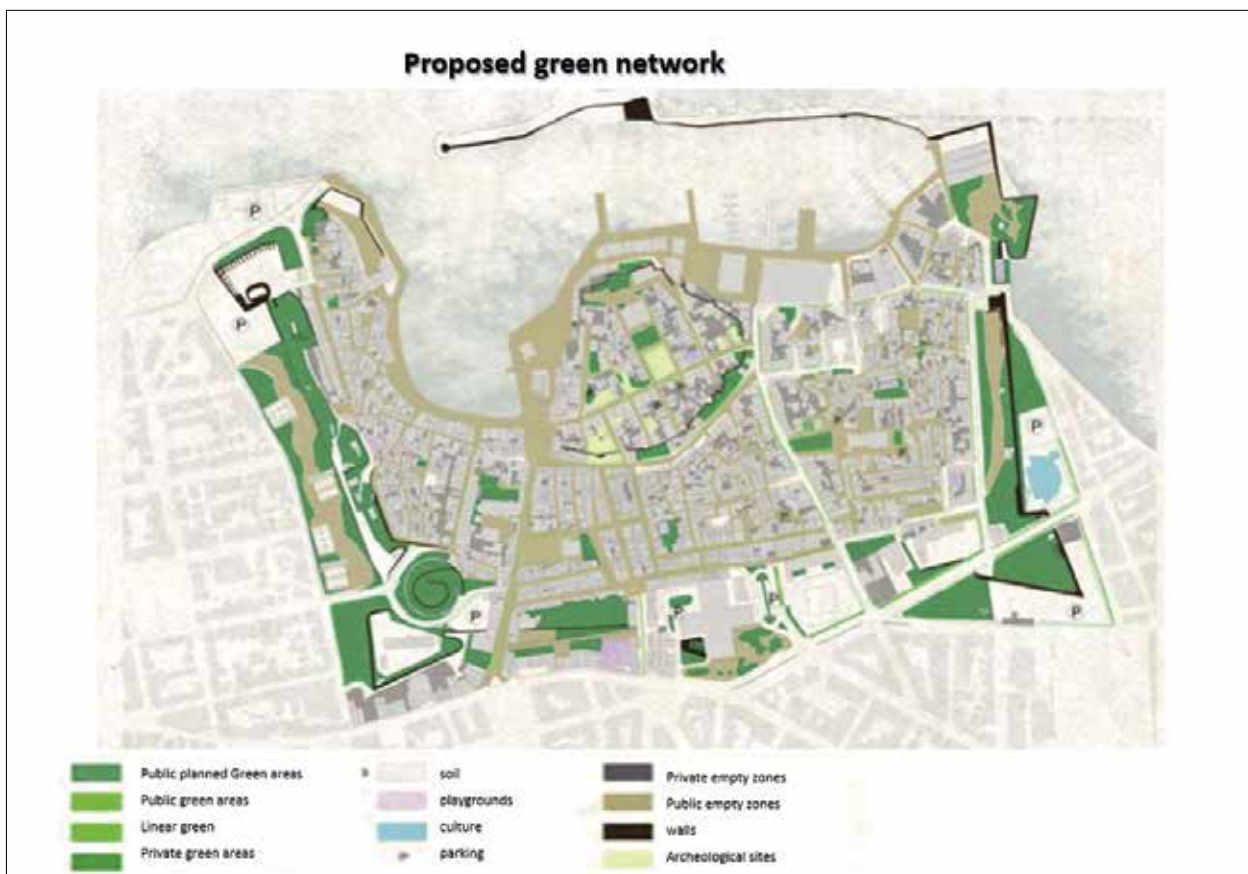


Fig. 3 - The proposed public and green areas. Source Petrou, 2017.

be included in a huge green zone, still this proposal has not been implemented as it requires big scale demolitions which will have a significant social, economic, and political cost.

Currently, the area exhibits a concentration of certain functions in specific zones. This type of distribution of uses often results in urban zones that are only operational during certain hours of the day or months of the year. However, the presence of residential areas within these zones can ensure their functionality throughout all periods. Furthermore, the development of a network of green and open areas is essential. The scale of the historic center defines the limits for the expansion of these areas. The west and east moats can function as parks with light structures for the conduction of sport and cultural activities (Figure 3). Additionally, small green areas, as pocket parks, can be allocated in unbuilt lots or in the inner parts of building squares. This network of small-scale green and open areas can produce sustainable neighborhoods with an integrated environment.

The historic centre of Corfu

The historic Centre of Corfu (Figure 4), situated on the Island of Corfu on the western shores of Albania and Greece, has its roots tracing back to the eighth century BC. It holds a position of great strategic significance at the entrance to the Adriatic Sea. Throughout a span of four centuries under Venetian rule, three forts were erected by Venetian engineers to protect the maritime trading interests from the Ottoman Empire. The Venetian Republic was dismantled after its defeat by Napoleon in 1797, leading to the French occupation of Corfu for two distinct periods between 1797 and 1814, with a brief interruption caused by a Russian-Turkish incursion. The French authorities were responsible for the construction of

the Liston in Corfu Town and had ambitious plans for the city's development. However, following Emperor Napoleon's defeat in 1815, Corfu became a British protectorate, initiating a 50-year period of British rule that witnessed significant advancements in the city's infrastructure. Notable developments during this time included the establishment of the prison, the construction of roads, and the implementation of a mains water and sewage system in Corfu Town. Additionally, this era saw the erection of structures such as the Palace of St Michael and St George and the Mon Repos estate. In 1864, Corfu, along with the other Ionian Islands, was ceded to Greece. During World War II, Corfu was invaded by Italy as part of Mussolini's grand scheme to revive the formidable Roman Empire. When Italy surrendered to the Allies in 1943, Corfu experienced the same fate as the rest of Greece, grappling with poverty, crisis, and emigration. In the late 1960s, the advent of tourist development injected new vitality into Greece's economic and social life, and Corfu shared in this resurgence. From the early years of the 20th century until the outbreak of the Second World War, Corfu rivaled Capri and Mallorca as the preferred Mediterranean destination for the European elite. Over the past four decades, the surge in mass tourism, combined with the rich historical heritage, has propelled Corfu to become one of the most sought-after holiday destinations for millions of people. This site has been recognized and designated by UNESCO since 2007 for its specific identity, which is reflected in the design of its system of fortification and in its neo-classical building stock. The urban and port ensemble of Corfu constitutes an architectural example of outstanding universal value in both its authenticity and its integrity, and the authenticity and integrity of the urban fabric are primarily those of a neo-classical town (UNESCO, 2023) (UNESCO, 2023).



Fig. 4 -The city of Corfu today. Source: Google Earth.

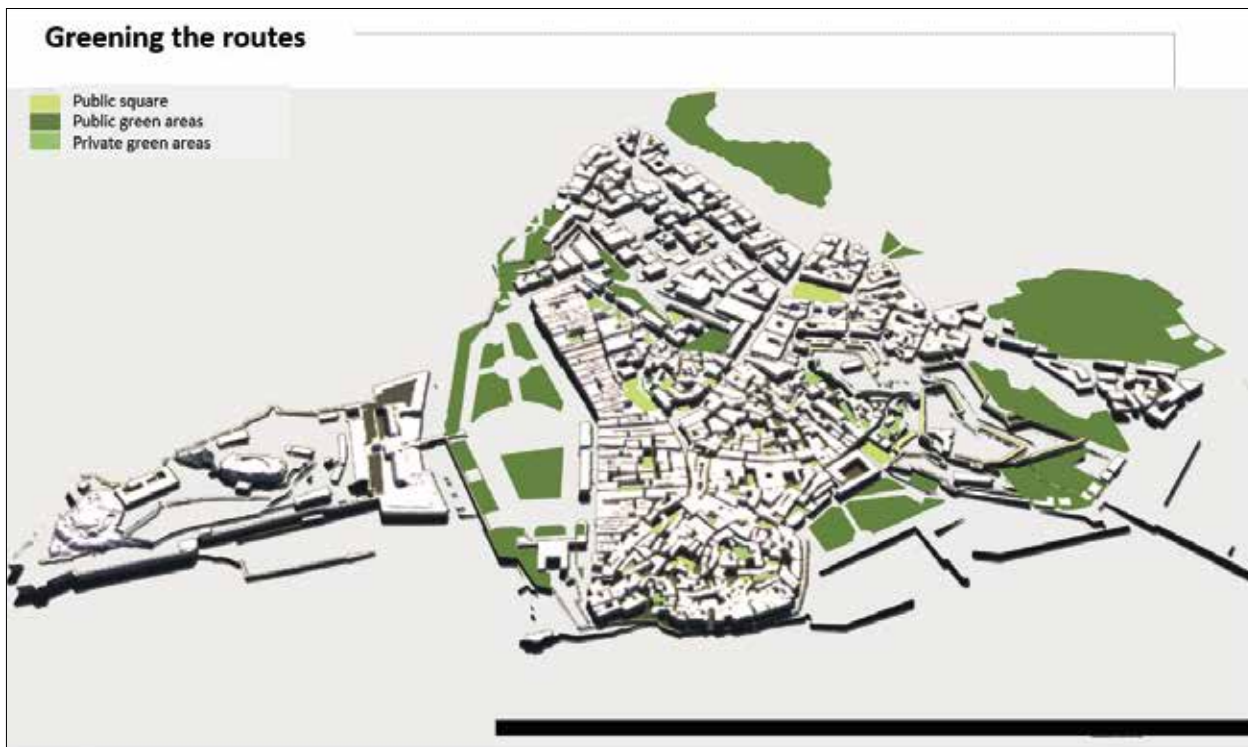
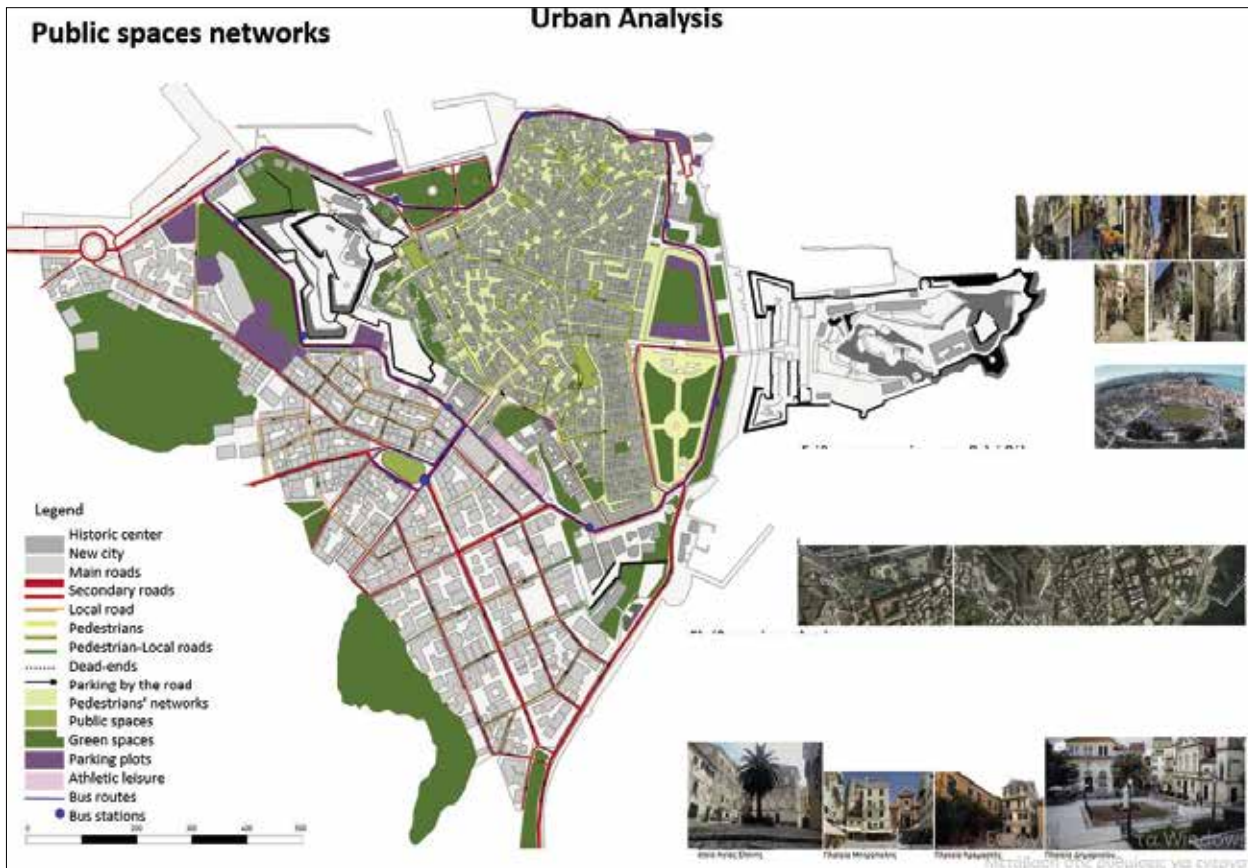


Fig. 5 - Corfu Green networks, analysis and proposal. Source: Tzermia & Chimonaki (2018).

The historic centre of Corfu is developed in ten districts, each of them has a small square in the middle that serves as its only open space and is home to a church and a tall bell tower. Most of the urban fabric is characterized with narrow roads and limited open spaces. The only area that is not following this rule is the Spianada public square in the east which was developed after extended demolitions for defensive purposes and today is the most important open-green area of the historic centre, concentrating uses related to tourism and leisure. The historic centre of Corfu encompasses residential, commercial, administrative, educational, cultural and tourism uses. The constantly increasing number of visitors mainly during summer creates difficulties for the town's daily functioning, including noise disturbances, traffic congestion, and overcrowding on the streets. As Chania city, in Corfu as well the few available open spaces are used by leisure activities and for parking. Except Spianada, the rest green spaces are quite limited. The planning of Corfu's historic centre should prioritize sustainable development and historic conservation. The most important issues of the historic city today are the re-composition of the different parts of the city through the open and green spaces networks and the creation of flexible spaces for multiple functions. The proposal is based on the development of green zones in the borders of the historic city, and the development of small-scale green cores in the available existing empty areas. The proposal is based on the principles that the historic area is organized by a pedestrians' network supported by the green and open areas corresponding one. It is based on the use of the road network mainly by the area's residents. For this reason, the existing supra-local parking areas are replaced by green and open areas, while the inner of buildings blocks that fulfills the requirements can function as small gardens for the certain building block residents (Figure 5).

Conclusions

Historic urban conservation has been a significant topic of planning, architectural discourse, and public policy for over a century. In the past fifty years, the issue of urban heritage conservation has taken center stage in urban policies, resulting in both positive outcomes and failures. Thanks to the efforts of specialists, preservationists, and citizens' groups, there is now a consensus that urban heritage conservation is a crucial component of social and community values. Currently, there is a growing agreement that the historic city should be viewed not only as a unity of architectural monuments and supporting fabric but also as a complex layering of meanings connected to its natural environment, geological structure, and metropolitan hinterland (Bandarin, & Van Oers, 2012). The conservation of "urbanistic heritage" also involves establishing new tensions between neglected urban areas and their surroundings to integrate them into global urban

development. Increasing financial resources and improving integration between urban preservation and urban planning are top priorities. Increasing public awareness is also crucial, as is enhancing coordination between government agencies. In summary, responses indicate that governments require increased access to funds, better planning, and cooperation, and increased public awareness (Ashworth & Tunbridge, 2000).

The historic cities of Chania and Corfu serve as the central hub of a continuously expanding urban area. Over the past few decades, the city has experienced a surge in tourism activities, which have had a detrimental impact on its environment, leading to the migration of its residents to the suburbs. The challenge at hand is to re-plan the area with principles that promote social cohesion and preserve its historic elements. Additionally, it is crucial to prioritize residential land use and foster its coexistence with other urban functions to a greater extent than currently exists. Financial incentives, such as tax exemptions for newcomers, could contribute to the revitalization of specific areas. Furthermore, encouraging property owners to maintain their buildings and fostering collaboration between the public and private sectors can enhance the quality of the built environment. In the field of urban planning, construction and preservation are two interconnected aspects of the same conscious effort. Both rely on a similar approach: preservation must be seen as an update of the past, while construction must be understood as a continuation of the historical process. To address these issues, the proposal suggests the creation of small-scale green and open area networks. The scale of the historic centre defines the limits for the development of open and green areas. These can be the big scale un-built zones that can function as parks with light structures for the conduction of sport and cultural activities. Additionally, small green areas as pocket parks can be allocated in un-built lots or in the inner parts of building squares, to produce sustainable neighbourhoods with an integrated environment. These networks would be integrated with pedestrian-friendly pathways. The proposals presented aims to address the issue of urban conservation in a manner that respects the diverse cultural traditions present in the historic area and strike a balance between conservation and development, taking into account the unique characteristics of the historic fabric.

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1.5 The New Daily life of Heritage Conservation Space and Society in Jieshou Village, with the Reconstruction of “Zhuo Lu” Guesthouse as an Example

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The dilemma of heritage conservation

Jieshou village belongs to Songyang Town that is located at the junction of Songyang and Suichang and is surrounded by mountains and water with excellent Fengshui². It is nestled on the north bank of the Songyin River, taking the shape of a belt. In 2006, the people’s government of Zhejiang province declared Jieshou village as the third group of famous provincial historical and cultural villages. Zhejiang Province listed the first group in 2003 and the second group in 2005.

According to the document of the People’s Government of Songyang County on the “Protection Plan for the Provincial Historical and Cultural Village of Jieshou in Songyang County”, Jieshou Village is a provincial historical and cultural village with a long history, a cultural deposit, a rich historical architectural heritage, and a relatively complete ancient village style. However, the conservation of the village’s heritage should be carried out in accordance with the principles of “protection first, rescue first, rational use and strengthening management”, and the principle of giving priority to the conservation of historical and cultural heritage should be adhered to, so as to maintain the overall appearance and cultural characteristics of the historical and cultural village of Jieshou, and to improve the living environment of the villagers while achieving effective conservation and sustainable development (2010)³.

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² An ancient Chinese belief that the way your house is built or the way that you arrange objects affects your success, health, and happiness.

³ “Reply of the People’s Government of Zhejiang Province on the Protection Plan for the Historical and Cultural Vil-

lage of Jieshou”. Accessed 22 June 2022. https://www.zj.gov.cn/art/2010/8/2/art_1229017138_64425.html.

It is easy to see from this document that the heritage of the village of Jieshou is protected by government policy and regulations. In the 20th century, tangible heritage was the main object of conservation; it was not until the beginning of the 21st century that heritage conservation moved systematically and on a large scale from “objects” to “people”. In 2002, the International Centre for the Study of the Restoration and Conservation of Cultural Property (ICCROM) launched the Living Heritage Sites Project and in 2009 published the “Living Heritage Conservation Methodology Manual” (ICCROM, 2015). This manual emphasizes the relationship between communities and heritage sites, arguing that community use of heritage sites not only perpetuates the use of space, but also interprets local traditions (Xi et al., 2020); heritage is not just a physical space, but a cultural process in which communities interact with space. In 2017, the International Council on Monuments and Sites (ICOMOS) released the Delhi Declaration, which once again states that heritage conservation should respect the connection between communities and places (ICOMOS, 2017).

With the implementation of the Chinese State Council’s strategy⁴ around the countryside, the construction of “beautiful countryside”⁵ is aimed at optimizing the allocation of resources, the intensive use of land, the comprehensive management of the environment, the improvement of infrastructure and the development of modern industries, with the aim of embodying a new socialist and harmonious countryside that is “A new harmonious socialist countryside” pleasant to live in, pleasant to work in, pleasant to travel in and pleasant to experience the traditional culture and customs that make Jieshou Village different from other places. To build a beautiful countryside is to create an ecological home, highlight farming culture, showcase local customs, and promote urban-rural integration, and vigorously develop rural leisure tourism, making it an important channel for villagers to increase their income. With the rapid development of tourism, some of the villagers in Jieshou village have long since disintegrated their residential communities, and the villagers are facing many problems (e.g., noisy living en-

vironmental pollution, etc.).

⁴ “The State Council of the Central Committee of the Communist Party of China issues the ‘Strategic Plan for Rural Revitalization (2018-2022)’_Central Government Documents_Chinese Government Website”. Accessed 22 June 2022. http://www.gov.cn/zhengce/2018-09/26/content_5325534.htm.

⁵ This refers to the specific requirements of “productive development, prosperous living, civilized countryside, neat and tidy villages, and democratic management”, which were put forward at the Fifth Plenary Session of the 16th Central Committee of the Communist Party of China when it proposed the major historical task of building a new socialist countryside.

vironment, little space to serve the tourism industry, rising prices, control over the repair of their houses by the residents, and the dominance of foreign operators in their business). As a result, some villagers began to move out of their heritage spaces and relied on renting out their original houses to outside operators to earn a significant and stable income. The loss of community and the disappearance of the original social fabric of Jieshou Village's heritage space leads to the conclusion that we should not aim for the integrity of the community inhabited by the villagers and the living heritage of local traditions, but rather be more rational about the current problems faced by Jieshou Village in terms of heritage conservation based on reality (Xi et al., 2020). However, this does not mean that the village is uninhabited or endlessly exploited, it still has the characteristics of an active and preserved local culture in terms of heritage conservation. But after the intervention of non-natives in the daily life of villagers', the spatial forms of heritage in Jieshou Village, the strategies developed around heritage, and even the social relations of villagers have taken on the character of a new and intervening daily life.

Space: Reconstruction of "Zhuo Lu" Guesthouse (2017)

The "Zhuo Lu" Guesthouse takes the courtyard as the basic spatial unit and provides a concrete sample of the observation of the heritage process in Jieshou Village through the changes around the history of spatial transformation and social relations. It is hoped that through the case of "Zhuo Lu" (Figure 1), which was renovated in 2017 by Weiren Wang's Architectural Research Office, the transformation of the physical space and social life of Jieshou Village in the process of heritagization will be explored, and finally a new daily routine of heritage conservation in Jieshou Village will be summarized. The result is a summary of the new daily life of heritage conservation in Jieshou Village.

Heritage Conservation and Spatial Transformation: "Zhuo Lu" (Figure 1) is the 162nd house in Jieshou Village. It's a five-bay guesthouse that was built as an extension of Family Liu's guesthouse during the Republic years and is a heritage space within the village. This heritage space is protected by the People's Government of Song Yang Town, and any permission for alterations must meet the "conservation planning" (Zhejiang, 2009) document mentioned above, and the space has now been transformed from locality to business. In remained literature collection of Chi Xi Cun Cao, it revealed

through comprehensive research, the conventional way of constructing a residential environment that celebrates the education-first lifestyle.

The renovation of "Zhuo Lu" needs to meet the concept of living preservation and organic development upheld by the Songyang County Government, because "Zhuo Lu" has a special geographical and cultural significance for Jieshou Village. This concept means that the traditional village should be considered in the context of historical dynamics, and the least, most natural, unintentional, and most effective artificial intervention should be used to maintain the original ecological rural scenery, the original countryside style, and the original sense of history, demolishing and decorating them with foreign culture rather than painting the walls over. The traditional village is an organic system and a complete living organism, with its own shape and core, as well as its own soul and spirit. "Zhuo Lu" has its own specific history, and will also play a specific function, even if simple, rough, dilapidated such as water pestle, well kiln, shrine, and even pigsties, the retention of the cowsheds and fences that were originally within the village is one of the elements included in the heritage of Jieshou Village.

Changes in social relations and functions: the changes in the social relations of the inhabitants have led to a series of changes in the functions (structure and form) of the space. In terms of spatial pattern, the old "Zhuo Lu" house before the renovation was a traditional courtyard space, belonging to the cultural heritage of Jieshou village, and unlike ordinary houses, the main building has five open spaces in the front garden, with a view of Wanshou Mountain on the left from the first floor and Chaowei Mountain across the Songyin Stream on the right. The main room in the courtyard (opposite the door and larger in size) is for the elders to live in, while a plaque hangs above the center of the room and the ancestral deities are worshipped in



Fig. 1 - "Zhuo lu". Source: <https://www.mafengwo.cn/hotel/69856844.html>.



Fig. 2 - "Liu Dehuai's Former Residence - House - Jieshou Village" before renovation. Source: <https://wwjarch.com/jieshou-Village-Courtyard-House>.

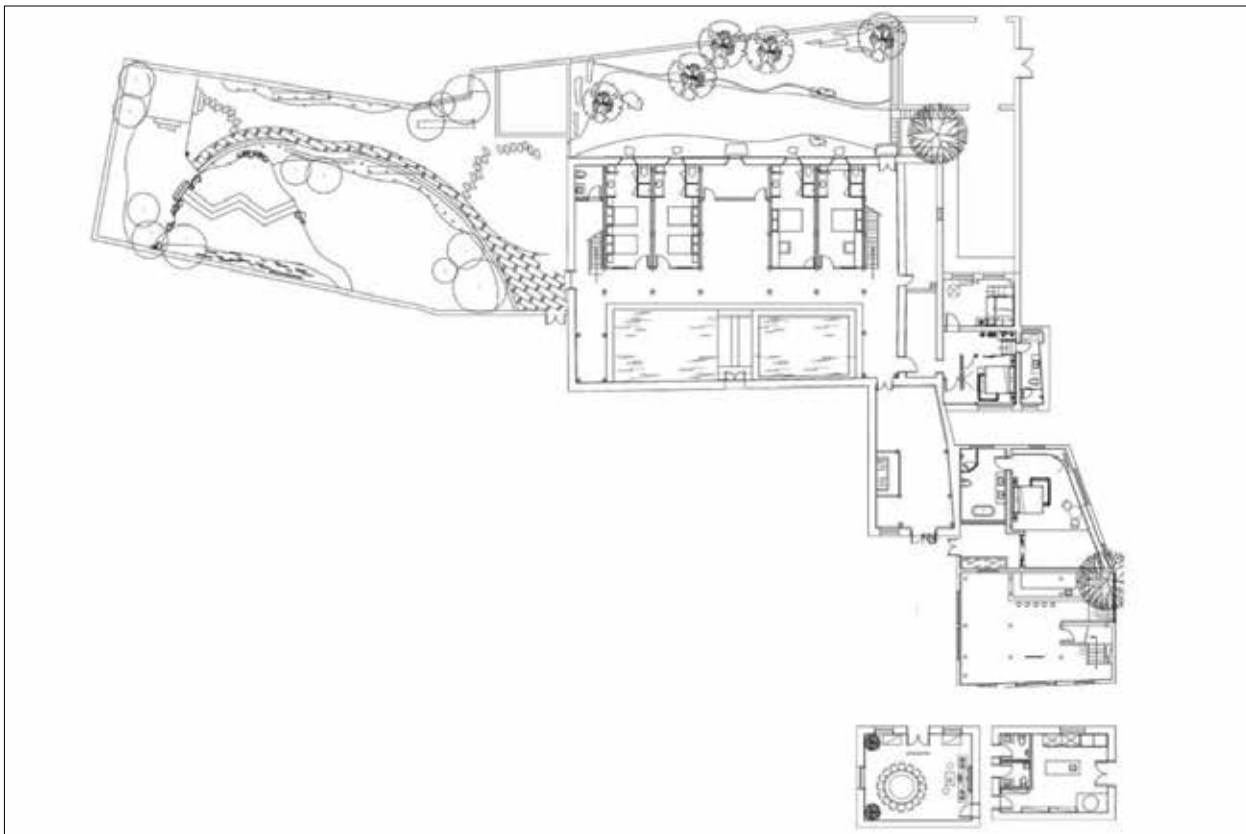


Fig. 3 - "Liu Dehuai's Former Residence - House - Jieshou Village" After renovation. Source: <https://wwjarch.com/Jieshou-Village-Courtyard-House>.

the middle, while the rooms on either side of the house (smaller in size and more remote or isolated in location) are mainly occupied by the younger members of the family group. When the house becomes a business, the social relations of the people living in it, as discussed earlier, begin to change: the owner of the compound gradually changes from the original owner to a renter or operator, and when the original owner becomes a renter, he does not usually live in the original house anymore, but rents it to a third party (the operator); the operator usually rents the house to provide accommodation for visitors; the visitors have a certain degree of This has led to a change in the structure of the original space from central and hierarchical to eccentric and flat. For example, the "Zhuo Lu" designed by Weiren Wang's architectural research laboratory maintains the original rectangular vertical spatial pattern, while at the same time, the entrance space, the patio, and the open space inside the space have been developed into a whole, becoming an important node of the entrance space on the west side of Jieshou Village. In terms of spatial relationships, before the renovation, the entire space of which Dehuai Liu was the owner was characterized by close communication and common activities between the family. However, after the renovation, when the owner was transformed into an operator, the original spatial relationships of "Zhuo Lu" began to become fragmented, his family and descendants having moved out of the heritage space separately with the origi-

nal owner. The social relationships within the space have been replaced by those of the owner and his family (travelers), visitors (visitors), government officials (offices) and students (sketching activities), which has further reduced the space for the activities that had been the subject of social relationships.

Society: plural subjects and the traveler' community

The new daily routine of heritage conservation: In December 1981, three departments, namely the State Capital Construction Commission, the State Administration of Cultural Heritage, and the State General Administration of Urban Construction, jointly submitted to the State Council a Request for Proposal on the Conservation of Historic and Cultural Towns in China, which marked the beginning of the conservation of historic and cultural towns in China (Zhonghua et al., 1986); The Conservation Plan (Zhejiang, 2009) is the basis for the protection and management of historic and cultural villages in Songyang Town, and activities within historic and cultural villages in Songyang Town must comply with the requirements of the Conservation Plan. The heritage conservation process that has begun since then has transformed Jieshou Village from a local community into a business tourism site; the majority of the courtyards, which are the basic spatial unit of Jieshou Village, have also transitioned from residential to commercial space, and heritage conservation has changed from the original preservation of cul-

tural relics to the preservation of historical monuments; the core driving force behind this change is the different demands behind the conservation of Jieshou Village. The core driving force behind this change is the different demands of the multiple actors behind the conservation of the Jieshou Village. Villagers: the villagers are happy to take their houses to achieve heritage conservation and development in two ways. One is to transform their houses into commercial residences to meet certain economic needs; the other is to rent them out to operators at a high price to take care of them, while they choose to enjoy their own comfortable life in the tranquil surroundings of Jieshou Village.

Visitors: visitors expect to Jieshou Village to come and experience a sensory stimulation and life experience that is very different from their previous living environment, and they look forward to experiencing the charm of a different culture while playing and living here. The expectations of visitors have a strong influence on the decisions made by the government and the actions taken by the operators.

Government: Jieshou Village, as one of the classical villages, is a calling card of Songyang Town and a key focus of the government to boost the local economy. In order to sustain the growth of the local economy, the Songyang Government needs to manage the overall tourism industry in Jieshou Village, maintain the heritage landscape, and encourage villagers and operators to maintain and create a unique local cultural landscape that will attract more visitors (a potential source of economy).

Operators: the operators, like the government, take the expectations of visitors seriously, and this is also because they have converted their own homes or leased the grounds (courtyards) of the Jieshou Village and need to consider the economics of breaking even while converting the space. One problem for operators, however, is that they have little knowledge of the local culture. Short-term operators (and this includes some of the villagers whose roles have been converted to operators) will consider short-term economic benefits and thus act to deceive tourists, while long-term operators will not consider short-term economic income and will prefer to develop a stable and good development model in terms of business model, architectural style, and experiential atmosphere. But the preservation and transmission of culture is what they leave out, which makes it possible for the operators to intervene in the local culture with foreign culture (coffee, tambourines, etc.), without any connection between the two. In leading to a question, in his discussion of the production of space, Lefebvre discusses the three types of absolute space, abstract space and space of difference. Absolute space is the product of the interaction of blood, land, and language, emphasizing the fixed qualities of space; abstract space is formed by the forces of political economy, emphasizing the abstract and exchange value of space; and difference

space belongs to everyday life, emphasizing the use value of space over the exchange value (Lefebvre, 1991; Ba, 2003). These three spatial types are also present in the current heritage space of Jieshou village. When villagers (locals) move out of Jieshou Village, the community belonging to the original villagers gradually declines, which means the gradual disappearance of absolute space; the government and operators (capital) move into Jieshou Village to carry out activities such as supervision, management, and operation, respond to the consumption needs of tourists and maintain steady economic growth, and at this stage abstract space begins to form. Diverse subjects: clash, negotiate, overlap, and intertwine in the defense of their respective interests, and together these actions shape a composite ancient city with a pluralistic character. The travelers, as a newly existing part of the social relations of Jieshou Village, plays a leading role in linking other relationships. forming leasing relationships with the original villagers, buying, and selling and even friendships with tourists, and being managed and guided by the government, running a part of their lives, becoming part of the villagers, and enjoying their leisure time in the village.

The new daily routine of heritage conservation

While absolute space disappears and abstract space is created following the intervention of the government and the operators who are the “new people of Jieshou”, are also producing spaces of difference in their daily lives. In the eyes of the visitors, these operators are already locals, and have become a resident group in the village. Is it therefore possible to increase their understanding and identification with the local culture, to improve local health conditions, education, and health care, and to make the foreign operators an important force in sustaining the village’s identity and vitality? As architectural historian Daniel Bluestone says, “living cultures are always in a state of dynamic change, and conservators should keep an open mind to the changes in cultural heritage, understanding and interpreting them as part of their heritage values” (Bluestone, 2000)

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1.6 Architectural sustainability strategies of the secular heritage building envelopes of Piazza del Duomo in Milan

R. HASBINI¹

Introduction

The memory of a civilization is written in built form through architecture. The architectural heritage, or the architectural legacy of the past knowledge, practices, values, and traditions communicates this memory to the current period through the built language. Requiring attentive conservation to preserve continuity (UNESCO 2023, ICOMOS 2023), this built form is a valuable translation of the past communities' way of life; reviving the memory, it contributes to the sense of place; moreover, it sheds treasured perceptions for modern actions. Continuity concerns the collective future or its sustainability i.e., a development which meets current needs while preserving the needs of the future generations, reconciling the protection of social and environmental balance with the economic development (EUR-Lex 2023).

While current modern cities are craving sustainability under the pressure of climate change global crisis and urban demographic burst, a sensible approach would be to learn from the sustainable wisdom of the heritage past i.e., its lasting architecture. Environmentally, the building sector contributes considerably to atmospheric pollution. In Europe, 36% of carbon dioxide (CO₂) – the main global warming agent – emanate from this building sector which consumes 40% of the energy (European Commission 2020). Differently, heritage building envelopes with high energy performance are environmentally sustainable. Socially, this building envelope reflects its sustainability through its own continuity; compared to destruction and replacement, their restoration is inherently an economic sustainable activity. As such, they present green architectural and

urban planning lessons. Therefore, and focusing on the secular heritage building envelopes of Piazza Duomo in Milan, Italy, this paper sheds light on the main green design and construction principles which determined the sustainability of this majestic place within the three realms of the social, the environmental and the economic. The aim of this article is, therefore, to draw these green principles for adoption by the future planners seeking sustainable solutions to their building envelope.

Urban Morphology

Reviewing, in brief, the history of the place and its urban morphology is prime to understand why these specific building envelopes are majestically sustainable. Piazza del Duomo is at the location of the previous Piazza dell'Arengario market of the fourteenth century. In the 18th century, Piazza dell'Arengario was redesigned to accommodate the Royal Palace and related open space area by architect Giuseppe Piermarini (Grillo 1998). Currently the seat of the Archbishop of Milan, the cathedral was started in the late 14th century taking six centuries before construction completion (Jenkins 2007). In the 19th century, architect Giulio Beccaria built the palace at the southeast of the cathedral (Wikipedia 2023). However, the major built form of the current piazza is attributed to architect Giuseppe Mengoni – commissioned by King Victor Emmanuel II of Italy; Mengoni's renovational activities between 1865–1875 majorly impacted the architecture of the square (StoriaDiMilano 2002). This resulted in three main landmarks: Galleria Vittorio Emanuele II and the two "Palazzi dei Portici" defining the southern and northern boundaries of the Piazza. Mengoni's master plan (StoriaDiMilano 2002) is shown in Figure 1. This master plan largely reflects today's Piazza Duomo architecture.

Piazza Del Duomo is the focal center of Milan. Major buildings, galleries and monuments determining the architecture of this square are (Figure 2):

- Duomo di Milano - Milan Cathedral (14th century on)
- Royal Palace of Milan (18th century)
- Palazzo Carminati (19th century)
- Palazzo dei Portici Settentrionali (19th century)
- Palazzo dei Portici Meridionali (19th century)
- Galleria Vittorio Emanuele II (19th century)
- Palazzo dell'Arengario (20th century complex) - (Regione Lombardia 2015).
- Monument to King Victor Emmanuel II (Wikipedia 2023).

As a morphological forecourt of Milan cathedral, Piazza del Duomo is an open space with an area of 38,000 m² (Wolfrum 2015).

Sustainable Strategies

With the aim of learning from the lasting architecture of the past, the sustainable strategic urban planning

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Fig. 1 - Giuseppe Mengoni's master plan (StoriaDiMilano, 2002)

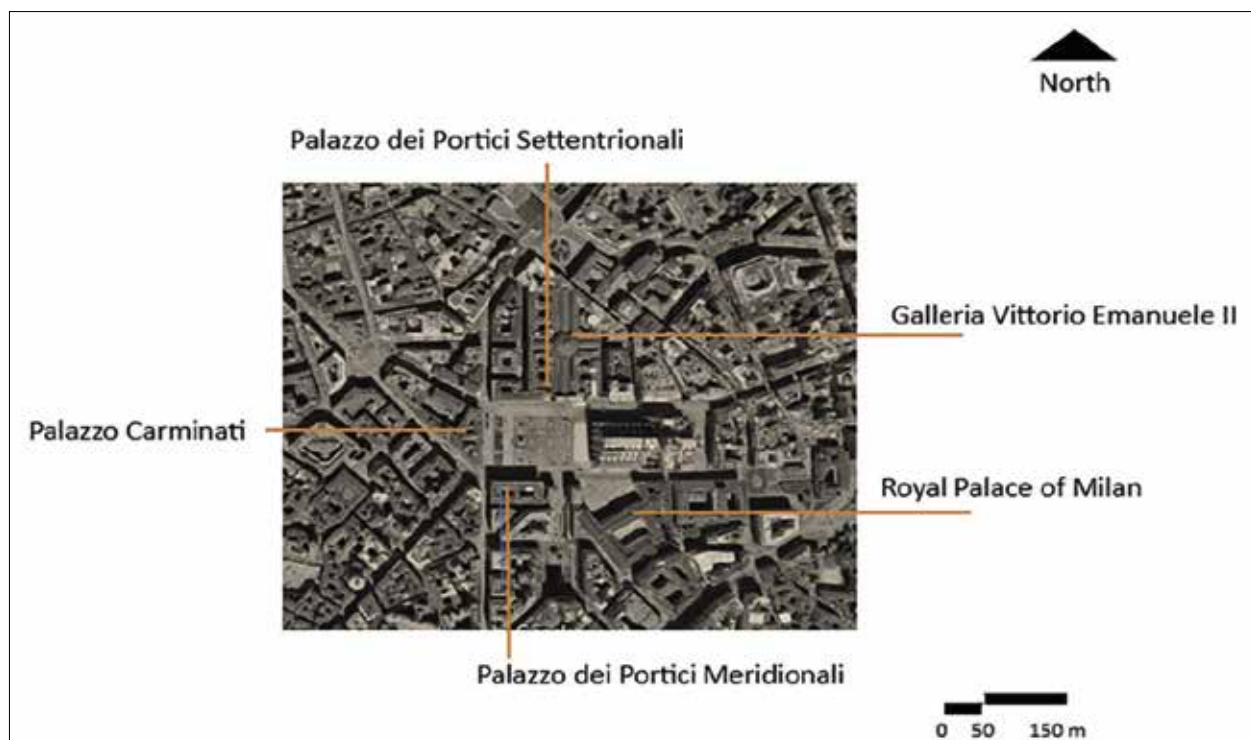


Fig. 2 - Piazza Duomo. Source: author's elaboration on Google map.

and architectural principles are described, in this Section, in relation to the secular heritage building envelopes of Duomo Piazza. To define architecturally, the building envelope is the ensemble of those elements which separates the inner space from the outer space including walls, doors, windows, roof, and ground slab (Hailu 2021). The building envelope protects the inner space and related functions as well as it defines the external space and related functions (Ching 1979). The envelope of heritage buildings, in piazza Duomo, exhibit mastery of passive design strategies in their urban integration form and layout and as well as their scale and functional adaptability. These characteristics give these envelopes strategic sustainability within the three spheres of the social, environmental, and economic realms. This is explained further in the paragraphs below.

a) Social Sustainability

In social cultural terms, the architecture of the building envelope expresses its identity reflecting the era and related techniques. With aesthetic intentions, the inner private space is separated from the outer public space with the aim of creating better livable surroundings. The building envelope is an expression of an identity. Heritage building envelopes incarnate the past in the present. Their restoration sustains their future. The paragraphs below describe further the urban architectural constructs which distinguishes

the social sustainable aspect of the secular heritage buildings envelopes of Piazza del Duomo.

Urban Integration and Piazza Articulation: In Italy, the typology of the piazza is an integral part of the urban fabric (Fusch 1994), which is the ensemble of the collectively built artifacts (Rossi 1981) reflecting the social way of life of citizens during a cultural era. Piazza Duomo is a nodal gathering space setting out the focal center of Milan; its orthogonal shape and scale further redefine this typology into a monumental element of the urban language with historical, religious, and communal significance. This monumentality is defined not only by the scale, but also, by the monumental expression of the surrounding heritage building envelopes articulating it. Remarkably woven into the urban fabric, the architecture, thus, defined by the envelope of the heritage buildings in piazza duomo exhibit urban planning mastery (Figure 3). This integration is asserted by street continuity and connectivity to the surrounding dense urban configuration opening up in this large central monumental square – see Figures 4 and 5.

Functional Adaptability, Scale and Language: Previously, façades for palaces, the heritage building envelopes of Piazza del Duomo accommodate, now, hospitality and commercial functions such as hotels, restaurants, headquarters of firms, banks,

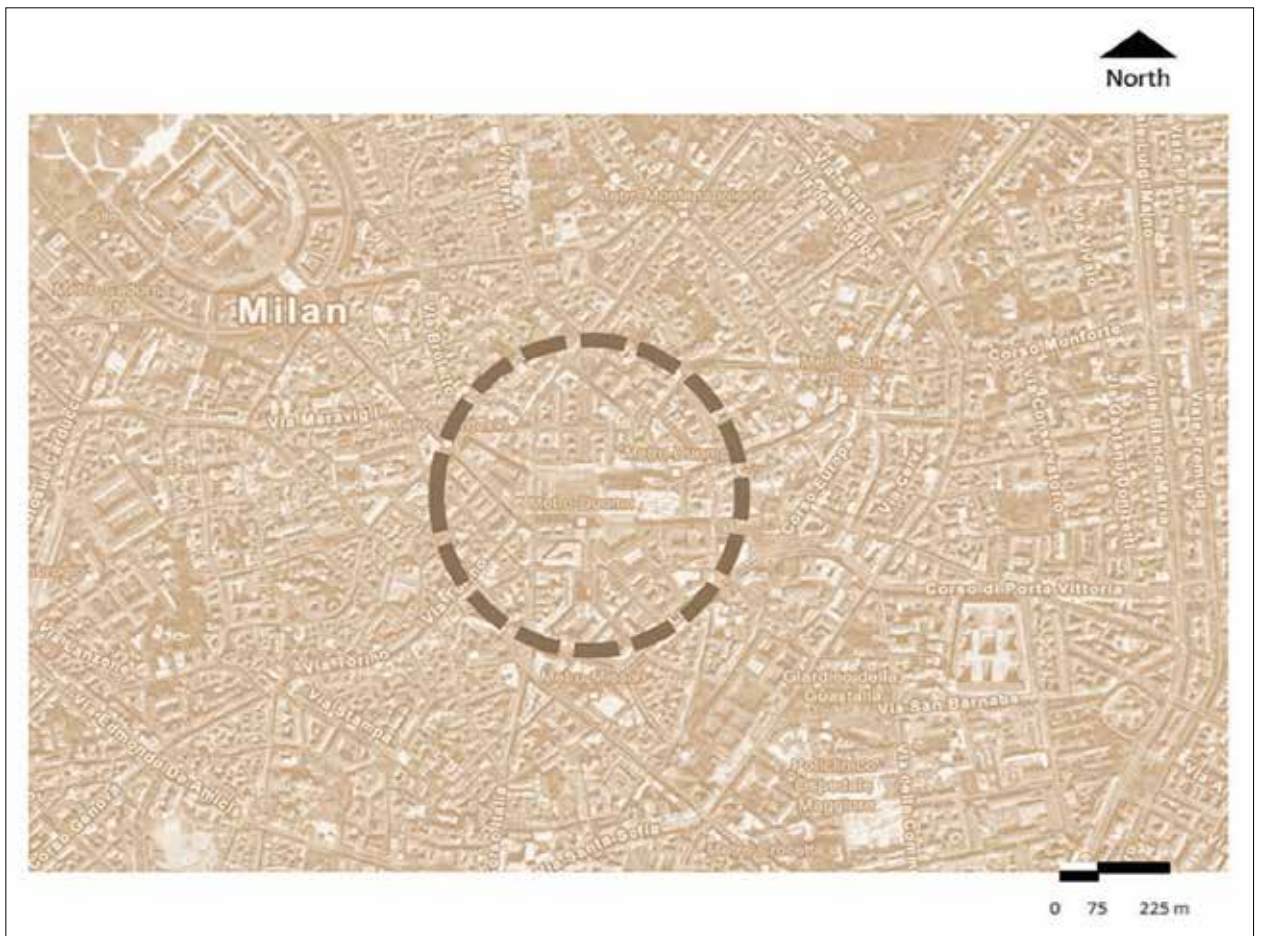


Fig. 3 - Piazza Duomo urban plan. Source: author's elaboration on Google map.



Fig. 4 - Urban plan. Source: Comune Di Milano Geoportale, 2023.

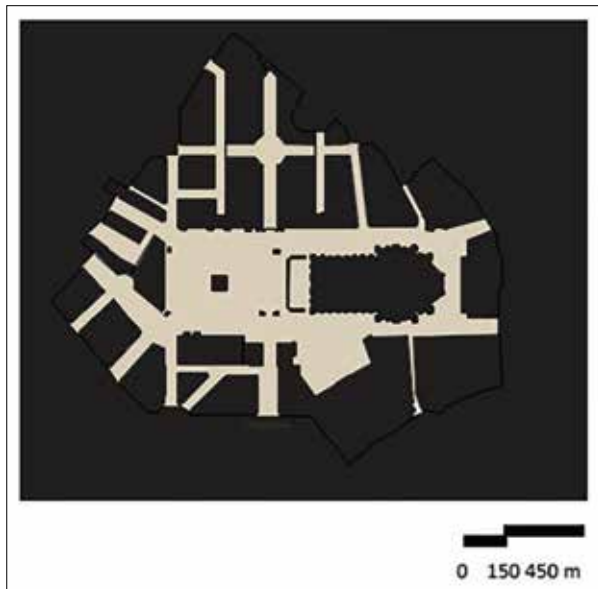


Fig. 5 - Study by Author.

and luxury boutiques; demonstrating, thus, a perfect ability to adapt to various modern emerging functions of this contemporary era i.e., social adaptation to stringent modern requirements as well as necessary openings and expression of luxury. The ability to accommodate different functions over time distinguishes a monument from the typical modern building (envelope) with strict functionalism; Moreover, monumentality propels its durability (Rossi 1981). These façades express a characteristic urban identity i.e., a sense of place – or *locus* – which

persisted through many changes, particularly the transformation of functions. Currently, a center for diverse social urban activities, these heritage building envelopes define the social sustainability of this space i.e., the locus of Milan.

The building envelope shapes the urban environment: it shapes both the volume of the buildings – the indoor space – as well as the volume of the space between the buildings – the outdoor space – where yin and yang always form each other; the outdoor space includes public squares, streets, and



Fig. 6 - View from Duomo.

private external areas; The way this envelope is articulated defines the pattern of the language (Alexander et al. 1977).

Moreover, the heritage building envelopes are to the scale of the people, by possessing this specific language which communicates with them. Compared to the faceless expression of modern façades, the classical harmonious articulation of openings, their rhythm, their scale, and proportions (Figure 6), endow the place with a unique identity paradoxically appealing to the local inhabitants as well as the international visitors from various different origins, cultures, and backgrounds. Additionally, the envelopes of those buildings exhibit continuity in style and order with subtle variances.

2.1.3. Harmony and Art: There, the composition of the heritage building envelopes are harmoniously classical. The longing to experience the space is similar to the desire to enjoy listening to a classical symphony over and over again...endlessly with deep fascination. According to Louis Kahn, space is a materialization of a form, of Architecture, as an art of space construction representing those institutions that must reflect and reverse the inspirations of man (Visconti 2023). Duomo place demonstrates this art of space definition and building. Furthermore, to the beauty of conception is added the exquisite detailing of the construction materials – such as stone, exhibiting mastery of execution through skilled craftsmanship. The Duomo locus incarnates sustainability in exquisite beauty.

b) Environmental Sustainability

In the previous section, the main architectural principles contributing to the social sustainability of Piazza del Duomo – as defined by the secular heritage buildings envelopes – have been highlighted. In this section, the environmental impact will be further analyzed underlying the passive strategies adopted. These building envelopes articulate sheltered spaces and buffer climatic zones; their massive construction possesses high thermal performance. They, thus, articulate an urban syntax of relatively narrow streets, courtyards, arcades, and gallerias defining an environmentally sustainable unique architectural composition.

Streets Definition and Courtyards Articulation: In the case of Piazza del Duomo, the secular heritage buildings envelopes define not only the urbanly integrated public main square but also, the relatively narrow diverging streets i.e., the semi-public circulation areas as well as the inner private courtyards i.e., the semi-private external spaces. Thus, they effectively develop semi-public and semi-private micro-climates; efficiently, the narrow form of these pedestrian streets proliferate protection from the harsh winter wind; Proportions of the building envelopes and the defined streets – heights versus

width – provide adequate shading during summer. Similarly, the semi-private courtyards are shielded from climatic harsh variation. Semi-public streets and semi-private courtyards present urban livable external spaces (Lynch, 1990). Moreover, the covered Galleria Vittorio Emanuele II is a unique grandiose semi-public circulation space effectively sheltered during all weather conditions providing climatic transitional spaces from the public piazza space to the private room or shop space. This composition syntax (Figures 2, 4 and 5), results in harmonious urban all-seasons-livable external spaces protected from climatic variations – where the environmental sustainability of this harmonious compositional syntax.

Buffer and Sheltered Climatic Spaces. Furthermore, the building envelopes of the palaces of Piazza del Duomo are articulated with arcades on the ground floor. These arcades protect the walkways from direct sunlight and direct rain during both the hot and the cold seasons. Therefore, they promote passive cooling strategies; During summer, they shade the inner façade reducing the direct sunlight hitting it; thus, significantly decreasing the cooling load and energy consumption required for the interior spaces. Arcades shelter pedestrians from rain, snow, and intense heat, enhancing the comfort of outdoor spaces. This protection can, also, reduce the need for weather-resistant materials and maintenance, contributing to long-term sustainability of the construction. Incorporated into the urban planning, arcades create pedestrian-friendly environments, by promoting walkability and other social activities (Wolfrum 2023). Another sheltering feature of the majestic place is the Galleria Vittorio Emanuele II which is connected through the square with Palazzo dell'Arengario (Wolfrum 2023). Similarly, this coverage reduces the need for indoor climatic load whether during winter or during summer. As mentioned above, the distinguished coverage of the galleria is a main factor in the usability of the circulation space through all seasons.

By wisely articulating and setting the urban architecture of narrow streets, courtyards, arcades, and gallerias, in response to climatic requirements, the composed syntax of secular buildings envelopes of Piazza Del Duomo confirms its environmental sustainability as well as its high significant social locus.

Construction. Articulating the urban form of the Piazza del Duomo, the heritage secular building envelopes are composed of massive walls with thermal insulation properties. This massiveness conserves the energy and reduces losses, by insulating the inner space. It is, therefore, considered an efficient thermal passive strategy. The structure and thermal properties of external walls affect both the thermal conditions inside the building and the energy demand (Bellos et al. 2014). This applies to

the energy requirement for heating as well as cooling. By increasing the thermal mass of a building, more heat is stored in the building structure and the daily maximum temperature is decreased (Kisilewicz 2019). Accordingly, the efficient energy performance of a building envelope is largely tied to its thermal performance (Tzortzi & Hasbini 2022). An efficient thermal performance requires reduced fuel and electricity consumption; consequently, reduced CO₂ and other greenhouse gases (GHG) emissions from the building and related sector. Besides, these building envelopes are built from local materials such as stone and wood. This approach reduces the trajectories needed for transportation; thus, reduced related greenhouse gas emissions. The mastery of execution in construction and the artistic expression play important role in social sustainability – refer to paragraph Harmony and Art above. These factors confer to the building envelopes of the Piazza environmental green performance as well as social sustainability characteristics and properties.

c) Economic Sustainability

Restoration – including repair and revitalization of a structure's exterior elements such as roofs, facades, windows, and doors, etc. – is inherently an efficient economic activity when compared to building replacement i.e., destruction and re-construction. By promoting the efficient use of existing resources, building envelope restoration aligns with environmental sustainability objectives. Retaining and renovating the building envelope reduces waste associated with demolition. Demand for new construction materials is minimized. Additionally, restoration projects often incorporate green building practices – such as green concrete (Tzortzi & Hasbini 2021), enhancing energy efficiency and reducing the structure's environmental footprint.

In the construction industry, building envelope restoration plays a vital role in promoting the economic sustainability of a place and its urban revival. By renovating historic or aging buildings, the cultural heritage is preserved. Moreover, re-purposing existing structures promotes sustainable urban growth by attracting new businesses, residents, and tourists. This stimulates economic activity and bolsters property values. In brief, the restoration of the secular heritage building envelope of Piazza del Duomo promotes the social, environmental and economic sustainability of this locus.

Enhancing Environmental Sustainability

The principles above have underpinned the strategies adopted to proliferate majestic sustainability to this monumental place within the three spheres of the social, the environmental and the economic. However, to enhance the external environmental conditions further solutions can be introduced to the building envelopes. These solutions pertain to absorb the carbon dioxide and other pollutants from

the external atmosphere. However, they should be introduced carefully while avoiding any conflict with the expression of heritage and distinguished aesthetics. They may range from green roofs (where possible) and green walls (limited and careful implementation) to water surfaces (subtle introduction). The beneficial environmental performance of green roofs is well-known. This includes thermal insulation properties, solar radiation absorption, cooling ability of plants, biodiversity enrichment, run-off limitation, and air-purification (Yeung & Li 2014). Similarly, the judicious implementation of green walls and the careful introduction of trees would enhance the atmospheric quality of the place (Tzortzi & Di Labbio 2019). Finally, water planes may be introduced in free-standing structures to add freshness to the place during hot summer days. Other innovative subtle additions may be considered without conflicting with the existing heritage aesthetics. These solutions would also allow subtle modernization of the place without compromising its historical majestic beauty.

Conclusions

This paper has shed light on the main sustainable strategic principles adopted by the architects for the secular heritage building envelope of Piazza del Duomo in Milan. These principles include focal center piazza articulation, urban integration, streets definition, layout, and form as well as materials and construction techniques. Scale, harmony, and beauty are specific considerations enhancing the social continuity of the construction elements. The sustainability of a heritage building envelope pertains to its social acceptance and continuity as well as its green environmental performance and the economic promotion of its locus through restoration. The latter is an inherently green construction activity minimizing waste and materials usage. Accordingly, these secular building envelopes of Piazza del Duomo integrate the three sustainable domains: the social, the environmental, and the economic.

Enhancing the green environmental performance of these building envelopes may be feasible by adding – subtly – green roof, green walls as well as water planes. Adopting green restoration techniques is mandatory to express sustainable continuity and to enhance the environmental conditions of this space scrubbing carbon dioxide and other pollutants. The secular building envelope plays an important role in addressing climate change issue, mainly in urban areas with dense fabric.

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1.7 Tobacco in eastern Macedonia and Thrace

The urban-socioeconomic impact and the case of Kavala

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Introduction

The present paper describes the correlation between the tobacco and the tobacco warehouses and their impact on the urban environment in Eastern Macedonia and Thrace with a special reference to the city of Kavala, from a social, economic and architectural perspective. Eastern Macedonia and Thrace is an administrative region that is located in the northeastern part of Greece, with the city of Kavala being the principal seaport of Eastern Macedonia. The region is known for its tobacco history as a part of cultural heritage. Specifically, tobacco was inscribed on the National Inventory of the ICH of Greece, entitled: "The cultivation and processing of Oriental Tobacco in Macedonia and Thrace", with the number 52, in 2020 (National Inventory of ICH of Greece, 2023).

Greece has a long history of tobacco production. It constitutes the second largest producer of oriental tobacco globally and one of the eight countries that produces the 99% of tobacco in the European Union (Tsaliki et al. 2023, p.1). Eastern Macedonia and Thrace offers the highest amounts of tobacco output in Greece. This is why tobacco is considered of great cultural value in this particular region due to the long tobacco history that has affected the social and economic life and the overall development of the area. The region is regarded as one of the three territories (the other two are related to the area around Smyrna-Sampsouda and Bafra on the southern coast of the Black Sea) that produces the best tobacco for cigarettes in the world (Flevaris et al. 2014, p.2).

Consequently, Eastern Macedonia and Thrace is well – known for its tobacco trade and boasts a rich heritage deeply rooted in the tobacco industry. The city of Kavala, which is located in the western part of the region, has been chosen for deeper explora-

tion because it was one of the most important tobacco city centers in the area and the country as well. During the late 19th and early 20th centuries, it largely boosted tobacco production and trading and gained a significant role in the Balkans and overall Europe (Ageloudi - Zarkada 1986, p. 49): it was called as "Mecca of tobacco" and "Tobacco City of Balkans", because of its notable geographical location and the presence of a harbor, which both served the commercial flow.

Within this context, the paper is divided into five essential sections. The initial section describes the historical background that shaped the socioeconomic conditions in which tobacco thrived, leading to the construction and subsequent evolution of tobacco warehouses. The second segment investigates the structural and architectural attributes of tobacco warehouses whilst the following part scrutinizes their impact in the region and examines how the architectural heritage influences the surrounding area. It further analyzes the social and economic factors arising from the construction of these buildings and explores the evolution of the area's social and financial status, which in turn affected the urban landscape. In this part, the survey commences at a regional level and expands in the following part to encompass the urban scale, taking into account the architectural influence as well. The last section focuses on the city of Kavala, in order to perceive how the aforesaid elements reflect the cityscape. It explores the evolution of the urban fabric from both socioeconomic and architectural perspectives. Ultimately, it delves into the conditions and factors that have shaped the current state of the architectural heritage within this specific urban setting.

Historical Context

Oriental tobacco, like every type of tobacco, is an annual plant with approximately 50 species (Flevaris et al. 2014, p. 5). The variety of Greek oriental tobacco is of high quality concerning its color, aroma and flavor and has excellent burning properties due to the optimum type of soil in the country, its appropriate climate conditions and the vast experience that comes from a long-standing tradition in the cultivation of the product (Bilalis et al. 2015). The most well – known variety of tobacco in Eastern Macedonia and Thrace is called "Basma", has an exceptional aroma, and is produced exclusively in Greece among the countries of the European Union (Omeroglou 2003, p. 16). It has been considered the most marketable variety until nowadays, producing up to 1200 cigarettes per kilo. The oriental tobacco in Eastern Macedonia and Thrace, with the "Basma" being its most important variety, has a long history that has affected the region on a spatio-temporal level, as it is mentioned below.

Tobacco was imported into Greece in the late 16th century, specifically in Thessaloniki, the country's second-largest city (Nollas 2007, p. 22). Its cultivation is believed to have originated in Eastern Mac-

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edonia and Thrace (ibid.). It is considered a very important product for the country due to its dual significance: it generated high economic profit as a merchandise with a simultaneous cultural value as a part of intangible (tobacco) and tangible (tobacco warehouses) cultural heritage. During the 1950s, tobacco was equivalent to 50% of the overall cultivated area of Greece, providing employment for approximately 200.000 households and creating additional jobs for 18.390 tobacco workers (Vyzikas 2010, Vol. A., p. 3). The city of Kavala had the highest number of employers in the same period, even larger than Thessaloniki, with 7.693 and 5.082 tobacco workers respectively (ibid.). In 1991, the cultivated area counted 750.000 acres, and the total tobacco production would reach 160.000 tons, with a percentage of 80-90 % to be used for exports (ibid.). The systematic cultivation of the whole region had begun in the mid-18th century (Omeroglou 2003, p. 23). The earliest mentions of tobacco production can be tracked back to 1828, as documented in a report by Frederick Strong, the Bavarian Consul in Athens (Flevaris et al. 2014, p. 4). Some years later, the first tobacco warehouses were built at the wish and command of the greatest tobacco dealers of that period. The reason for the construction of the first large tobacco warehouses, funded through substantial financial investments by tobaccoists in the mid-19th century, was mainly the lack of suitable industrial spaces (Nollas 2007, p. 24) that could accomplish the need for tobacco storage and production.

The warehouses

Before the erection of the large warehouses, tobacco was stored either in small single-story buildings that were spread out in the urban fabric or on the ground floor and possibly in the basement of the traders' houses (Monioudi-Gavala 2016, p. 86). In the 1870s, the warehouses took the form of two-story buildings constructed of thick stone walls, a four-sided roof covered with Byzantine tiles (Ageloudi - Zarkada 1986, p. 49), and wooden girders and tiles in the interior (Flevaris et al. 2014, p. 75; Nollas 2007, p. 25). Their form followed their function: the form of the building assured much light in the upper part and shading in the lower part – down below (Nollas 2007, p. 25). That was because light was essential for processing and darkness for storage (ibid.). Tobacco processing took place on the second floor with larger windows designed to provide abundant natural light, while skylights were occasionally used when the light was insufficient for the processing (Rentetzi 2008, p. 72). Windows on the ground floor were utilized to ventilate the space in order to prevent rotting, and were intentionally kept small to minimize the amount of light exposure to the raw tobacco (ibid.). The floor plans of the warehouses were rectangular, with the façade placed on one of the narrowest sides (ibid.).

Later, the buildings of the tobacco warehouses were

much bigger than the older constructions, built with the same materials -stone and wood-, with large symmetrical openings and sometimes with the use of concrete in the newer buildings (Vyzikas 2010, Vol.C., p. 3). The storage, processing and production of tobacco similarly followed the form of the buildings in the vertical axis: raw tobacco was stored on the first floors, spread out around in order to get good ventilation for preventing rotting while the processing of the tobacco was carried out on the upper floors (Ageloudi - Zarkada 1986, p. 49). The tobacco warehouses in the Eastern Macedonia and Thrace were similarly constructed with the abovementioned features and general form in order to have the best functionality for the overall tobacco processing and production. However, concerning the shell of every single building, sometimes there were specific characteristics that would distinguish them from one another, even at a microscale level. Such characteristics would be triangular gables on their roofs with circular or rectangular skylights; less often, balconies with ornate railings; circular in the upper part or rectangular window frames; etc. Those warehouses marked the city and left historical traces in the urban fabric. They disclose attributes of tobacco that are related not only to its production process and categorization as a trade product but also to its influence on the everyday life of that period and the ongoing evolution of cities up to the present day.

The impact of tobacco and tobacco warehouses in the region

Tobacco exerted a significant influence on tobacco cities as it has been for decades one of Greece's main export products, with its pinnacle being in the 1920s (Monioudi-Gavala 2016, p. 81, 82). Not only was it a channel of communication between Greece and Central Europe, but also, due to the substantial financial gain that it provided to the country, it would further contribute to the country's banking system (ibid.). Besides, the tobacco warehouses introduced architectural elements from Central Europe, viz., typologies and styles (ibid.), which were new to the country's architectural norms. Those factors, together with the extension of the residential area of the refugee settlements in the tobacco towns (ibid.), had a social, economic and architectural impact on the tobacco cityscapes.

During the early 20th century, modern planning approaches emerged as references to classical antiquity faded, paving the way for persuasive arguments supporting universal progress through industrial development (Yerolympos 1996, p. 29). In the same period, the economies of some of the cities in Eastern Macedonia and Thrace, such as Kavala, Xanthi and Drama, depended almost exclusively on the production and sale of tobacco leaves (Rentetzi 2008, p. 64). Especially in coastal areas, like the city of Kavala, the sense of tobacco was indisputably part of the everyday life of the city, as the tobacco produc-

tion cycle –picking, drying, processing, baling and afterward transporting to the port – would be visible around the cityscape through the trucks that would load the tobacco in front of the warehouses and then transfer the product to the harbor in order to grant them to the foreign companies' streamers (ibid.).

This urban transformation of many cities in Greece had started long ago, with Governor Ioannis Kapodistrias' aims to reconstruct cities in Greece in the early decades of the 19th century (Yerolympos 1996, p. 24), followed by the changes in the 20th century and three reconstruction projects that stood out as fine examples of a new approach to city planning, namely Serres in 1914-1918, Thessaloniki after 1917, and the program for the destroyed villages and towns of Eastern Macedonia with 170 settlements (ibid., p.29) that were devastated for various reasons (warfares, abandonment, etc.).

Furthermore, adopting urban models of European origin resulted in modernization and growth, shaping the newly formed national identity through its connection with antiquity (Monioudi-Gavala 2016, p. 82). Similar changes took place in the cities of Eastern Macedonia and Thrace. The region underwent a transformation process, shaped not only by those external forces but also by internal factors within the region, that would modify the cityscapes, their interrelationships, and the overall cultural identity of the area.

Specifically, at a regional level, commercial, social and other types of interaction between cities were formed as people relocated from their places of origin to urban tobacco hubs, either with their families or alone, seeking employment opportunities. Also, the establishment of migration patterns not only from other countries, especially Europe, to Eastern Macedonia and Thrace but also within the district boundaries of the region resulted in the settlement of merchant tobacco dealers, either Greeks or foreigners, in the big tobacco city centers. They brought customer growth and economic financial flows to the cities, which transformed them into bustling hubs of commerce and trade.

The transportation of the product during and after its processing would also affect the region's attributes through the motility of the trucks and tobacco workers and the consequent changes in its economic profile. Finally, the alterations in the urban scale that were related to the construction of the tobacco warehouses, which had a specific architectural form different from the other buildings, affected the architectural identity of the region, as the tobacco structures were built with the same rationale in each and every city of the region. This means that at a regional level, cities with different identities could coexist, linked by a common element: tobacco as a product, as a "means" of erecting tobacco-related structures, and as a focal point for economic and commercial activities.

At this juncture, mutual influences among the cit-

ies began to emerge, leading to the formation of a regional network. Specifically, the urban dipole of Kavala and Xanthi cities that produced the "Basma" tobacco of an excellent flavor and aroma, and the city triangle consisting of the cities of Kavala, Xanthi and Drama, which were the three biggest tobacco centers in the region with a remarkable number of tobacco warehouses, have been created and formed strong tobacco-related connections with many development opportunities even nowadays, in the framework of cultural heritage. Whether in their interactions or independently, each of these cities holds great potential for contributing to the preservation of their heritage.

Urban transformations: implications of changes at the city level

On a smaller scale, within the confines of a city, the impact of tobacco cultivation and trade is evident in the industrial structures of that era. These, along with more recent buildings, define the city's architectural landscape, especially when considered from a cultural heritage perspective. Nevertheless, the alteration of the cityscape and its industrial profile over time was substantial and occurred due to diverse elements, including changes in the economic and social conditions of both the urban populace and the city as a complete entity.

The financial gain of the tobacco retail led not only to the construction of the warehouses but also to the creation of marketplaces, trading centers and processing facilities, all dedicated to tobacco, resulting in the creation of employment positions and raising of the city's wealth. The traffic in the urban landscape had increased not only due to the transportation of tobacco products, but also because of the general modifications to the urban fabric caused by the city's transformed status as a "tobacco city center". Customers from various places would visit the tobacco centers; workers would relocate to the central tobacco hub; and tobacco dealers would establish themselves in these urban areas. Those requirements, particularly the necessity to facilitate the transportation of the tobacco products, led to further infrastructural development, encompassing the enhancement of existing roads and ports.

At a societal level, tobacco fostered unity among diverse communities, resulting in a fusion of cultures and traditions, a phenomenon instigated by the migration of populations for employment, purchasing and other purposes. Ultimately, the "presence" of tobacco became apparent in the cityscape through the existence of tobacco warehouses, the regular transportation of tobacco trucks, the activities and labor of tobacco workers, as well as the observation and shared experiences of the everyday tobacco lifestyle among residents. Among the three primary tobacco hubs in the region -Kavala, Drama and Xanthi-, Kavala stood out further due to its function as a port channel connecting with other countries.

The case of the city of Kavala

Kavala, tracing its origins back to the mid-7th century B.C. as a coastal city in Northern Greece, was formerly known as Neapolis in the ancient years. Nowadays, it extends in an amphitheatrical manner around its harbor. Located within a short naval distance of the city, the island of Thassos played a significant role in the tobacco business by enabling the movement of tobacco workers to Kavala. The city has a long history as an ancient Greek city, with the tobacco featuring prominently in its historical narrative even before the Greek Revolution of 1821. Financial prosperity, driven by the tobacco industry, emerged around the end of the 19th century and the beginning of the 20th century.

During that time, Kavala was called the “Mecca of Tobacco”, due to its prime geographical location with a natural port, proximity to other important tobacco city centers (triangle with Drama and Xanthi) and the cultivation and sale of the exceptional type of tobacco named “Basma”. This variety commanded the highest prices for tobacco in the region. Over time, Kavala gained widespread recognition throughout Europe (Ageloudi - Zarkada 1986, p. 49) and became one of the primary processing and marketing centers of tobacco not only within Greece but also in the broader Balkans’ region. In 1937, tobacco exports from Kavala port represented 30.9 % of Greece and 41.9 % of the monetary value of the total exports of the product (Vyzikas 2010, Vol.B., p. 33).

Consequently, the city began to thrive as a node for tobacco merchandising, acquiring substantial financial gains. The establishment of regular maritime commercial transactions of tobacco after the 1920s, with major trade centers in Europe, Alexandria, Odessa and other important cities, resulted in the rise of the capital inflow, the workforce and the urban population who would come from the islands, Epirus and the Western Macedonia (Ageloudi - Zarkada 1986, p. 50). The population growth rate of that period was mirrored in the number of

tobacco workers, who, in 1930, were up to 14.000 (Lalenis 2017, p. 106). Besides, the city hosted another 2.282 businesses directly associated with tobacco processing, which occupied 792 employees and 2.826 workers (ibid.).

Regarding the quantity of tobacco enterprises, in 1838, seven tobacco firms operated in the city, three of which were Greek, two French and the other two Austrian (Vyzikas 2010, Vol. B., p. 33). The increase of tobacco businesses in Kavala started to grow gradually after the 1860, with the consequent rise of the tobacco warehouses, which, based in London, Budapest, Dresden, New York, and Cairo, set up their offices in the town (ibid.). The city’s first major company in the tobacco industry was “Allatini”, later named “Commercial Company of Salonica Ltd.”, established in the middle of the 19th century (ibid.). The building was constructed from stone, showcasing exceptional construction quality, standard floor height, anti-seismic reinforcements, and a hipped roof. (Ageloudi – Zarkada 2008, p. 11). By 1910, the three major corporations, Commercial, Herzog and ATC, employed around 6.000 tobacco workers in their warehouses (Vyzikas 2010, Vol. B., p. 33).

This economic welfare led to the creation of the appropriate conditions for the intellectual, social and cultural prosperity of its citizens. From the late 19th century, educational institutions that hosted different cultural groups were already functioning in the city, to wit, Greek, Muslim, Jewish and French (Stefanidou 2007, p. 305, 306). Furthermore, the communities formed their own clubs in different areas of the city, such as the Muslims and Jewish communities, and other types of clubs by profession or social stratification, including the Grand Commercial Club and the Tobacco Workers Club (ibid., p. 308). Besides, the city featured an array of amenities such as restaurants, hammam baths, hotels and other facilities (ibid.), all of which enhanced its cultural diversity. This urban profile was further enriched by the multicultural blend of tobacco dealers and tobacco workers.

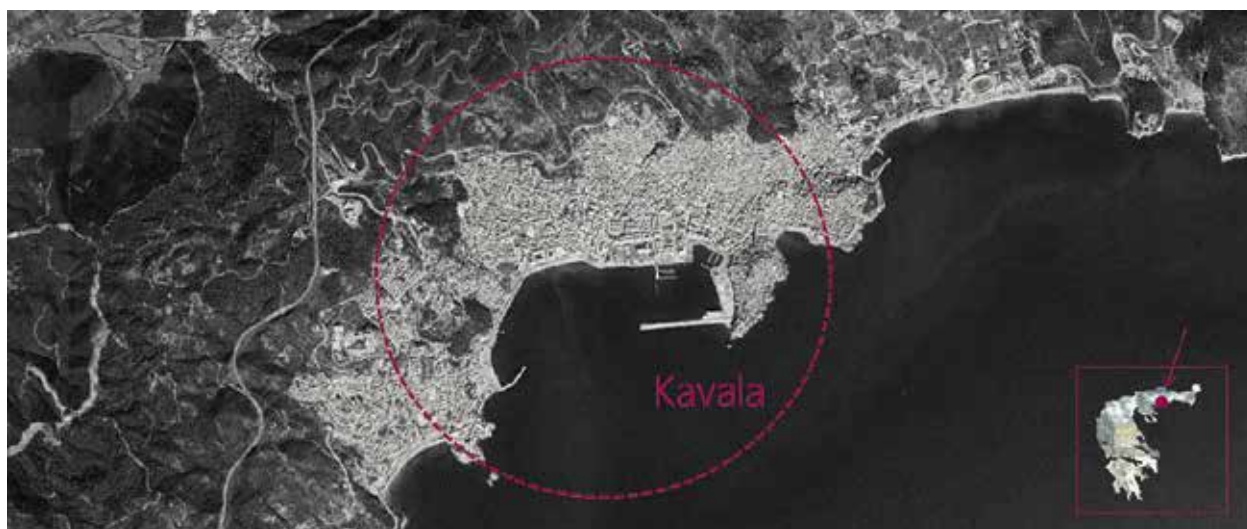


Fig. 1 - Location of the city of Kavala. Source: author's elaboration on Google Earth basemap.



Fig. 2 - A bridge – like structure that connected the warehouses to each other (Image by the authors).

Aside from the cultural elements originating from foreign nations, Kavala assimilated diverse customs from Greek groups, such as Pontic Greeks, refugees from the Asia Minor coast after the Asia Minor Catastrophe in 1922, Thracians and other Greek island tribes who had settled in the city. Furthermore, a significant portion of Thasians relocated to Kavala, either with their families or independently, in order to be employed in the tobacco industry. This migration facilitated cultural interactions between the two places, resulting in the exchange of civic traits and the transformation of the city's spatial and social dynamics.

In the aforementioned urban context, tobacco warehouses did not emerge in specific locations but were scattered throughout the cityscape, either individually or in clusters. Initially, the first buildings were erected along the coast in order to streamline the loading and unloading of products at the port (Ageioudi-Zarkada 2008, p. 11). Tobacco warehouses in the coastal area had entrances facing a central street (Venizelou Street) and stairs leading directly to the sea for tobacco transportation (ibid., p. 15). As a result, the seaside was allocated for the warehouses, leaving only a limited area for local bathing purposes (the area around Ag. Ioannis) (ibid.).

In cases of clustering, small bridge-like structures were sometimes built to connect adjacent tobacco buildings within the same area. The warehouses were exclusively utilized for tobacco processing and

production, with the administrative chambers and offices seldom found inside the warehouses (Zoniou et al. 2004, p. 316). The older buildings primarily feature a simple design without elaborate decorative features. However, in some of the larger warehouses, eclectic and neo-renaissance decorative elements, as well as monograms of the companies and inscriptions indicating the construction date, adorn the main facades of the structures (ibid., p. 318). There were originally 144 warehouses, but nowadays only 49 of them remain (Vyzikas 2010, Vol. C., p. 14-maps 1, 2). The Municipal Tobacco Warehouse, the National Tobacco Organization and the Regie shopping mall warehouses are highlighted as the most renowned examples of former tobacco warehouses in the city that have been re-used. Specifically, they have been transformed into a cultural venue, administrative offices, with the Tobacco Museum of Kavala to be hosted on the ground floor of the same building, and a shopping mall respectively.

In the period following the 1960s and 1970s, the city underwent significant changes, mainly marked by ongoing construction, transforming it into a 'concrete city' (Ziogas 1995, p. 30). These buildings were constructed using manufacturing solutions that departed from the architectural and decorative styles previously prevalent in the area (ibid.). After the mid-70s, the city experienced a decline in the tobacco industry as well (Lalenis 2017, p. 109). In



Fig. 3 - Municipal Tobacco Warehouse | National Tobacco Organization | Regie shopping mall (Images by the authors).

1992, 1.500 tobacco workers remained, a number that was steadily declining, while the revised development strategy focused on the marble industry, textiles and tourism (ibid.).

Eventually, Kavala transformed into a standard Greek mid-sized city (ibid.). Though tobacco defined the identity of the city, the so-called “Mecca of Tobacco” or “Tobacco City of Balkans”, the old city gradually became integrated into rapid urbanization due to the construction of vertical, nondescript, massive apartment buildings with no particular architectural style. The warehouses, once emblematic of a vibrant commercial city lifestyle centered around tobacco and a defining feature that shaped the city’s identity as well, have mostly turned into abandoned structures. Despite being crucial ele-

ments of architectural heritage, these warehouses have been neglected in a significant proportion.

Presently, the city hosts just one active tobacco enterprise, with possible subsidiary companies, indicating a substantial decline in the city’s tobacco commercial prominence. Despite the decline, the business continues to contribute to the area’s cultural and economic environment, albeit /though to a much lesser extent. Besides this active tobacco enterprise that highlights the city’s heritage through its commercial activities, there are two notable tobacco-related institutions in the area. The Institute of Social Movements and Tobacco History, founded in 2008, organizes events related to tobacco cultural heritage, striving to enhance and preserve this heritage. Similarly, the Tobacco Museum of Kavala



Fig. 4 - Interior hall of an abandoned warehouse (Image by the authors).



Fig. 5 - Tobacco warehouses that are no longer in use. (Image by the authors).

displays exhibits dedicated to the city's tobacco cultural heritage.

Consequently, nowadays, tobacco remains a part of the city's identity, not only through the aforesaid references but also via a limited number of initiatives aimed at repurposing tobacco warehouses. Alongside the previously sited uses as a museum, cultural venue, administrative offices and shopping mall, some of these warehouses have occasionally been transformed into entertainment centers and bars, showcasing the diverse ways they contribute to the city's heritage and economy.

Conclusions

Ultimately, tobacco carries immense importance for Greece, not only because of its historical significance and the consequent affection as cultural heritage in various regions, but also as a valuable commodity and a thriving product for the country. It has also yielded significant economic profit for Eastern Macedonia and Thrace over the years, and remains a vital agricultural export product for the region. The arrival of tobacco in the area had a substantial impact on the urban environment and had significant socioeconomic implications as well.

It formed a regional network involving the major tobacco city centers of the area, thereby strengthening the local economy and social flows (relocation of tobacco workers, settlement of foreign tobacco dealers in the tobacco hubs, etc.). These social transformations have subsequently influenced the overall cultural profile of the region as a whole, highlighting its significance as a prominent tobacco mer-

chandising area during the 19th and 20th centuries for Greece, Europe, and even worldwide, and have also affected each one of its cities individually. This alteration has shaped the contemporary image and identity of the region and its urban centers, albeit with a diminished presence of the tobacco cultural heritage element.

On an urban level, although the processing and industrial production of tobacco once played an important role in the development of cities such as Kavala, Xanthi and Drama, shaping new social classes and communities, today's tobacco production has significantly declined. The tobacco warehouse complexes in the city of Kavala, primarily situated in the urban fabric, have gradually fallen into disuse, exhibiting noticeable signs of neglect and damage over time. Due to the private ownership of many of the tobacco warehouses in the town, the inability to cover maintenance costs could potentially lead to their demolition.

Considering the prevailing trend of adaptive reuse for heritage buildings nowadays, which plays a vital role in shaping urban landscapes by inserting new activities within existing structures and combining the old shell with contemporary use, and recognizing that conservation, preservation and restoration techniques are rooted in extensive knowledge and continue to evolve, the cultural identity of Kavala and the preservation of its heritage have not been given the importance they rightfully deserve. It is crucial to prioritize the restoration, reuse, maintenance and promotion of the tobacco warehouses and the city's cultural heritage and identity as a "tobacco city". Finally, although the value of tobacco heritage has been recognized, it seems that there are many deficiencies in the management of cultural heritage, even in places that have historic buildings and a strong identity based on heritage, such as the city of Kavala.

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PART



URBAN PLANNING AND ADAPTATION STRATEGIES

DIMITRA BABALIS¹

Advanced conception of urban planning has become a difficult matter in finding adaptation strategies in design practice for quality. A variety of meanings and appears must be defined through different policy scenarios. This could lead to varying degree of quality that can be experienced in legislation or introduced by statutory requirements. Further, climate change and other urban risks have been such a pressing issue to stimulate decision-makers and professionals to find appropriate solutions and actions. To this end, cities around the world they are processing ambitious climate actions plans to adapt to the impact of climate change. The required actions they must deal with adaptation through mitigation to cope with urban change in existing and future development. Professionals must also have an important role in putting all development and regeneration efforts that should respond to people's needs. It is crucial, therefore, to examine recent discussions on sustainable and ecological urban planning and design that critically reflect on urban change. It is questioning on how existing tools and attitudes can bring together knowledge and evolution to determine current adaptation strategies. However, appropriate ones can be considered those that can set out clearly both theoretical insights and innovative drives to achieve design quality and placemaking.

The main future perspective is for the Transforming City that must embrace quality and equity to urban resilience and ecological challenges. There are many opportunities to harness future urban transformation to create more inclusive, active, and healthy landscape and urban heritage and at the same time to provide multiple social, environmental, and economic benefits. Consequently, existing urban environment and landscape need to fulfil many roles, such as providing for active and passive activities to developing specific policies to meet the

adaptation commitments such as: Sustainable Development and Urban Regeneration, Healthy Green Infrastructure, Streetscape, Landscape, Urban Ecology and so on.

At the current, there is a growing research and community recognition to achieve a clear vision for a more resilient urban environment and landscape that a proper design should be adopted with clear directions and specific actions. For instance, potential opportunities can help to reconnect planning and design to urban adaptations to prioritize thriving and healthy environments for future generations. Sustainable strategies must outline opportunities and benefits to provide and implement good and resilient urban environment to live, work and enjoy.

Particularly, to obtain a higher 'degree of urban environment' with an 'added value', a dynamic and sensitive design approach should be adopted to transform and revitalize the city's cultural heritage. Challenging and proposing city plans must mainly focus on sustainable and ecological decision-making and placemaking process. On the other hand, emerged originality from the recognition of people's participation needed to go beyond consultation processes. However, it must be allowed locals to express their needs in shaping city's adaptation strategies and physical plans for urban transformation. A clear challenge is that the current planning legislation adoption is slow and urban change is difficult to be implemented. Nowadays, the issues like sustainability, climate change, social resilience are evolved much faster than policy and specific planning and design criteria could be elevated to strategy status.

The articles in this volume examine current discussions on sustainable planning of urban heritage and cultural landscape that critically reflect on existing tools and methods to face urban regeneration and transformation. They bring together learning, knowledge, and evolution of thinking by investigating on current urban and landscape tools, design matters and challenges.

"Participatory Process in Practice. Learning from practices within Rome's consolidated urban fabrics" article examines complexity and procedures within the governance of participation. It covers a field of which the implementation of public policies established by local authorities and the volunteer contribution by citizens providing a range of perspectives and uncertainties mostly conditioned by regulatory frameworks, both in the implementation and assessment processes. The participatory processes and lessons learnt are described by the two presented co-planning study cases in Rome "Piazza Testac-

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cio" and "Prati del Popolo Romano", well-located within the core of the Historic City. They each offer reflection on complexity that cover issues of participation procedures in which the stakeholders can be numerous together with the diverse level of public administration involvement. It is, therefore, argued that specifically in relation to urban regeneration and transformation approach the adoption and role of a participation grid can create an added opportunity to highlight restrictions and potentialities of implementation. It is important to underline that in the cases of the two examples the regulatory framework can easily support people's participation, especially in facing times, economic commitments, quality and added value in the adoption of simple projects. This can be confirmed by tasks and responsibilities of participation that can become more substantial for the whole participation process.

"Unconscious Heritage", the article provides definitions and principles of cultural and natural heritage in which the landscape plays a central role on human relationships with the environment that considers issues such as conservation, ecosystem services and so on. Particularly, it emphasizes heritage concept as a dynamic one for change and ongoing process of practices and interactions in shaping communities. It also clearly shares key messages on 'unconscious heritage', focusing mainly on the legacy of the recent past for local authorities, professionals, and the public. Going into the depth, landscapes are in strong relationship with existing grey or opaque realities and many infrastructural works can generate fractals in the landscape. In such way, the unconscious heritage can call positivity for rethinking new landscape condition and new projects that can become expressions of latent values. Within this framework, hydraulic infrastructures can be considered as a starting point to explore conditions for redeeming environmental realities crossed by these infrastructures. The main aim is to recognise the infrastructure as a latent resource for redefining natural heritage. To demonstrate the possibility of an 'unconscious heritage', reflections of a real case study can be considered as the main experimental field. The CSNO Axis in the Metropolitan City of Milan is presented as a case study. CSNO infrastructure can be considered as an axis connecting different points of a network, but also as a collector of unconscious possibilities made opaque by this infrastructure's controversial nature. It mainly based on the recognition of relationships to restore the territory and bring aesthetic value to the canal axis and be part of the landscape.

"Re-Connecting Heritage. From a former railway route to a sustainable landscape infrastructure", the article outlines current concepts on landscape definition. Contemporary landscape must be recognised as a complex and dynamic issue that requires an holistic design approach. Landscapes in natural, rural, urban and peri-urban areas must be considered

as places of particular ecological, aesthetic and cultural value. But also, they have a new dimension related to the intangible value, considering intangible elements of landscape those linked to the historical and cultural values. The article defines the Cultural Heritage Landscape (CHL) as an area of heritage significance with a range of heritage features such as old structures, spaces, archaeological sites and natural elements to be preserved and regenerated. So, the CHL pattern reflects the dynamicity of a site to be recovered and regenerated. Furthermore, it is essential to increase awareness about the landscape as an element to cope with climate change but also as an environment to maintain the relationship among people, nature and history. The article also argues on Green Infrastructure as an integration element in order to avoid fragmentation among places, structures and people. The 'Piacenza-Bettola', a former railway path crossed the Nure Valley and connecting the City Centre of Piacenza to the mountain's small historic centres is taken under consideration as a case study. The dismissed railway and its tangible and intangible heritage aims at a sustainable fruition with the making of a structure to assure accessibility while celebrating heritage, biodiversity and activating micro-economies. In so doing, the urban, rural, cultural, and wet landscape is considering under a multi-scalar approach to create the urban green infrastructure along the old railway by re-designing a multi-scope, multi-functional, multi-benefit and multi-scale infrastructure. So, Green Infrastructure has to be considered as a tool to address cultural challenges and implement preservation strategies and regeneration. Greenways, green corridors and socio-cultural infrastructures can help for a better connection between natural environment and local communities.

"Regenerative design in the evolution of the Italian Garden in the XX Century" article argues on the evolution of the Italian Garden of the Twentieth Century and its reinterpretation with the adoption of new techniques and contribution of contemporary art experimentations. It examines on how the formal typology of the Italian Garden as a proud example of 'Italianness' is the express of classicism and rationalist geometry, the monumental appearance and the enchancement of native flora. The Italian Garden throughout historic times is considered a vital element of the city integrating harmoniously with other natural elements and other structural green elements. Historic parks and gardens are considered particularly important for people's everyday life with a range of multiple benefits fostering identity and heritage value. They are considered spaces of an evolving environmental, social and economic challenges. Yet, climate change negative impacts are producing resilience erosion and degradation, wild climate effects such as floodings and rainfalls are increasingly damaging green-blue infrastructures, urban tissues and quality of life. But, it also

increase levels of air quality, water efficiency, plant diseases and urban ecosystems. Heritage Urban Gardens seem particularly vulnerable to climate extreme events and deserve mayor attention from local administration, planners and designers. To this end an innovative approach is essential. The article undelines how to better define the value of historic gardens and parks through restoration and renovation. It raises awariness of the dynamic new trends and opportunities that can bring design for specific climate adaptation. Enviromental design strategies and solutions can emphasize meaningful engagement in the design process in both short-term adaptation and long-time mitigation processes.

"The Salvaging of the Alpine Cultural Heritage Involved in Natural Disasters", the article explores the outstanding natural and cultural resources of the Alpine Region and its peculiar transnational relationships shared among the alpine populations in different countries. To this end, the Alpine Area can be observed both as a unique and homogenous area and as a system of local peculiarities to be preserved and evaluated. However, the Alpine Macroregion is recognized by the European Commission as a Region with common characteristics and common policies to be applied. Further, due to the UNESCO recognition for its outstanding natural environments and landscapes as well as for its vulnerability and in terms of risks and natural hazards, the protection of people's lives must be also taken into account. The chapter presents the CHEERS project, (Cultural HERitagE. Risks and Securing activities), financed by the European Commission Interreg Alpine Space 2018-2021 program and implemented by the 12 Partners from the six countries that belong to the Alpine area (Austria, France, Germany, Italy, Slovenia, Switzerland) and under the coordination of the lead partner Lombardy Foundation for the Environment. The main objective of the Project is to develop methods and tools to support decision-making regarding environmental emergencies and natural disasters to be faced from professional groups with specific skills. In these respects, subjects with proper responsibilities can act for the protection, management of cultural heritage, the entire territory, civil protection by facing emergencies at local and over-local levels. In summarizing, the project follows three main points: (i) the development of tools and guidelines for protection from natural disasters of the Alpine cultural heritage; (ii) the recognition of the values and vulnerabilities of the Alpine cultural heritage and their reduction; (iii) the creation of tools for a clear decision-making processes to mitigate effectiveness and promote the participation of local stakeholders during emergencies. What mainly emerged is a set of a "territorialisation approach" for development and application of the project defined methods and tools.

"Meta-Producing Cultural Heritage Resources", the

article defines how important is to preserve tangible and intangible value of Cultural Heritage while simultaneously it requests to meet new demands and people's needs. The article presents the 'Meta-factory' project, as an innovative and multidisciplinary initiative for the redevelopment of 'Ladopoulos Paper Company' in the City of Patras in Greece. The project is focusing on a holistic approach to face Cultural Heritage issues, sustainability and preservation of local memory. At the same time, it aims to revitalize the former industrial complex giving an added value by introducing innovative cultural issues, reusing of the old industrial buildings and creating an urban mixed-use hub. The former industrial complex can ensure a dynamic evolution for both the City and the wider Region. Furthermore, the article explores the significance of maintaining the productive scope of the complex, emphasizing economic sustainability as a focal point, exemplifying how a creative hub can be a core point for both cutting-edge research and art creation while supporting local economy. Finally, the project demonstrates an innovative dimension with the incorporation of digital technologies, high-end equipment, and manual labour to facilitate the meta-production of cultural assets and preservation of intangible heritage.

"Game engine-based visualization of climate change hazards in heritage", the article introduces definitions of tangible cultural heritage as an important issue for the cultural character and historical evolution of a site. It considers preservation of tangible heritage as an important matter. On the other hand, current climate change emergency can negatively affect tangible cultural heritage, by deteriorating of monuments and archaeological sites from stone or marble. The article proposes a methodology for generating 3D meshes and creating a serious game simulator which is presented in this manuscript at an early stage. The simulator can visualize and navigate the 3D mesh geometry and provide information on monument and climate change phenomena. In addition, the simulator is accompanied by a menu, which provides a short description about the monument as well as information about several climate change phenomena (i.e., acid rain, extreme heat temperature). The Theatre of Epidaurus, which is a part of the Asclepius Sanctuary, located in Peloponnese Region in Greece is taken under consideration. Following the proposed methodology, the whole process was based on free and open-source software and tools while the proposed technologies are free and open source. Further, the methodology can be easily used for simulating several tangible heritage artifacts, monuments, or archaeological sites, including their descriptions and possible hazards and an accurate 3D mesh can be created using web sources like social media. The artificial intelligent technology can also be used from people with limited or no vision.

2.1 Participatory Process In Practice

Learning from practices within Rome's consolidated urban fabrics

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The complex relationships in the participatory approach

The governance of participation practices and the possibility of evaluating and getting a measurement of the processes is a very complex subject. On one hand, it interferes with the variability of uncertain and not set-out procedures, in which involved stakeholders can be numerous, different, and not at the same levels of awareness. On the other hand, the preparation of a shareable common framework is placed at a cross point between the implementation of public policies by city managers and the offer of volunteer contribution by citizens plethora. Behind this, there is also a matter of powers equilibria. I.e., Who counts more in the re-arrangement of a square or the re-design of a challenging area? Both themes of significant impact on building consensus and reciprocal trust among the different power groups.

In reality, local politics find it still hard to recognize the novelty (and the challenge) of citizens' free associations, which present themselves as "disinterested" and autonomous subjects capable of undermining the usual centralized bureaucratic approach. These culturally unripe uncertainties condition and are conditioned by the regulatory frameworks, both in the implementations and in the assessment of the effects, so raising the need for measurement and evaluation parameters.

This article aims to comprehend how participatory processes function and are being managed in practice by learning from two co-planning study cases in Rome; "Piazza Testaccio" and "Prati del Popolo Romano", both located in the heart of the consolidated

urban fabric of the Historic City.

The regulation of participation procedures – and therefore the possibility of evaluating the final result, also obtaining a measurement of it – is a very complex topic. In the first place, it interferes with the variability and fickleness of procedures, which can range from minimal interventions to much more complex situations in which the stakeholders can be numerous, and even the involved levels of public administration can be multiple.

In cases of noticeable complexity, the adoption and employment of a participation grid take place over the fragile convergence between public and common interests. Top-down urban regeneration, in the field of urban transformation policies, to the test of the facts can be insufficient and ineffective; while precisely the offer of collaboration by citizens can create the opportunity to highlight these limits and put them correctly.

Beyond these passages lies a question of power. Often, in the progress of participation processes, the surprise of politics is perceived as being placed in the presence of different directions, materials, approaches, and sometimes even more suitable solutions, which can change, even deeply, the official paths previously adopted. As an answer, we often witness the entrenchment of politics and city managers and the claiming of relative primacies. Precisely while through participation, the ability to govern would instead be exalted, and no one would hold in mind to question the prerogatives of local government. In truth, as said, local political levels find it hard to recognize the novelty of citizens' organizations, which strictly focus on the real needs and wishes, usually free from constraints attributable e.g. to the family circle or property interests, and, even more, exempt from electoral expectations. This cultural uncertainty conditions and complexifies the relationships between public and private actors between top-down and bottom-up action.

Two Case Studies as practices to learn from a) Piazza Testaccio

The case of the "Piazza Testaccio" (Figure 2) recovery project is the first of the two case studies we took from. The site is located in its historic center in the "Municipio I" of the Municipality of Rome.

This urban open space, formed in the early 1900s within a subdivision of the works for "Rome the capital of Italy", was used initially as an open vegetable market until the Second World War. The vegetable gardeners were used to occupy the square in the morning to clear out in the early afternoon. After obtaining permanent accommodation at the beginning of the 1950s, in 2012 the market was transferred to a more suitable facility, as the health and hygiene requirements of the old structure had seriously failed over time. The arrangement of the vacated space was the subject of a participatory process that began in 2010 and ended with the re-

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Fig. 1 - Piazza Testaccio: Regeneration works in progress.

turn to an urban square in 2015.

In those same years, a process of elaboration for a regulation on popular participation divided into two stages took place at Municipio I. The first experimental version, approved in 2014, opened a series of collaborations with dwellers and involved interventions in various urban contexts. However, for a general lack of awareness not fully successful, the results do not appear questionable today as they have not undergone either evaluation or measurement. Nevertheless, we can ascribe them to a first and inevitable running-in phase between the two subjects, public and private, whose development led, we can imagine, to the drafting of the final regulation approved in 2018.

The participatory path for Piazza Testaccio took place outside of any regulation, indeed, but the long phases that followed have likely provided useful material for the drafting of the first experimental regulation (2014). The self-determination of the proposing associations was the only source at the origin of the procedure.

The work has followed a trend not supported by agreed procedures, but the personal investment of citizens has provided the energy necessary to face a path that lasted five years that not even the definitive regulation would have been able to cover (the duration of the procedure indicated here foresees three months doubled). And this discrepancy already introduces an element of reflection. It looks like, at the moment, participation lends itself to being conveniently regulated only in very simple cases.

Three steps led this "spontaneous" participatory process, so to speak, to the final result. Of a good standard, if we consider the popularity with the inhabitants.

The first step was characterized by the gift of a project idea to the competent municipal department. It is clear, with hindsight, how much naive generosity there was in this behaviour.

The technical offices of the Municipality of Rome are a garrison of high capacity and quality, and the case of Piazza Testaccio will prove it.

The citizens' design ideas shall be rightly discarded, and the offices will provide and implement an exemplary design. This first phase did not create particular friction among partners. The Administration must have considered the deed of the gift as the final event of the participative process, after which the procedure would have fully fallen within the competence of the offices. Instead, the difficult times were all yet to come.

The second step was made complex by the emergence of the "security" issue.

Alerted by the start of a more concrete negotiation a group of residents, worried by the prospect of vandalism and the crossing of unwanted groups, asked for the fencing of the whole square. The new cost, not being able to add to the funds already allocated, would have affected the overall quality of the realization.

Politics began to pay attention, while, for their part, the citizens resolved the issue with a referendum, rigidly modelled on the institutional ones and adequately supervised, so that it was possible to obtain a credible result. A little less than a thousand residents out of about 8000 will vote. In the end, the square free from the fences will be chosen by a large majority, thus leaving room for a better quality of both form and materials of the overall system.

In concrete terms, this passage allowed the resto-



Fig. 2 - Piazza Testaccio as it is today.

ration and return to the center of the square of a fountain that had been installed there in 1925, and which then, a few years later, had been repositioned along the Tiber River. It was an indication gained and supported by citizens, even forcing the criterion that binds a monumental asset to the place where it resides after a long period, even if the initial one is available again. With this choice, not only the problem of the redesign of the square has found an authoritative landmark for its final shape, but also, in terms of recovery, the square has regained a historical image and therefore appeared as restitution and restoration of an intervention for the "Rome the capital of Italy" earlier project.

This significant turnaround has given prestige to the participative process and made all other actors, especially politicians, more attentive to subsequent developments.

The third and last step was related to the supervision of the dynamics within the construction site, by far the most complex. Implementation obstacles and financial coverage issues have arisen, which have been reported within the participatory process and managed with written interventions, public events, and warnings. Finally, a representative group of citizens obtained partial access to the site during the main phases of the works; an opportunity that also allowed the final quality of the construction to be monitored by the bottom. These were the circumstances in which the role of citizens shortened the time, made the best solutions available, and favoured the closure of the works.

The last step, unfinished, was attempted after the handover of the new square. The conservation of the asset so laboriously obtained immediately raised

the question of its maintenance to the citizens. Unfortunately, we did not go beyond highlighting the tangle of the requested procedures. Here, too, the absence of a framework, even a schematic, that could legitimize citizens to take an active part was noted. The labyrinth of duties, tasks, competencies, and the absolute impossibility of shedding light on checks and measurements, even of interdependent quantities (e.g., periodic cleaning of the water pipes and maintenance of the fountain as a monumental asset) soon won over the matter. Maintenance was reduced to ordinary cleaning, watering, and visual inspection, and performance was no longer organically relevant to the new work, but uncritically replicable in any other corner of the neighborhood, as it has happened.

However, we cannot fail to underline this outcome, namely the concern of a rapid deterioration of the object which has been desired for so long, as a further and possible product of more active participation if the conditions would be there. Therefore, to the numerous limitations of timing and content that the regulations present, as mentioned above, we can also add a limitation in the objects on which it is possible to concentrate. The experience of Piazza Testaccio tells us that maintenance, an emergency that particularly afflicts the city of Rome, has still a hard time entering the cone of light of participatory processes.

b) Prati del popolo romano (Campo Testaccio)

The second case that we want to emphasise is related to a further participatory process that involved another area of the same "Testaccio" district, the so-called "Prati del Popolo Romano". This area, next to the Aurelian Walls, in the stretch between the Porta



Fig. 3 - Ex Campo Testaccio as it is today.



Fig. 4 - The regeneration project "I Prati del Popolo Romano" (Sycamore Studio, winning project, 2020).



Fig. 5 - The demolition of an illegal settlement in Borghetto Caselli.

Ostiense and the Pyramid, up to the former slaughterhouse and the Tiber River, is historically a public property. Over the centuries, it has hosted religious events and popular festivals, and yet it is a place of ancient (and recent) secular burials.

Treatment from the area immediately appeared much more complex than that required for Piazza Testaccio. In the 1930s, the area was home to the first stadium of one of the city's two football teams, and therefore it preserves the value of a sporting myth that involves the whole Capital City. And it is thanks precisely to the obstinacy of the football fans, who practically defended the toponym "Campo" ("Campo Testaccio, you have so much glory" is the first word of the football team fans' hymn), that today we find ourselves pondering about this urban recovery and not on others.

The area has significant archaeological and monumental legacies although it is burdened by illegal settlements and hosts a large pit, the result of the demolition of the original sports facility, never replaced (whose dramatic conditions were the cause of the start of the participatory process). This zone also has safety concerns, as it is isolated during the day and then dangerous at night.

The participatory process, after a period of preparation, formally began in September 2018, the date on which four citizens' associations gathered in a common "cartel" asked Municipality I to be able to

act under the institutional cover of the 2018 regulation, the final one already mentioned above. The process ended in December 2019 with a document unanimously approved by the Municipal Council.

The complexity of the subject immediately highlighted both the operational limits of the regulations in force and the cultural setting that produced these regulations. As mentioned above, the formally admitted duration makes us understand the irreducibility of the topic dealt with within the regulation. In fact, the proceeding in question then continued for 15 months. However, this exceptional duration did not help in deepening the theme. There were three sessions of meetings in all. The first of presentation, the second of effective comparison, and the third of closure. In the meantime, the associations have taken care to access the confidential documents on the abusive settlement kept at the municipal offices of the public property, and have confirmed -accumulating opportunities for discussion, studies, and materials- the primitive intuition; namely that the solution to the problem was to be sought in the regeneration of the entire area, within which the reconstruction of the football field would have been strategically only the advisable starting point.

On the part of Municipality I, however, there has been no equivalent sign of interest. For example, the connection with the internal offices was not activated, and therefore there was no official access

to the documents and information stored there. Indeed, no relations were even launched with the other levels of public administration, among which those with the Department of Urban Planning, the Public Property Office of the Municipality of Rome, with the Capitoline Superintendence, which would have appeared to be of immediate use.

This last circumstance, in particular, sheds significant light on the limits of the regulatory approach and even more, on its implementation. The communication with the Municipality of Rome and its involvement could not be overlooked, indeed.

The urban regeneration process, with the need for a possible urban variant (but also the internal articulations of the area, the informal settlement, and the former Campo, if one wants to consider them autonomously) are all seen in the Municipality of Rome as the custodian of the authorizations. Therefore, the procedure lacked elementary prerequisites for concreteness. In conclusion, it became clear that in the application of the regulation the aim was essentially to acquire a sort of “non-binding opinion”, while the actual procedure would proceed on the traditional formal track.

Once the participatory process was only formally closed, in immediate succession, Municipality I and the Order of Architects launched a call for tenders to develop an urban regeneration project for the same territorial area covered by the previous participation activity. This decision heartened the citizens, who nevertheless saw the initiative as a result of the information and awareness campaign that had previously been produced by the free associations.

The “cartel” of associations, mentioned above, has renewed its request for participation, however neglecting to fall under the shield of the regulation. Participation is resumed, in free form, according to the methods already tested for Piazza Testaccio. The tender was awarded in July 2020. The winning project then entered the services conference, from which it came out in May of the following year, unfortunately, cut into two parts. On the one hand, the settlement of Caselli addressed to host a settlement of ateliers for artists and artisan workshops, throughout an urban variant; on the other hand, the former Campo, which was regressed to a basic destination of the master plan, is, an area with an urban vocation to be developed later on. This last result has deeply disappointed citizens’ expectations. The motion to participate started up again. But, in the meantime, five years have already passed by to come to nothing more or less. At this point, relying on an existing regulation is a question that has lost all substance.

2021: A new season for the participatory process in Testaccio

The PNRR 2021 (National Recovery and Resilience Plan) has currently directed an extraordinary project boost to Rome, accompanied by an unprecedented amount of funding. In Testaccio, this new impulse

was accompanied by other initiatives, of a public nature, which in the meantime were coming to maturity. The mixture of these investments and their mutual relaunch shows an opportunity/ability of this neighborhood to transform and take on roles.

The Ministry of Tourism, with the “Caput Mundi” program, holds an exclusively targeted Rome intervention for a total amount of 500 million euros.

Caput Mundi consists of several small-scale projects that revolve around some predominant interventions for both economic and cultural value and also for their restructuring capacity of territorial and urban planning actions. Three of these projects directly involve the Testaccio context while surrounding the area of “I Prati del Popolo Romano”. In further detail they are:

- the Recovery of the linear park of the Aurelian Walls, which includes the financing of the “Porta S. Paolo – Tevere” section (€ 2,340 million out of a total of € 23,160 million).
- the “City of Arts” at the “Ex Mattatoio” (€ 18,720 MIL).
- the “Tevever”, redevelopment of the left bank of the river Tiber (€ 10 MIL).
- In addition to these big interventions, as said, other smaller but equally significant initiatives took place, namely:
- Refurbishment of the “Pyramid of Cestius” (€ 0,500 MIL), to supplement the intervention on the Aurelian Walls.
- “Diffused Museum of Testaccio”, with interventions on the archaeological sites Monte dei Cocci, Porto Fluviale, Porticus Aemilia, and the area below the new market (€ 1,500 MIL).
- Caput Mundi (without the Tevever quota on the shore of our interest, which is unknown) allocates € 23,060 MIL to Testaccio.

Other than the PNRR, the other public interventions concern the reuse of the Ex Mattatoio. They consist of the expansion of the Academy of Fine Arts and the expansion of the Faculty of Architecture of the University of Roma Tre. For now, the Academy has been entrusted with two other warehouses, the so-called “Fienili”, for a recovery amount of about € 1.6 million. But from journalistic sources, we learn that further deals of spaces are underway in order to expand and integrate the activities in its competence. As regards the Faculty of Architecture, the initial project is being implemented with the deal, restoration, and refurbishment of other pavilions for 15,000 square meters and an amount of 40 MIL.

Taken in their conciseness, these numerical data, however, allow an objective overview of the mass of projects and funding that are nowadays addressed to the Testaccio area and urge the citizens to be responsible for renewing the role that their participation can and must assume in this special conjuncture.

The first topic for reflection concerns the many involved competencies and how they are distributed along the government network of the Public Administration; indeed, the appropriations refer to a plethora

ora of Ministries that have formulated their specific programs. The resulting lines of financing are obviously inspired by differentiated missions within this plurality of subjects.

Finally, the actual interventions are entrusted to a further plurality of specific authorities responsible for the accomplishments; this ramified top-down path asks to be verified by following another path, but reverse.

Definitely, it is sufficient to superimpose this patchwork of projects on the territory, to realize how urgent considerations are to be made on the interference that these interventions determine between them and with the context, and how the grid of realizations postulates additional surrounding services. There is a need for locals' participation, entirely borne on the citizens, concerning which one must equip oneself.

From the point of view of the hierarchy and of the overall investment volumes, there is no doubt that the most significant intervention concerns the Ex Mattatoio. Here, while the Faculty of Architecture is expanding its already considerable presence, two equally attractive functions are affirmed. The City of Arts, destined for contemporary art, and the expansion of the Academy of Fine Arts, which with the diversification and increasing of its functions (there will also be classes for music) seems to assume the characteristics of a new DAMS (Discipline of Arts, Music, and Entertainment). Therefore, the setting up of a new big cultural Service Hub for the capital city, the region and beyond is underway, and its implementation will certainly require adjustments and transformations to the surrounding context.

For instance, one of the criteria adopted by the Ministry of Transport for the circulation of people is to connect the Ex Mattatoio, the external university's buildings, and the railway/subway stations through bike paths. This need is decisive for the Ex Mattatoio-pole, due to the particular "cul-de-sac" condition in which the Testaccio district is structured, which may not adequately respond to an excessive concentration of car-flows. Therefore, reflection on the role of the Ex Mattatoio is necessarily associated with a reconsideration of the entire larger network of the area cycle paths, which must take on these special service tasks in the neighbourhood. Interferences and gaps appear immediately as yet to be filled.

The Tevere intervention, especially characterized by the strengthening of cycling mobility on the edges of the Tevere, poses a problem of height differences, given that this district (and therefore the service hub) is located a few tens of meters above the shore. Also, the entire existing cycle network must be reorganized and connected to a new GRAB - Grande Raccordo Anulare Bici- (a Bike Ring Road); which is entrusted with the huge task of making bike circulation around the city easier. Also, the Ministry of Transport finances in the Capital (into the PNRR) 57 km of new pathways, among which a section

starts from Piazzale Ostiense up to Porta Metronia, along the route of the Aurelian Walls. It is immediately obvious that the continuation of the Walls up to the river Tiber, financed as a measure of archaeological enhancement, does not appear in the aforementioned Bike-paths Plan. However, it even touches one side of the Ex Mattatoio.

A further consideration concerns the impact on the neighbourhood as a result of the aforementioned foreseen interventions. A connection between Testaccio and Trastevere via a pedestrian and bicycle path is already legible at the current time. Starting from the Testaccio bridge, it crosses the central internal axis of the Ex Mattatoio and reaches via Galvani, along which numerous other services are available, such as the new local market, a school complex split into several institutes, a post office, parks, and green areas, as well as a relevant complex of cultural and archaeological heritage. This is why the site as a whole calls for a general reconsideration in view of the new urban and territorial values that will be activated from the PNRR. We cannot allow, indeed, the commercial network, transport, and services, for instance, to find any equilibrium on their own, as already happened in the case of the transferring of the Piazza Testaccio market from the original to the new location – it is certainly a more modest but equally significant example.

All these and other correct evaluations of the area, however, cannot fail to consider the main urban mobility problem of this area, namely the interruption of the Lungotevere Testaccio; an important connection line, which goes to die between the Ex Maccello-wall towards the Tiber, and the railway bridge. The most evident fact is that this limit to circulation reverberates throughout the surrounding area and generates a concern that is highlighted -starting with the Master Plan itself- whenever the opportunity to host new recall services arises in the district, as already happened for the reshaping of the Ex Campo Testaccio.

In addition, the projects of the Tevere and the Linear Park of the Aurelian Walls, while making us discover renewed technical attention to these strong urban and territorial traces; also tell us that here they find their melting point. And not only that, a further trace of the same strength, namely the railway ring – the third strategic planning area indicated by the Rome Capital City Plan (like the previous ones) – comes to add to the other two.

The special combination of these "traces", however, instead of being enhanced through adequate overall design intervention, is in danger of finding itself upside down today in a situation of fragmentation, leftover opportunities, and general insecurity. This order of considerations cannot be expected from the various parted design intervention programs that have been briefly touched upon, all top-down as said. A new responsibility, then, can take form instead of a new commitment to local participation,

in which citizens and local authorities can shed light on the full impact of the new and so relevant interventions for the future exploitation of the area.

Concluding Remarks

Taking into consideration only the two case studies dealt with, the renovation of Piazza Testaccio and the procedure of the Prati del Popolo Romano, we can state that the regulatory framework made available by the Municipality can easily support the request for people's participation in simple projects, while it appears definitely inadequate on more complex issues and projects. Even more, they come out from diverse ways and Institutions.

The evaluation of the results, which is applicable, let us remember, not only ex-post but also, and with a more significant advantage, along all the internal phases during the participatory procedure, still awaits to be carried out with the attention it deserves and which has not yet had. Intuitively, however, an unsatisfactory outcome is already expected. The general data of the procedure described here, the times, the economic commitment already faced, and the capital of hours worked by internal staff, have been saying for some time that we have been working at a loss, and this without calculating the commitment of citizens, who over the years it has never failed and has, instead, added value. A weak or even lacking outcome ethic has consequences.

If politics and management fail the appointment with a result up to the minimum expectations, dissatisfaction, and detachment will arise in the citizens. In the case of the Prati del Popolo Romano, the decision to relaunch the procedure without following the path indicated by the regulation certifies the insufficiencies of the available regulatory framework.

However, a new planning and investment stratification of exceptional level has been superimposed on our territorial area. The Borghetto Caselli and the Ex Campo Testaccio, occupying the central area, are fully involved in this regenerative drive. The tasks and responsibilities of participation are becoming more substantial.

The continuation of the procedure will have to place the results obtained in a shared framework of territorial compatibility, in which a more important role of the Testaccio district comes into play in the provision of services to the entire metropolitan area, with benefits and burdens.

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2.2 Unconscious heritage

A. OLDANI¹

Introduction - Heritage between manifest and latent values

Heritage is often defined as recognising and preserving cultural and natural elements with historical, aesthetic, scientific or social values (Andriani, 2010). The use of the term 'heritage' is widespread, particularly because it is a useful concept for connecting with the past, enabling an understanding of cultural identity, and promoting a sense of belonging (Jetten & Hutchison, 2010).

Within these implications, landscape is central because it is not only a physical entity but also a cultural and social construct that reflects human relationship with the environment and better represents nature-culture interactions and immaterial features (Harrison, 2015; Eriksson, 2018). This includes intangible aspects of cultural and historical significance, such as traditions, customs and knowledge that are transmitted and preserved over time (Vecco, 2010) and that society considers important and worthy of preservation. Furthermore, the recent debate on landscape heritage broadly considers issues such as conservation, ecosystem services (Tengberg et al., 2012) and management, considering the long-term biological and social relationships that shape the landscape (Grove et al., 2020).

However, it is important to emphasise that the concept of heritage is not static but rather dynamic and subject to change, as an ongoing process of practices and interactions that continually shape and reshape its definition, constructed and delineated differently by different individuals and communities (Knippenberg et al., 2021). This fact is particularly relevant to the topic of this paper, not only because it demonstrates the lack of validity of theories and practices that tend to limit this phenomenon by reducing it to something musealised, but also because it demonstrates the difficulty or impossibility of determining exactly what is or is not heritage.

It is, therefore, fascinating to explore the concept of 'unconscious heritage', focusing on the uncomfortable legacy of the recent past.

As a matter of fact, landscapes are dense with presences that reflect a utilitarian conception of the relationship with the landscape and contribute to the existence of grey or opaque realities in which it is difficult to recognise oneself. This is the case with many infrastructural works, even large-scale ones, which have caused deep wounds in the landscape, generating a form of disaffection that is difficult to eradicate. Sometimes, these are only 'recent' works, invisible according to classical conservation standards; in other instances, they are inconvenient or ugly realisations that one would hardly want to consider as heritage. Therefore, the concept of 'unconscious' heritage sees something almost invisible or unrecognisable as a source of positive issues and calls for rethinking its condition. Heritage thus becomes an expression of latent values that the project must discover and bring to light.

Within this framework, this paper takes the reality of hydraulic infrastructures as its starting point, with a double intention. On the one hand, it explores the conditions for redeeming the territorial realities crossed by these infrastructures, adopting the network metaphor, and grasping the potentialities of reticular systems. On the other hand, the aim is to recognise the infrastructure as a latent resource for redefining the heritage, showing how the project tools make it possible to redeem the meaning and presence of these territorial components. To demonstrate the concrete possibility of an "unconscious heritage", these reflections will take a real case study as the main experimental field. The starting point for this approach will be the infrastructure concept and the study of its potential.

Infrastructure as resources

Talking about heritage in relation to infrastructures means moving from a perspective more focused on the value of relevant singular artefacts and their historical significance to rethinking the realities of entire networks in the landscape as part or backbone of systemic components and a resource with some potentially discernible values that are also capable of responding to the multiple crises of the present. For this reason, it is essential to rethink the forms of relations and the modes of systemic interaction with the environment in the Anthropocene (Chester et al., 2019), especially the spatial nature and territorial relations they offer, the creation of new landscapes and the expansion of the concept of heritage.

Therefore, extending the more traditional way of considering infrastructure is necessary to rethink the possibility of influencing places at different levels. As a result, infrastructure is full of potential and capable of providing multiple responses to cities and territories where its presence is massive and critical and where the future depends on its rethinking. For this reason, it is necessary to fill an obvious gap by studying their design potential and looking for a perspective that goes beyond their primary func-

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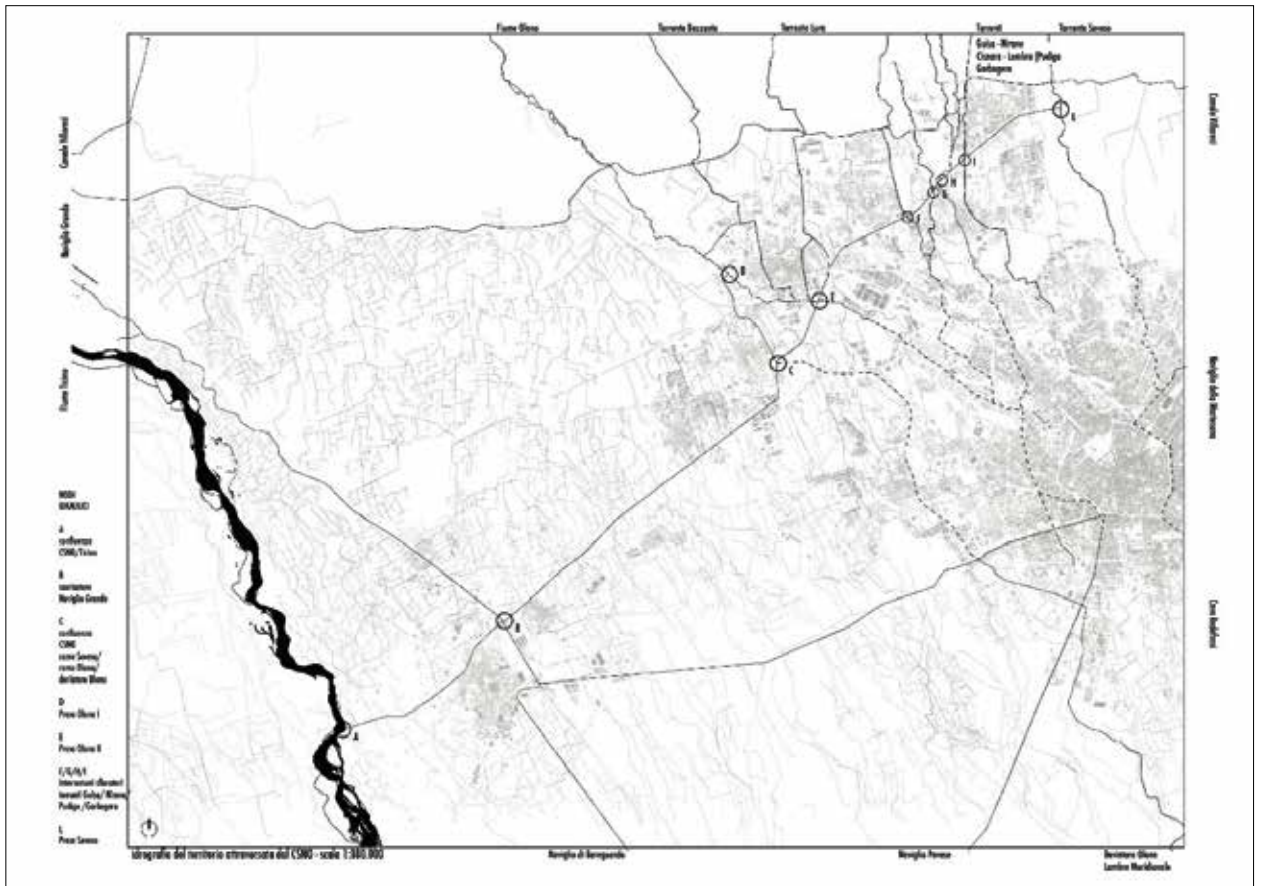


Fig. 1 - Descriptive map of the hydrography of the territory crossed by the CSNO; in evidence, the relevant hydraulic nodes of the system. Source: author.



Fig. 2 - The CSNO between the urban and the rural crossing the city of Abbiategrosso. Source: author.

tional aspects (Ferlenga, 2012). This intent also considers the possibility of infrastructure becoming a means of significant territorial reorganisation, a fundamental action in the uncertain future of our metropolitan areas.

To this end, it is useful to consider each infrastructure line in terms of the network metaphor. Thus, each axis appears as one of the multiple connecting configurations between the nodes of local and global networks (Dematteis, 1995), the importance of which is crucial for any design opportunity, including assessing and programming ecosystem services. In this way, we can understand how a geometric infrastructural entity, such as a line, can assume an extended plural and multifunctional meaning for the territorial reality it crosses, assuming a variable thickness. Consequently, existing infrastructures can become vectors of innovation, recombining biological, cultural, landscape, urban, economic, and social functions as an indispensable part of a "network of networks" that structure the territory (Todaro 2010). Rethinking the reality and meaning of works inherited from the past, even the more recent, challenges the theme of heritage as a set of material and immaterial facts deposited in our territories to establish relationships. In this context, the green/blue networks, even the most neglected ones, assume a primary role in outlining the characters of a more meaningful landscape, with the potential to increase its social value and promote its sense. How to describe and interpret the infrastructure thus becomes the possibility of recognising a different heritage, still unconscious.

A peculiar experimental context: the CSNO axis in the Metropolitan City of Milan

The Scolmatore di Nord Ovest Canal (CSNO) is a thirty-eight-kilometre-long artificial waterway that runs north-west of the city of Milan, collecting excess water from natural and artificial waterways and transporting it to the river Ticino.

The events that led to the construction of the CSNO go back a long way in history. In fact, since Roman times, natural streams and rivers have been highly humanised, creating an integrated, articulated, and complex network, gradually transformed and adapted to the needs of the metabolism of an urban centre in constant development (Poggi, 1913; Columbo, 1960; De Finetti, 1969). Given the exponential urban growth of one of the most urbanised regions in Europe (Turri, 2000), this complexity has led to the increasing instability of a hydraulic system unable to respond to the extraordinary flooding of natural and artificial watercourses. In this context, the Olona River and the Seveso Streams represent the main risk, and the CSNO is one of the most recent, but inconclusive, pieces of this millenary history of deputy solving flood risks in Milan.

The events that accompanied the design and construction of this canal are particularly complex and

lasted from 1912 to the late 1970s, resulting in a fully operational infrastructure only in 1980 (Borrini & De Polo, 1985). The result is a controversial reality, hovering between opportunity and detriment, reflecting a long series of compromises, mistakes, and lack of attention to the crossed landscape and its delicate palimpsest.

To consider the CSNO as a recognisable part of the heritage is now unfounded. This state is due to many factors, including the recent age of the infrastructure, its appearance, its origins and its function; the same consideration is also linked to the poor quality of the water discharged during the overflow of the streams and rivers of northern Milan.

For example, the aesthetic impact is linked to the choice of an extremely narrow and deep cross-section, which extends up to eight or nine metres below ground level. Another condition that favours the alienation from the landscape is the presence of embankments built with the earth from the excavation. These facts lead to a total separation of the canal from the surrounding reality. In addition, the construction's technical and artificial nature underlines the artefact's hostility. The canal experience is uncanny (Royle, 2003) because it represents something of the collective imagination that appears under a different spectrum, producing feelings of subtle or oppressive anxiety that are transplanted directly into the heart of everyday normality (Vidler, 2006). Moreover, the infrastructure is rapidly deteriorating, and the ever-increasing need for systematic and coordinated maintenance interventions, while offering a creative opportunity for regeneration, produces a sense of decay that makes the whole even more difficult to perceive.

On the contrary, a different point of view makes it clear that these negative characteristics do not allow us to consider the CSNO as a reality that can be excluded from the list of elements that are part of the territory and participate in its destiny. It is, therefore, necessary to refocus our attention and understand what resources are available and whether they are sufficient to give value to this infrastructure. Looking at the canal from a different perspective allows us to identify a potential that could become the basis for a new destiny and a path to heritage recognition. Reflecting on this possibility requires the valorisation of the role of design as a fundamental theoretical tool to identify potential, deepen knowledge and prefigure a different reality. This process was applied to the axis of the CSNO to question the previous theoretical assumptions and the more practical possibilities of the landscape.

The CSNO, although superficially appearing as a sign without quality, is, on the contrary, an infrastructural axis rich in potential and novelty for a creative hypothesis of care, innovation, and design invention. The canal is, in fact, the bearer of an extraordinary latent force that acts as a link between densely urbanised areas characterised by a few fragments

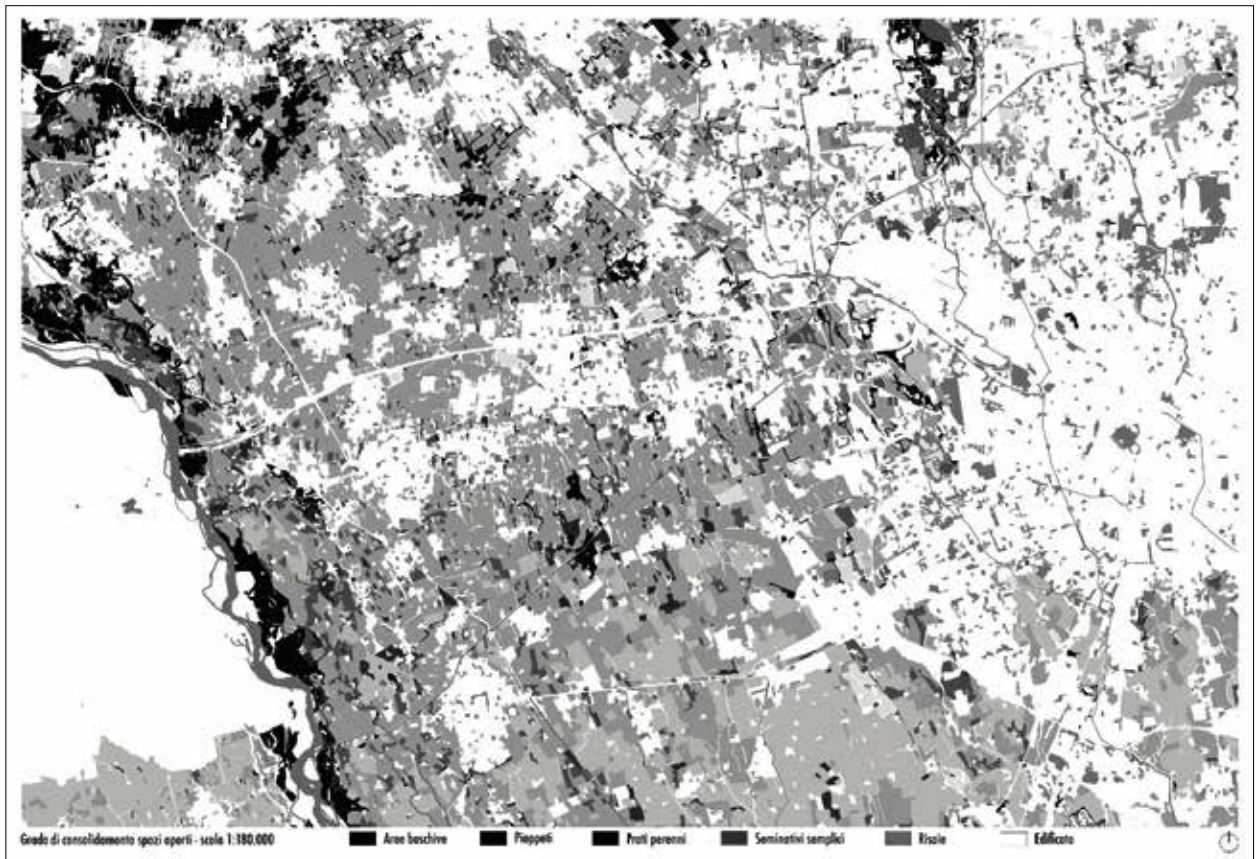


Fig. 3 - Interpretive map of the degree of consolidation of open spaces along the CSNO; the areas of greatest ecological value in black. Source: author.

of naturalness, connecting them to a vast territory determined by the predominance of open spaces with an agricultural vocation, reserves and fragments of diversity. Leaving the dense peri-urban areas, it moves towards outwardly extended but still autonomous urban forms, where it is possible to recover some unexpected functional connections. Meanwhile, the canal crosses numerous green/blue lines corresponding to natural watercourses, surviving fontanili (Albergoni et al. 1989), ditches and canals that flow perpendicular to its course, sometimes crossing it. This fact represents a great potential for the possible reorganisation of an extensive ecological network. Also significant is the interaction between the canal and the aquifer since the deep excavation has cut off the water table and the gravel material, where water naturally filters into the subsoil layers and feeds the canal itself. As a result, the canal, unlike the original project, which envisaged it being prevalently dry, is constantly active and contains water of a quality that is quite different from that which is discharged during floods from the polluted waterways of northern Milan. This constant presence of water is a fundamental resource for activating ecological thinking and represents a lifeline for the canal, opening another design challenge aimed at recovering, in an ecological key, the groundwater drained by the CSNO.

The rethinking of these potentials offers a fundamental contribution to expanding the offer of ecosystem services (Collins et al. 2011; Carpenter et al. 2012),

seeking to deepen and extend the paradigm already offered towards new intentions (Nassauer and Opdam 2008; Bruce Jones et al. 2013; Landis, 2016). Consequently, the proposed design process follows a multi-scale and cross-scale approach (Scholes et al. 2013), considering the territorial transects of interest to the CSNO and the main nodes of its network, without excluding small environments that are fundamental as refuges for diversity (Clément, 2004).

The CSNO infrastructure as a landscape of diversity

The brief considerations set out above allow the first outline of strategies for a more resilient ecosystem based on increasing diversity, restoring the environment, and innovating. These are necessary actions to overcome the controversy and ambiguity of this forgotten line as an opportunity in a vast and complex mosaic, the recovery of which is fundamental for the future of the environment, the safety, and the possibility of inhabiting these areas. The result is a process that makes it possible to recognise the existence of an “unconscious heritage” that needs to be rediscovered, rethought, and enhanced.

The design study begins with the definition of some gradual and incremental strategies. The first and most basic action is to maintain and complete the continuity of the green corridor as a vital link between different ecological networks, diffuse elements, and exceptional nodes. It is essential to intensify the quantitative and qualitative presence of the forest along

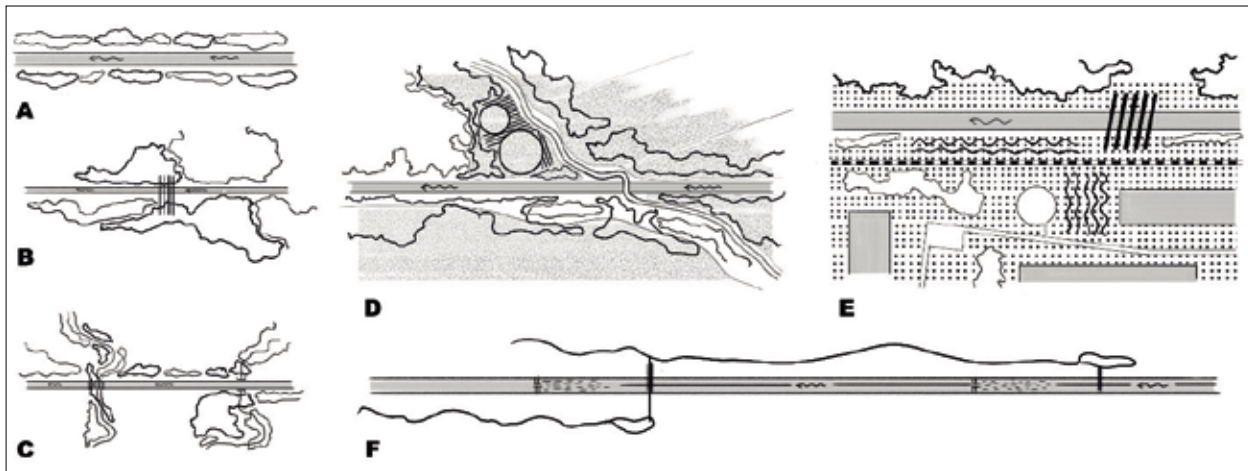


Fig. 4 - Diversity intensification, environmental reparation, and innovation strategies. Source: author.

A - care and completion of the green corridor / B - intensification of the reserves of diversity also through new infrastructural connections (green bridges) / C - intensification and enhancement of the areas of intersection with green/blue networks also through the architecture of the artefacts / D - compensation of land returned to nature through new forms of innovative, or controlled agricultural production / E - elimination of bounds and inclusion of the canal in innovated types of public spaces, new plural infrastructures, and inclusion of new shapes and roles for urban wastewater and rainwater / F - rethinking of the hydraulic compartmentation of the canal and ecological use of the groundwater collected in the lean period as a landscape of diversity.

the canal, including the restoration of patches and the provision of some structures, such as green/blue bridges, to reconnect a system of valuable areas of diversity and to strengthen and extend their role.

The second strategy is strictly related to agricultural production. More than half of the canal runs through an active area. The simplification of the countryside landscape is evident and dramatic, including intensive use, parcelling and the loss of green structures. In this context, it is possible to recover some areas for biodiversity through three actions:

- Reuse marginal abandoned or residual areas as high-density forestry sites.
- reclaiming some agricultural land and converting it into woodland in exchange for land and structures for developing new forms of intensive, environmentally controlled agriculture, such as vertical farming. These new areas could find an excellent location close to urban realities, recovering areas that are no longer agronomically relevant, vacant plots or even brownfields, including abandoned buildings.

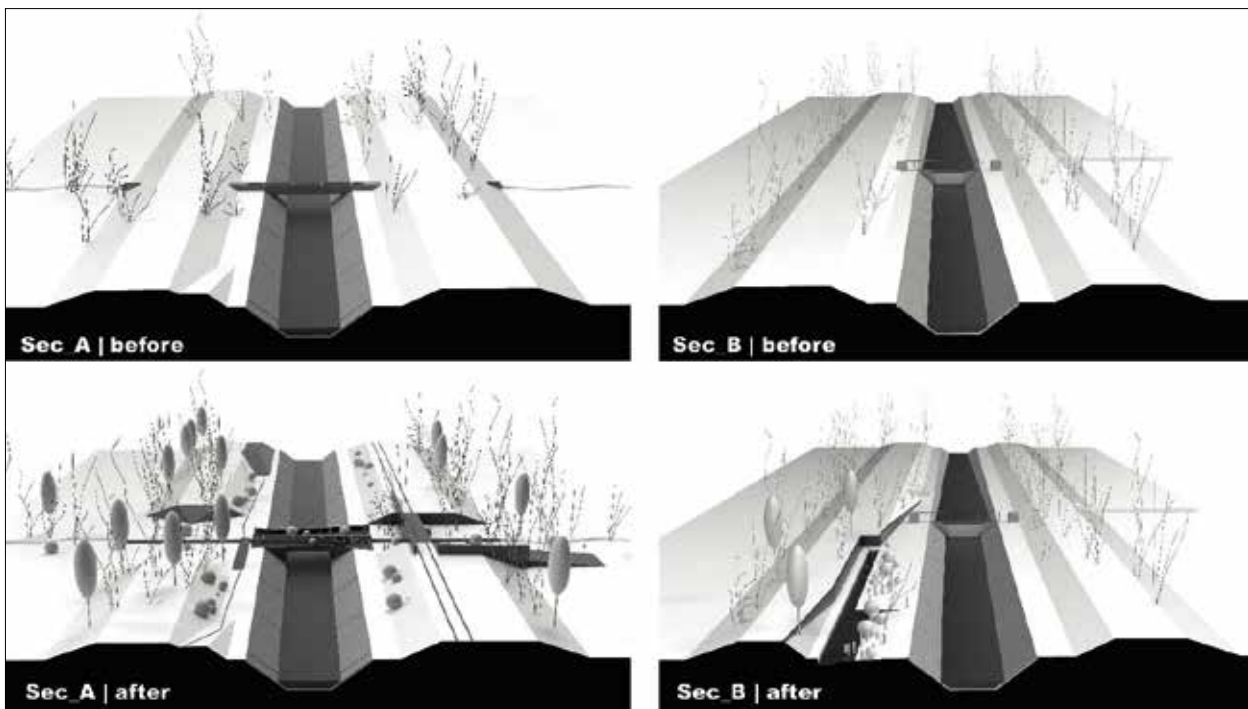


Fig. 5 - Exemplification of two design strategies at significant cross-sections and pre-post intervention comparison. Source: author.

Section A: Eco-systemic intensification, hydraulic transversal reconnection, banks remodulation for social use, and retrofitting the existing canal bridge as a green/blue infrastructure. / Section B: Recovering of the hydraulic compartmentation, groundwater retention, banks remodulation for social use, and design of a secondary ditch with ecological functions.

- introduce some mediating spaces where intensive agriculture leaves room for environmentally friendly and careful practices, open to diversity (Ditzler, 2020). These spaces can be located near several existing farms along the canal, which already practice horticulture and can more easily adapt to new attention and trends.

These actions can coexist with a third strategic intention concerning the peri-urban fabric crossed by the canal. Today, there is a clear separation between this infrastructure and the urban landscape, sometimes marked by a physical boundary. The hypothesis is to eliminate this separation by including the canal in innovative types of public spaces. These should be designed as new plural infrastructures, capable of giving identity to the landscape and introducing new forms and roles for urban residual wastewater and rainwater as part of a climate change-responsive and sustainable programme.

Finally, the fourth strategy concerns the presence of a constant flow of good-quality groundwater. The idea is to rethink the problematic hydraulic compartmentalisation of the canal, which was introduced in the mid-1980s for temporary groundwater retention and is no longer active. This resource could once again be made available for agricultural use, in addition to the permanent secondary ditches with minimal flow, which mainly perform ecological functions.

All these strategies are combined with a more traditional design approach to improve elements, structures, artefacts and the overall architectural quality, whose contribution is substantial compared to the need to make the value of the infrastructure line clear and appreciable.

Conclusions

Limiting the concept of heritage to a particular object or set of objects that can be clearly associated – by age, condition, quality, and significance – is certainly the most common attitude. Regarding landscape, this approach is particularly limiting because it encourages the tendency to isolate certain parts from the whole.

Working instead with the concept of relationship allows each reality to be inscribed in a complex system that nourishes exchanges and associations. This is even more substantial when seen through the lens of infrastructures, which are relational by nature. An unexpected or unconscious heritage thus emerges. The value of the project is, therefore, substantial in terms of the possibility of two fundamental actions. The first is to recognise, then describe and make the system of relationships hidden within a specific reality intelligible. The second action is that of modification, which is the questioning of the state of things based on a transformative and improving intention. The network thus becomes the ideal place to collect the instances already recognised, of a linear or punctual nature, as heritage and to put them into

a system with some invisible resources, sometimes particularly problematic, whose collection is possible starting from the project's action. These resources constitute an unconscious form of heritage that finds the possibility to be revealed.

The case study presented makes it possible to clarify these assumptions. The CSNO, as an axis connecting different points of a network, is a collector of unconscious possibilities made opaque by this infrastructure's controversial and inhospitable nature. Based on the recognition and systematisation of these relationships, the project makes it possible to restore order, dignity, and aesthetic value to the canal axis.

This process creates the conditions for recognising the CSNO infrastructure as part of the landscape rather than its opponent, changing its state from unconscious to conscious and, therefore, heritage.

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2.3 Re-Connecting Heritage

From a former railway route to a sustainable landscape infrastructure

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Introduction

In contemporary culture, landscapes have increasingly been recognised as a key element for individual and social well being. The concept of landscape has been widely discussed because of its complexity and dynamicity which requires an holistic approach that integrates many subjects and point of views. At the beginning, in literature, landscape was a definition merely dedicated to places of exceptional ecological and aesthetic value but nowadays the attention has moved to all its facets. Are considered as landscapes in all the natural, rural, urban and peri-urban areas, whether terrestrial, aquatic or marine environments, and not only when they are outstanding but also ordinary or damaged. This happened because many areas are undergoing profound changes and are catching the attention because of the need for tools and new approaches for protection, management and planning. Town planning, transportation and, more general, changes of man, have led to the degradation of landscape and the fragmentation of ecosystems. This led to the consideration that landscape not only has the visual dimension, the one that the eye can embrace and that our senses can perceive, but also an abstract dimension related to the intangible values. These intangible elements of landscape are related to the historical and cultural features that remind us of our identity and collective root, providing a sense of understanding of our environment. Moreover landscape is related to the individual experience, contributing to individual wellbeing in a so called "existential" sphere. The factors determining its influence on individual quality of life are imponderable and far from the mere sphere of aesthetic values. The landscape has also a subjective component, more connected with the observer and the impressions that he experiences. Landscape combines both natural and cultural as-

pects, expressing and at the same time supporting the spatial and temporal interaction of man with the environment, in all its diversity and creativity. The affective and symbolic values bind to individual memory and day by day habits are maybe the most important ones. We can say that the key of the significance of landscape is not only its ecological value but also its cultural value since culture is a product of the shared values and beliefs that connote a sense of belonging. Landscapes so characterized are what we call Cultural Heritage Landscape (CHL), the term is defined in the Provincial Policy Statement (2005) as a geographical area of heritage significance which has been modified by human activities and is valued by a community. It involves a grouping of individual heritage features such as structures, spaces, archaeological sites and natural elements, which together form a significant type of heritage form, distinctive from that of its constituent elements or parts. Examples may include, but are not limited to Heritage Conservation Districts, villages, parks, gardens, battlefields, main streets and neighborhoods, cemeteries, trailways, aboriginal trails and industrial complexes of cultural heritage value. The term cultural heritage landscape seems to have entered the official lexicon of the professional practice and emphasizes how landscape get more significance and value for the community because embodies the identity and the history of the place, it is the base of our territorial identification that, together with its ecological, environmental and economical value, makes of it an element of great impact for the social sphere. Therefore in this border area between heritage and landscape, the heritage-landscape, relies the always evolving pattern of the sense of place created by time by the mutual exchange between man and nature. This pattern reflects the dynamicity of the two generative elements and makes very challenging the understanding of contemporary landscape and territory and even more difficult to find a methodology to approach the recovery and care of fragile territories where cultural heritage landscape lost its significance due to the economic changes that characterized the cities in the last century and have left great spatial repercussions and a more vulnerable land.

The Piacenza-Bettola study case

The growing concern on how to maintain and recover the balance between preserving the natural and cultural heritage as a reflection of our identity and diversity, while using it as an economic resource, made clear the necessity to better understand and act on landscape fragility. Because of rapid urbanization and economic processes many areas are undergoing situations of marginalization and fragmentation with an absence of a programmatic and unitary view and consequent loss of identity. Many of these areas are characterized by abandoned infrastructure that left a great impact on the territory. That's the case of

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the Piacenza-Bettola, a former and dismissed railway path that originally crossed the Nure Valley connecting the city center of Piacenza to the smaller towns of the mountain system. The Piacenza-Bettola was a tramway born in 1880 to carry people and goods, later transformed into a more efficient electric railway. Due to advancement of wheeled transport, it was suppressed in 1965 against the will of people who remained so tied to the railway that, three years ago a local newspaper wrote an article, saying "at least let's bring Giuditta home" (Giuditta is the name of the first wagon of the train that is actually kept in a deposit). Nowadays along the path are left different kinds of heritage. Some tangible ones like the abandoned stations, some others stations that have been reconverted into houses but still bring the plate with the name of the old station, some tracks that are still visible and an abandoned bridge. But also some intangible heritage, like some beautiful hidden views over landscapes that have been forgotten.

Materials and methods

The methodology adopted starts from an analysis of the territory to investigate the historic dimension and then move to the study of the relation between the old railway path and the natural features of the territory taking in account the land use, the natural-

istic and protected areas, the naturalistic and cultural itineraries, the architectural heritage and the slow mobility system. PTCP Piacenza and Emilia Romagna region Geoportal and MiBACT were the main sources. All the components have been considered in order to be able to draw a complete picture of the nowadays situation: the ecological, focused on the ecosystems and their services; the cultural, including historical factors and the identity features; the socio-economic, referring to the social factors and the economic activities determining the human action permanently constructing and changing the landscape; and finally the sensorial, connected with the sensations caused by landscapes, with the way they are appreciated by people. This last one is the most difficult to evaluate since it is quite subjective, but it has not to be underestimated, as landscapes are mainly cultural landscapes since they are done in the first place for Man. All these elements have contributed in understanding and defining the changes in terms of landscape identities and led to the recognition of four different typologies of landscapes, that characterize the Nure Valley, with different problems and weaknesses. These landscapes are actually very fragmented and disconnected but, if mended in a coherent way, can strengthen each other and make very visible its cultural heritage value.

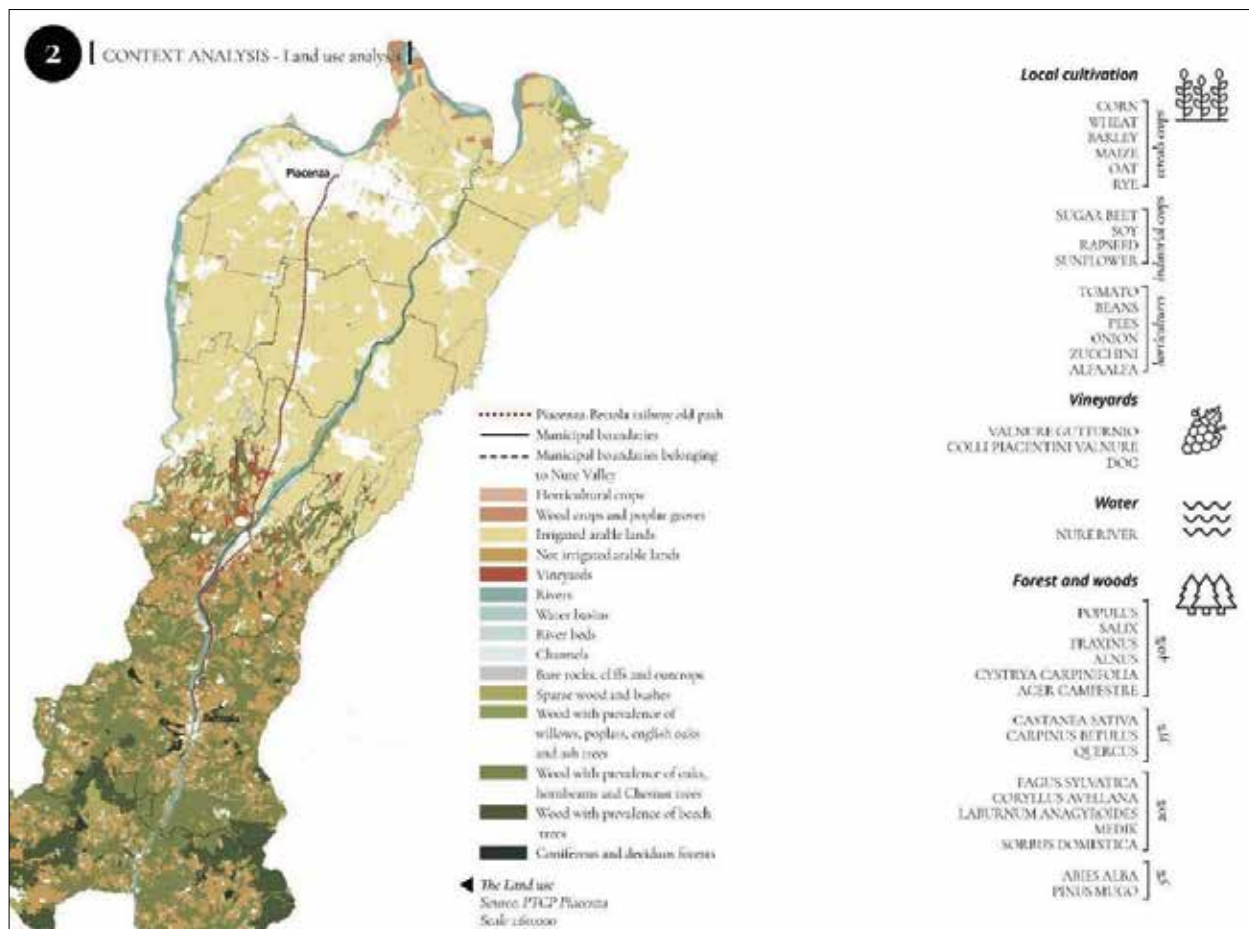


Fig. 1 - Naturalistic and protected areas and naturalistic and cultural itineraries.

a) Data collection

Land use

The old path, which is 35 kms long, crosses part of the territory of the Piacenza province that is called Val Nure, which takes the name from the river Nure. The territory it cross is very rich and varied: starting from Piacenza it cross first a dense urban fabric, going to the countryside the agricultural field, mainly monoculture, reaching the hills it cross the vineyards, and finally the path runs along the Nure river surrounded by mountain rich of different kind of forests and woods (Figure 1).

Looking at the wider context of the entire Piacenza Province it is possible to notice that the path crosses and connects different naturalistic and protected areas belonging to the Natura 2000 network and it also crosses two different ecological corridors. Also from the point of view of the itineraries is very interesting because in the starting point of the path there is the "Via dei Pellegrini", the hills have another path called "Road of Wines and Flavours", while the mountain area is rich of trekking itineraries and, close to Bettola, is present another pilgrimage route "Via degli Abati".

Slow mobility system and architectonic heritage

From the slow mobility network analysis, it is possible to see that in the northern part there is the Ciclovia del Po and some urban bikelines, while in

the southern part there are some mountain-bike circuits and some horseback trails. It is very evident the gap between the northern and the southern part of the province, which lack connectivity, and so the potentiality of the Piacenza-Bettola to bridge that gap. From MIBACT have been also collected all the most important historical buildings, abandoned and in function. It is so evident that along the way there are also many different kinds of valuable buildings like castles, rural buildings and industrial heritage.

The abstract and sensitive dimension analysis

Last analysis considers the spatial form and physical setting of the environment which has been shaped by human activities and natural processes. Those affected the perception of landscape creating a richness in the territory that has an impact on the non-material sphere. Many benefits are gained from the different atmosphere, colors, texture and patterns of the Nure Valley, like spiritual enrichment, cognitive and emotional development, and recreation and aesthetic experience (Figure 2).

b) Data analysis

Collecting all the elements that have been mentioned previously, it has been possible to understand that the path crosses four main areas characterized by a specific landscape with a specific vocation. The first landscape is the "urban landscape" and

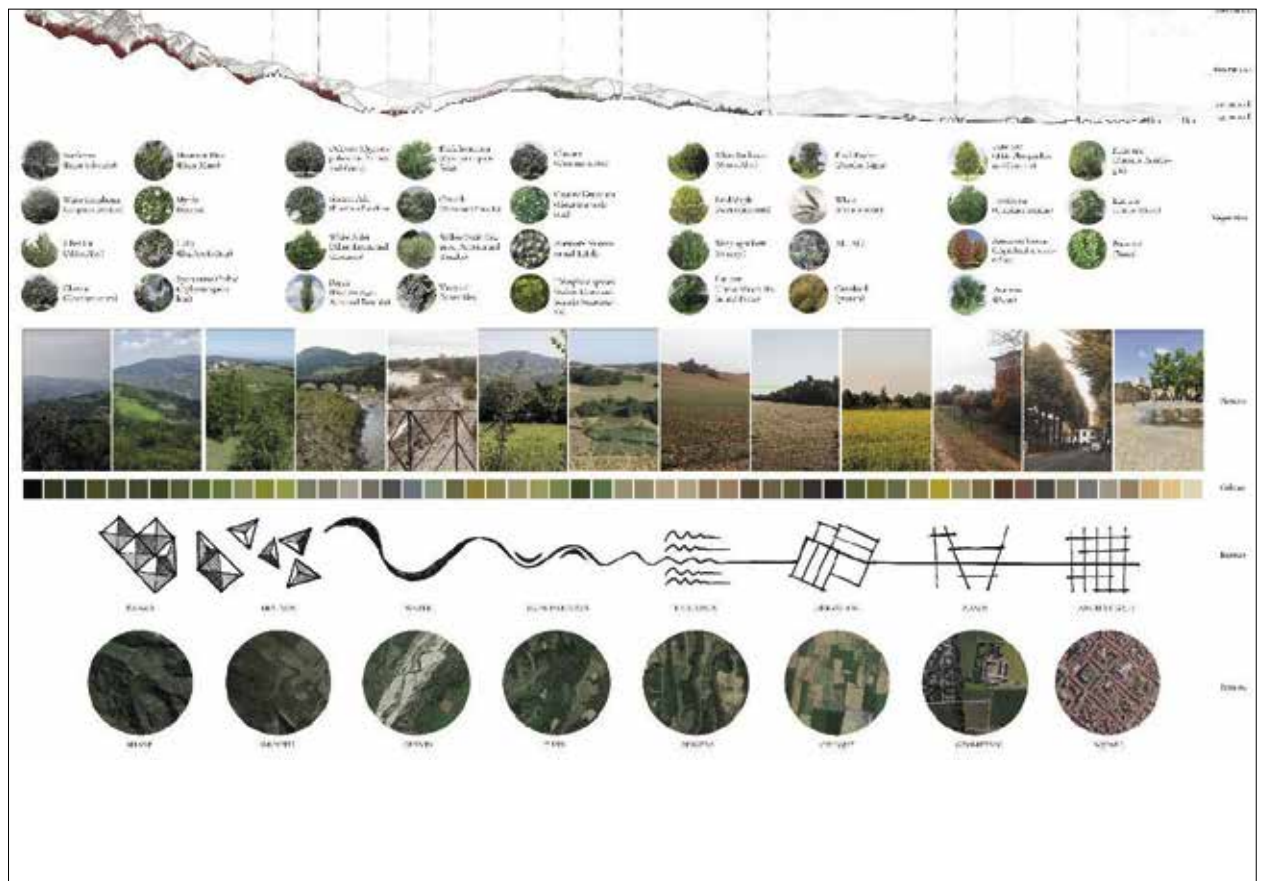


Fig. 2 - Sensitive dimension analysis

corresponds to the municipality of Piacenza that is part of the Milanese metropolitan region scheme. Its vocation is sociability because the urban center works as a strong catalyst. Unfortunately it is absent a programmatic view over green spaces and there is a good presence of urban cycle paths but no connection in terms of slow mobility with the countryside. The quality of life should be improved especially in terms of social and environmental justice to become an example of excellence to carve out a further role to play, in the perspective of the metropolitan region scheme.

The second landscape is the “rural landscape” represented by the municipality of Podenzano and its vocation concerns agriculture and production. The area is characterized by rural buildings of historical interest and a strong presence of monocultural fields that caused a loss of biodiversity and a degradation of the soil and of the underground water resources. The typologies of agricultural management based on monoculture have led to the simplification of the territory and to environmental problems, on the other hand the large arable land constitutes, together with the smaller surface hydrographic network, the potential for the development of elements of continuity and connectivity.

The third landscape is the “cultural landscape” that unify the municipalities of Ponte dell’Olio and Vigolzone. The area is rich in valuable heritages like castles, villas and industrial artifacts. It is also rich in protected areas, vineyards and gastronomic itineraries that define its vocation oriented to cultural and gastronomic tourism. Thanks to all these elements, this zone assumes the nominative of “Hills of the rural tourism”, making this site a rich zone but also a delicate nerve center.

The last landscape is named “wet landscape” because the path runs along the Nure river. The area presents a lot of small historical villages located over the mountains, horseback trails and trekking itineraries. It represents the emerging pole of the Val Nure mountain area, it exercises a supra-municipal role towards the surrounding countries with respect to service, commercial and production functions. But at the same time there is a growing phenomena

of marginalization of the mountain and depopulation which is bringing phenomena of abandonment and instability of the territory, also due to the lack of connectivity with the flatland.

c) Multi-scalar approach

The analysis depicted a rich scenario in terms of cultural values but at the same time showed that all these elements are not well enhanced and almost forgotten because they pay the bill for that process of abandonment and aging that began over a century ago and never stopped. In this frame, the hypothesis of using the old railway path, to find a way to relink these elements and reverse the process of neglecting, becomes a great occasion for the territory. A multi-scalar approach is introduced with the aim to propose a way to relink the landscape with its cultural value and through this approach the aim is to create a new rail trail to reclaim a way to enjoy the landscape in all its shapes and colors but in a different way, more sustainable and closer to nature. Moreover, taking in account the vocation of the landscapes this won’t be a simple rail trail but it will become a proper multi-functional corridor that will go to support their different ecosystem services and cultural identity. The resulting linear corridor crosses four different landscapes characterized by different land uses and combines healthy and livable recreational areas, sustainable small-scale agro-ecological solutions, the creation of a cultural landscape identity and ecological restoration. Instead of compartmentalizing these landscapes, the new urban green infrastructure blends them, enhancing the vocation of each area and creating a new lively and dynamic experience while providing multiple benefits to the environment and while supporting cultural identity and community cohesion. The railway route, which embodies cultural value both from an historical and industrial point of view, will be the means to redevelop the territory bringing out its past.

The methodology adopted to create the urban green infrastructure along the old railway path is based on applying different actions on three scales to create a multi-scope, multi-functional, multi-benefit and multi-scale infrastructure (Figure 3).

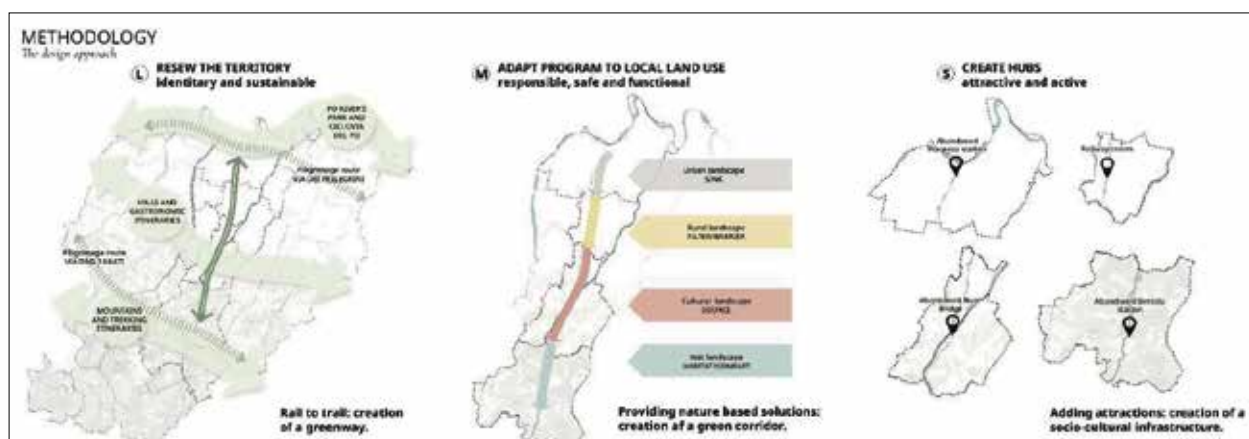


Fig. 3 - Multiscalar approach

Rail to trail: creation of a greenway

At the Large scale the aim is to create a new form of slow tourism thanks to the reconversion of the old railway path in a new rail trail that will assume a regional importance because it connects transversely three main systems represented by the Po river and its *ciclovía del Po* and *Via del Pellegrino*, the hills and their gastronomic itineraries and the mountains and their trekking itineraries. This will help to reseed the territory in an identity and sustainable way building the backbone of the project. At this scale there are five different actions: the creation of a bikeline, the valorization of the existing traces like the abandoned tracks, the creation of some explanatory totem where there were the old stations, the presence of a red line where the traces are no more present to rebuild the memory of the old railway, the creation of a parapet when the path will go closer to the street.

Providing nature based solution: creation of a green corridor

At the Medium scale the program will be adapted to the local land use. Respecting the different vocations, will be applied some nature based solutions along the path that will go to regenerate the landscape. This will create a responsible and safe green corridor that assumes different functions based on the landscape it is crossing. The actions related to nature based solutions have been categorized by identifying their direct environmental benefits and their socio-cultural effects to address them to the different landscape. The ones related to ecological restoration are mainly related to the rural area, the ones related to protection and conservation are more related to the wet landscape, the ones about landscape management are related to the urban landscape, while the ones related to landscape enhancement are associated to the cultural landscape.

Adding attractions: creation of a socio-cultural infrastructure

Finally at the Small scale, always taking in account the different vocations, have been chosen four points, one for each landscape, that present a railway element, like an abandoned station, and have been reconverted adding a new function so to create some landmarks along the path while promoting citizens engagement with the territory and improving the vibrancy of the local economy. These new attractive hubs will work as landmarks and will make the green corridor a socio-cultural infrastructure. In detail, the actions affect the reconversion of abandoned stations, abandoned infrastructure elements like the Nure bridge and the Giuditto that will be brought back to life.

Results

The new corridor will create not only a new space but a proper narrative, about the environment and humans who shaped it, that mixes history and tra-

ditions with ecology. Thanks to the reconversion of the old rail trail, cultural identity and historical significance, that are the first pillar of the cultural heritage landscape, are enhanced, helping connect the historic center of Piacenza with the mountain system of which Bettola is the gateway. As a direct consequence of this, also the second pillar about tourism and education is reinforced. In fact the new infrastructure is inserting itself into an existing system of pilgrimage routes, cycle paths and gastronomic and trekking itineraries boosting a new form of slow tourism of regional importance to help people to get to know their territory thanks to this alternative route that represents the new backbone of Val Nure. Finally the last pillar about environmental sustainability is taken into account. The project in fact works as a vibrant ecological corridor able to regenerate the surrounding areas through nature based solutions that will help in creating a multi-scope, multi-functional, multi-benefit and multiscale urban green infrastructure. A deep understanding of the context's issues and characteristics, such as flora and fauna, supported the choice of the correct ecological solution to be adopted in each landscape with the goal to convert sterile areas into vivid spaces able to boost biodiversity and help birds, insects and pollinators to regain their lost habitats. In this way the different landscapes of the Val Nure crossed by the new corridor, to be precise urban landscape, rural landscape, cultural landscape and wet landscape, which are now fragmented, will be "mended" thanks to an ecological approach that respects their vocations and their different habitats. All the landscapes have in common the actions at the Large scale, while the actions at the Medium and Small scale will change based on the specific features of the area:

Urban landscape

Some actions are applied to the urban area in order to support the urban ecosystem service and to solve some challenges related to water treatment management, on site infiltration, reduction of air and noise pollution and the enhancement of sociability (Figure 4). The hub created, that in this case is represented by the reconversion of the old Piacenza station that will become a community hub and will put the path in relation with other elements as the *ciclovía del Po* and the Pilgrimage route.

Rural landscape

Regarding the rural landscape where the main issues are related to the intensive agricultural activities, the actions are mainly aimed to improve soil quality and food production quality while providing ecological continuity and reducing agricultural pollution (Figure 4). In this case the point chosen to create the hub is the old station of Due case where we have some railway traces, here the Giuditto will be brought back to life becoming a small museum related to the railway.

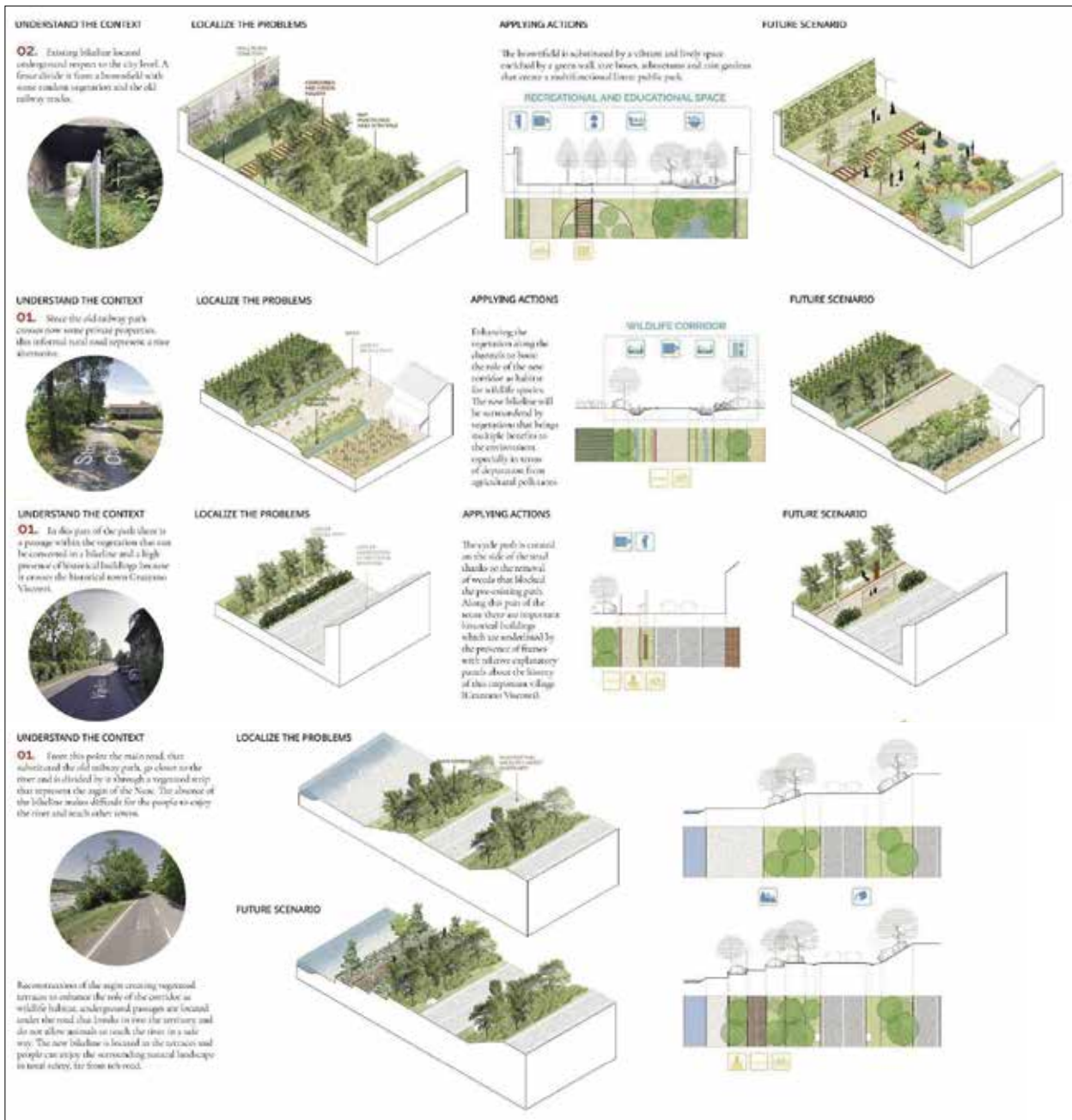


Fig. 4 - An extract of the design for the four case studies (Urban landscape, Rural landscape, Cultural landscape, Wet landscape).

Cultural landscape

In the cultural landscape instead there are no particular environmental issues and its strengths stay in the amount of naturalistic and cultural elements that are present. Therefore, together with some actions aimed to provide ecological wildlife continuity, some other actions will be applied to improve knowledge and boost people's engagement with the historical and naturalistic valuable elements present along the way (Figure 4). In this case the hub created aims to redevelop the abandoned Nure bridge and convert it into a cultural hub thanks to the addition of an observation tower.

Wet landscape

The last landscape is the wet landscape. Here the path runs along the Nure river and is surrounded

by mountains and forests. The actions are aimed to restore the degraded ecosystem, provide protection and conservation strategies for wildlife, provide habitat continuity and improve knowledge and people engagement (Figure 4). In this case the Bettola station will be object of reconversion and inside it will be created a touristic hub that will work as gateway to the mountain area and information point to support accommodation facilities in the mountain area, a base for sports activities related to trekking, bridleways, cycle paths and so on.

Conclusion

Especially nowadays, when more than ever the relationship between man and nature is central, it is necessary to increase awareness about the potential of landscape as an element to not only build

resilience for coping with climate change but also as a tool to rebuild the intimate relationship between people, their natural environment and their history. That's why the idea takes its first step from a growing phenomenon, the greenways, that has been further exploited to develop a model of territorial regeneration, both in terms of environment and economy, through the creation of a proper green infrastructure that sees the landscape and the cultural identity at the center. The infrastructure has the aim to avoid the fragmentation, not only between the different landscapes, but also between places and people who inhabit them, making them accessible. Assuring a sustainable fruition of the territory, thanks to the creation of a structure that works like a backbone for the valorization and requalification of the Nure Valley, allows people to live meaningful experience and get to know about the heritage while celebrating biodiversity and activating micro-economies. The hope of this research paper is to invite a reflection over the potentiality of urban green infrastructure as a tool to address cultural challenges and implement conservation strategies with the bigger aim to ensure that the cultural landscapes,

which characterize our territories, continue to enrich our lives for generations to come, encouraging new ways of feeling and seeing nature. Urban green infrastructure applied to cultural heritage landscapes may constitute a model of sustainable city growth which links past, present and future to make our cities more livable, assuring a better connection between environment and urban communities.

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2.4 Regenerative design in the evolution of the Italian garden in the XX century

M.B. ANDREUCCI¹

Introduction

The evolution of the Italian garden of the twentieth century is accompanied by national historical events, combining the reinterpretation of the cultural heritage of the Italian Garden with the necessary and brilliant adoption of new techniques, contributions and elaborations of contemporary European society, becoming a field of technical and artistic experimentation. The self-congratulatory spirit of fascism relaunches in particular the formal garden, as a proud example of "Italianness", through the rediscovery of the ancient imperial glories, compositional classicism, rationalist geometry and the enhancement of native flora. Giacomo Boni realizes with Nicodemo Severi and Rodolfo Lanciani (Royal Commission of the monumental area of Rome) the Park of Porta Capena at the Archaeological Walk (1914-1917), researching the typical species of the Roman garden – through the analysis of the wall paintings of Pompeii, the Palatine Hill and the Villa of Livia at Prima Porta – to integrate the architecture in open spaces by means of vegetation such as *Buxus sempervirens* and *Laurus nobilis*.

The new architecture of gardens very often in Italy must relate to the pre-existing ones. The request for demolition of the unhealthy settlements formed within the historic centers – among the main statements of the Athens Charter of 1933 – leads to the design of green areas around the functional monuments and to rearrange some historic gardens. With the archaeological ruin, Raffaele de Vico is still confronted in Rome with the park of Colle Oppio (1928), and Antonio Muñoz with the garden of the Temple of Venus (1935). With Pietro Porcinai, attention to history is the protagonist in all the interventions. From the first villas and gardens of the '30s where the theme of the exedra triumphs (Villa I

Collazzi, Villa Pazzi, Gherardesca garden, and garden of Villa Belvedere in Signa), up to the topiary forms of the arrangement of the garden with swimming pool in the villa Il Palmierino, in the seventies. Tomaso Buzzi enriches with refined quotations and references to ancient art – working on the dual side of interpretation and invention – the gardens of the villa Il Salviatino near Florence (1928), of the villa Volpi, formerly Barbaro, in Maser (1934-1937) and of the villa Invernizzi of Trenzanesio (1955). In the restoration of the nymphaeum garden and the rose garden in Maser, in particular, Buzzi created elegant chessboards of grass and stone with a clear secessionist flavour, reinterpreting references and formal schemes, enriching them with river pebble and concrete crossings characterized by the same reticular geometry. Carlo Scarpa in the Sculpture Garden at Venice Biennale (1952) enlivens the planes of the facades with chromatic streaks made by saline treatments – recalling the signs left by the alternation of the tides along the brick walls that generate the texture of the Venetian canals – and completes the composition with hygrophilous vegetation (Nymphaea) and climbing and compounding shrubs in the brick planters, material protagonist of the project (Figure 1). At the Querini Stampalia Foundation (1961-1963) water, a vital element of the city, also comes into play in the garden, integrating harmoniously with the other natural elements, the lawn surfaces and even the hygrophilous, shrubby and climbing vegetation, with many shades of green.

As far as the culture of conservation is concerned, during the first three decades of the XX century, the debate on the garden is still in an embryonic state, contrary to the already consolidated experience in the field of restoration of monuments. The Italian Garden Exhibition opened on April 24, 1931, in the Salone dei Dugento in Palazzo Vecchio in Florence. The organizing committee of the exhibition was the same as the two previous and successful manifestations of the Italian Portrait (1911), and the Italian Painting of the seventeenth and eighteenth centuries (1922): Ugo Ojetti, one of the most brilliant Italian intellectuals of the time, together with Count Gamba and Nello Tarchiani (secretary). The exhibition told for the first time the story of the "Italian" garden, in 52 rooms starting from the Pompeian Garden and, through the fourteenth-century garden as described by Boccaccio, reconstructed the Medici gardens, as well as the papal ones, up to the baroque and neoclassical gardens. The itinerary began with a series of real "theatres" placed in the Salone dei Cinquecento, which reproduced the types of different regional gardens belonging to different eras. The material presented was divided into sections dedicated to the garden in the various Italian regions and included a section dedicated to the "Italian garden outside Italy". Other sections were then reserved for the exhibition of books on the Italian garden, on ancient and modern fake flowers, on botanical gar-

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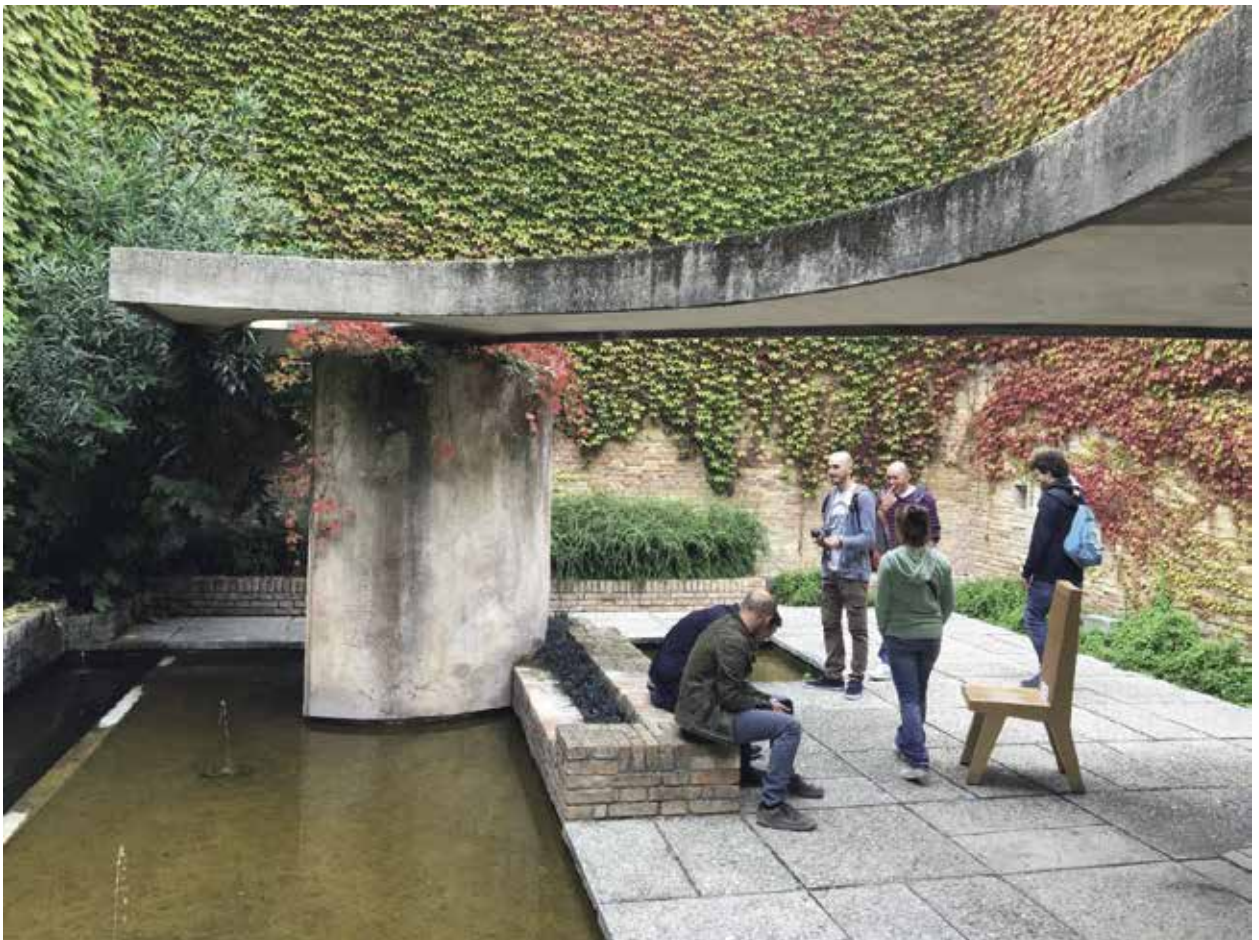


Fig. 1 - Sculpture Garden at Venice Biennale, Carlo Scarpa (1952).

dens and scientific figurations of plants and flowers and, finally, on games and leisure in the villa. There were also some cases of restoration at the exhibition (such as that of the garden of Villa Guicciardini Corsi Salviati, in Sesto Fiorentino) from whose analysis we can deduce a certain indecision about the path to take, between attempts to reconstruct past excellences, and less effective “in style” realizations. Evident is the difficulty of identifying the boundaries between conservation and enhancement through re-interpretations (here the term “enhancement” is used in the sense that it will be sanctioned many years later by the European Landscape Convention, 2000) for a work of art in continuous transformation such as the garden. Insights into the architecture of Italian historic gardens were still the subject of foreign scholars (E. Wharthon, 1904; H. I. Triggs, 1906; M. L. Gothein, 1914; G. Gromort, 1922; J. Shepherd and G. Jellicoe, 1925) with the modest exception of “Il Giardino italiano” by L. Dami (1924).

Abandonment of eclecticism and revival of the Renaissance Garden

The images of Italian gardens of the early decades of the twentieth century show botanical choices still dominated by exotic taste (Manuale di Floricoltura by Giuseppe Roda, 1928) while in Europe new movements are born (Arts and Crafts, Art nouveau,

Jugendstil), contrary to the excessive artificiality of the Victorian eclectic garden. The best performances of Jean Claude Forestier (1861-1930) and the brothers Vera (1881-1971) and Paul (1882-1957) André find inspiration in spontaneous flowers (so-called “floral style”) or in geometry, as in the Deco creations of the twenties and in the cubist gardens of Gabriel Guevrekian (1900-1970) in France. Even in Italy, dominated throughout the nineteenth century by “landscaping across the Channel”, the new ideal of garden was affirmed in the twentieth century, which after being “pictorial and in its own right” recovered its close and fertile relationship with architecture, through the revival of Renaissance lexicons. Thus the Uruguayan architect, Cecil Ross Pinsent, redesigned the noble architecture for wealthy Anglo-Saxon clients on the hills of Fiesole and Arcetri (Villa I Tatti, 1909-1914; Villa Le Balze, 1911-1913; La Foce, 1927-1939 and Villa Capponi, 1939). Respecting the strong Renaissance identity of the places, Pinsent proposes and reworks the elements of fifteenth-century landscape painting, merging in an original way –according to the principles of wild gardening – spontaneous species and ornamental plants. Some architects who until then had worked exclusively on building projects will also resume and reinterpret the Renaissance and Baroque tradition, significantly diversifying their activity: Carlo Busiri

Vici (fishpond of the garden of Villa Doria Pamphilj in Rome, 1913), Pio and Marcello Piacentini (Villa Aldobrandini in Rome, 1925), Clemente and Michele Busiri Vici (Villa Giorgina in Via Po in Rome, 1922 and Villa Attolico in Rome, 1930).

Innovation in the technical sector and in concept design. Internationalization

At the same time, in many realizations, important innovations in the technical sector of vegetation, means and materials of use took place. Among the first innovative works from a technical point of view, the garden of Piazza Cavour in Rome by Nicodemo Severi (1911), planted with 287 palms of different species, with the help of the transplanter wagon for large trees, brought from France. Innovative in terms of concept design, as informed by principles of harmonious expansion on the territory, is the project that Gustavo Giovannoni realizes in Rome, starting from 1920 for the city-garden Aniene in Monte Sacro. A large public park typical of the garden city (now incorporated into the Aniene Nature Reserve), a settlement fabric characterized by low density and the building type of the villas with a garden of relevance and, respecting the morphology of the territory, a design of the road system characterized by mainly curvilinear and irregular tracks. Ferrante Gorian, a pupil of the then young Porcinai, was active in Italy from 1939 to 1948, mainly in Treviso and Lombardy and collaborated with the van den Borre, Priola and Tagliamento nurseries. In Gorian's Italian projects the use of plant screens is wise, used as green textures to mitigate traffic and cement structures using strawberry trees, birches, various types of maples, beeches and oaks, flowering and fruit cherries. To these strategies, in an innovative way for the time, he associates the use of perennial herbaceous plants. In the projects of the E42 in Rome, the presence of the English style in the parks still predominates (Figure 2), a reference to the monumental emphasis attributable both to the political personality of Mussolini and to the stylistic character of Marcello Piacentini. Almost all the parks and gardens of the E42 are built after World War II (despite having been designed in 1939) by a group specially created within the urban planning and architecture office, whose experienced and specialized members are the landscape architect Maria Teresa Parpagliolo, professor Luigi Piccinato and professionals Cipriano Efisio Oppo, Michele Busiri-Vici, Guido Roda, Alfio Susini and Carlo Pareschi, with Raffaele de Vico, consultant for technical-artistic design. The whole group of designers has direct experience of contemporary European and especially German gardens. The studies of Luigi Piccinato confirm in particular the influence exerted by the German school, in particular attributable to the experiences of Leberecht Migge, author of the "Green Manifesto", published in Germany in 1919.

Among the most significant achievements, the Square of Concordia and the Avenue of Civilization

and Work (1939-1942), the Avenue of Roman Civilization (1942), the Gardens of Olives (1940-1952) and the Parks of the Nymphaeum and Tourism (1940-1952) designed by De Vico, and the Garden of the Waterfalls (1961). In the technological design of Pietro Porcinai in the second half of the century the most specialized portions of the park of Villa San Pedrino (1953) are to be mentioned: the greenhouse for orchids, the winter garden, the technical group consisting of the manure and the warehouse for soils, the rose garden and the rock garden. In the landscaping of the factory commissioned by Adriano Olivetti in Pozzuoli, designed by Luigi Cosenza and Marcello Nizzoli (1950-1970), Porcinai takes into account in an exemplary way the technical performance requirements related to the function performed by the buildings – such as the need to shade the large windows of the complex – and the landscape ones, in full respect of the local agronomic tradition. As trees, he chooses in particular to use plane trees, «natural replica of the load-bearing structures of the sheds». It inserts an organically shaped tank that, in addition to having aesthetic, irrigation and fire-fighting functions, combines the built architecture with that of vegetation. He designs green roofs and planters to distribute water in a capillary form, with a water-saving project. It chooses to safeguard the existing arboreal vegetation (*Pinus halepensis* and *Ceratonia siliqua*) that integrates with deciduous species not native but typical of the Mediterranean area (*Brussonetia papyrifera*, *Choysia insignis*, *Jacaranda mimoseifolia*, *Phytolacca dioica*, etc.). Maria Teresa Parpagliolo innovates again in concept design, with the creation of private open spaces within residential areas and offices in constant reference to the Anglo-Saxon models of Community Landscape. In Casal Palocco, a garden-city built in the 60s in the outskirts of Rome, Parpagliolo designed the greenways and numerous public and private gardens. Borrowing the attention to the community learned in Germany, she tries in particular to spread the practice that the gardens of the houses are not divided from the streets through fences, or other architectural barriers, but are separated by vegetation, with the aim of creating sensitivity towards the "commons" also in our country. Following his stay in Berlin, she theorises and writes about the concept of «garden as an extension of the house and outdoor housing», which in Germany has been discussed since the early '90s, and again in the '20s, on the basis of the English influences of the Arts and Crafts movement, where the planting of spring-flowering bulbs, and the use of exotic shrubs and floral decorations together with architectural components is desired, such as retaining walls and stairs.

As if to sanction the strong international contamination that characterizes the work and thought of Italian designers, the AIAPP Italian Association of Garden and Landscape Architects was founded in 1950, founded on the European model of the IFLA



Fig. 2 - E42, Rome

International Federation of Landscape Architect (1948) by Pietro Porcinai and Maria Teresa Parpagliolo (also present in Cambridge for IFLA) together with Raffaele de Vico, Mario Bafile, Michele Busiri Vici, Giuseppe Meccoli, Elvezio Ricci (director of the gardens service of Rome).

Design and restoration – creating and restoring parks and gardens

In Borgo Monterosso, near Acqui Terme (AL), designed on the gentle profile of the fertile hills of Monferrato, was built – starting from 1937 and with subsequent design interventions by the landscape architect Pietro Porcinai (1955-1970) – one of the most significant modern gardens in Italy, within a residential complex originally built for the Ottolenghi family by the architects Federico D’Amato, Marcello Piacentini, Ernesto Rapisardi and Giuseppe Vaccaro, with the contribution of the artists Venanzo Crocetti and Arturo Martini. The first construction of the residential complex embraces a long period of time ranging from the 20s until the 50s of the twentieth century and covers 35 hectares, of which 10 are cultivated with vineyards, 10 for park and 10 for woods. The villa, the artists’ studios, the park and the adjoining mausoleum are defined by the architect Piacentini, an “architectural symphony” where architecture and nature come together in an unrepeatable unicum. Connected to the main body of the villa by a pergola of *Wisteria chinensis*, the artists’ studios,

in particular, represent with purity the compositional style of the ‘30s. The patio overlooks the park with its porch, connecting the indoor and outdoor spaces. The circular mausoleum, the Temple of Herta, stands halfway up the hill, surrounded by vineyards and the centuries-old park, called Earthly Paradise because it houses Martini’s sculpture Adam and Eve. From 1955 until the seventies, Porcinai worked at different times at Villa Ottolenghi, elaborating and reworking several projects for the two main open spaces of the complex: those located between the villa and the artists’ studios, which still maintained the lawn surfaces and the informal paths designed in 1937 by Vaccaro and the portion of the garden on the south side of the villa, overlooking the valley. In the large rectangular parterre between the artists’ house and the manor house, Vaccaro had created the swimming pool and the tennis court, two large rectangles side by side. Porcinai has the idea of connecting the garden and the vast, rigid green area of recreational services with a vegetated dune with evergreens, through earth movements, at which he places the Garden of Stones. Japanese-style composition – probably inspired by recent contaminations with the “California style” of the landscape architect Thomas Church – with outcropping rocks, soft changes of level, “dwarf” shrubby vegetation, small trees and stone circles, borrowed both from oriental culture and from avant-garde pictorial forms. In addition, to lead the gaze more pleasantly along the pergola de-



Fig. 3 - Garden of Villa Ottolenghi, Acqui Terme

signed by Giuseppe Vaccaro towards the artists' residence, Porcinai designs a border of perennial and annual herbaceous plants, to complement the rich palette of vines he himself studied. To resolve the relationship between the portion of the garden on the south façade of the villa overlooking the valley and the villa itself, Porcinai works on the square mesh of the courtyard of Piacentini and designs a new and wider chessboard, with which he orders the large outdoor garden-terrace that opens through a sinuous balustrade on the panorama of Acqui Terme. The squares of the new grid are adorned with lawn and roses creating harmonious lozenges, while inside the smaller squares of the Piacenza courtyard alternate borders of *Taxus* and other species from flower to pebble designs, which take up the theme of the surrounding vineyards and orchards, indicating that Villa Ottolenghi is also a place of agricultural production, as well as art (Figure 3).

A long row of round pedestals for citrus vases, in a lateral position on the parterre, completes a completely innovative and modern composition compared to the ante operam. Porcinai, always attentive to the relationship with the surrounding area, concludes the garden downstream with the suggestive view of the village of the underlying Acqui Terme and a refined organic redesign of the arrival routes to the Villa that affects the entire hill. The plantations of the complex carried out by Porcinai include the following species: (trees) *Fagus sylvatica*

atropurpurea, *Populus alba*, *Lagerstroemia indica*, *Cedrus atlantica*, *Juglans nigra*, *Quercus petraea*, *Quercus ilex*, *Pinus nigra*, *Pterocarya fraxinifolia*, *Juniperus sabina*, *Ulmus campestris*, *Morus alba*, *Corylus avellana*, *Magnolia soulangeana*; (shrubs) *Crataegus monogyna*, *Buxus sempervirens*, *Arbutus unedo*, *Osmanthus fragrans*, *Prunus laurocerasus schipkaensis*, *Tamarix gallica*, *Cotoneaster franchetii* and others; (blooms) many varieties of roses, including Meilland, Paulette, Tzigane, Mitzi, Crimson glory, and *Aster dumosus*, *Berberis*, *Iberis sempervirens*, Armenian *Veronica*, *Veronica saxatilis*, *Geranium sanguineum*; (climbers) *Wisteria sinensis*, *Parthenocissus tricuspidata*, *Hedera helix*, *Hydrangea petiolaris*, *Bignonia radicans*; (ground covers): *Hypericum calycinum*, *Juniperus horizontalis*, *Euonymus acuta*, *Sedum anacampseros*. Of his conception also the numerous design details, such as the furnishing elements, such as some swivel armchairs carved in marble, still present. After the sale by the Ottolenghi heirs in 1985, the complex went through a prolonged period of abandonment and degradation, risking several times to lose its qualities entirely through impromptu transformations. In 2006, a new owner started a project of conservation and restoration of the garden, albeit partial with regard to the complex vegetation plants at the time wanted by Porcinai. While simplifying the original projects, in the garden of Villa Ottolenghi have survived the historical events, not always favorable, all the

aforementioned compositional solutions typical of the modern garden of Porcinai and the same enjoys today the maturity of a rich and original arboreal plant. In 2013, the vineyard of the complex was also completed, respecting the design conceived by Porcinai himself. The garden of Villa Ottolenghi can be counted among the rare Italian examples of intervention of recovery – in this case, simplifying – of the garden of the modern. In this sense, the attribution to Düsseldorf of the European Garden Award, organized by the European Garden Heritage Network (EGHN) for the “Historic Gardens” category, is consistent. The members of the international committee decided to award the first prize in the category “Best enhancement of a historic garden” to the garden of Villa Ottolenghi because

«although it has been little known so far due to the complex history of the property, it is one of the most important gardens designed by Pietro Porcinai in Italy, which makes it important to make it known at European level... because it is a rare example of a modern garden revitalized after a period of neglect. In this sense it is a good example of “restoration of the modern”, where the problem of recovery is applied to a modern garden recognizing its historical value... because it presents itself at the same time as a good example of the significant union between an art garden and the culture of wine, a fundamental combination for the development of cultural routes in Europe».

The realization (1932-1935) by Piero Portaluppi and Tomaso Buzzi of Villa Necchi Campiglio represents one of the last stages in the process of transformation of the central area of Milan, between Via San Damiano (flanked by the internal Naviglio until 1929), Corso Venezia, and Corso Monforte, marked by the presence of large gardens, at the service of extensive monastic properties and important eighteenth-nineteenth-century noble palaces. It comes, in fact, in 1924, the proposal of subdivision of the architect Aldo Andreani with which, in the following six years, «a large part of the former patrician Sola-Busca park is put to good use among the “green scenes of the surviving plants”, in one of the most elegant districts of the city» (writes the architect Renzo Gherla, in 1931), i.e., the new residence of the Necchi Campiglio family. It is through the quality of the new architectural system that the modern entrepreneurial class intends to compensate for the change in use of the “heritage” green areas. The land chosen for the construction Necchi Campiglio annexed various portions of historic gardens purchased and protected over time by the various owners. It will be precisely this context of the highest value (there are numerous exemplary trees of *Taxus baccata*, *Fagus sylvatica* and *Magnolia* spp.) that will inspire the eclectic architect Piero Portaluppi in creating a “villa in

the city” with swimming pool and other equipment in the green, a completely new setting for this type, normally intended for holiday resorts. The photos of the time suggest a declination of the spaces of the villa marked by the continuous reciprocal exchanges between inside and outside, between the garden and the residence, through an articulated and varied system of filters and openings. Thus, for example, the front of the main entrance is punctuated by a *jardin d’hiver* that acts as a counterpoint to the small greenhouses (at the time furnished with succulent plants) located on the sides of the portal. As a primary component of the garden, the pool area polarizes the compositional attentions of Portaluppi, who proposes a sumptuous classical project for the water spaces of the property. However, his solutions will not meet the taste of the Necchi Campiglio who will entrust, starting from 1938, to the inspiration of Tomaso Buzzi, at the time much in demand as a garden architect by the nobility and Italian entrepreneurship (in 1937, he masterfully renovated the Palladian villa of Maser, for Marina Volpi). Buzzi intervenes in different areas of the Necchi Campiglio garden, designing the scenic backdrop of the swimming pool, and creating small service structures, in the area dedicated to tennis. In 1946, and until 1957, Buzzi resumed the collaboration interrupted by the war, further enriching the spaces of the villa with numerous details aimed at recovering the comfort and tradition of the places. The residence, donated to the FAI by the two sisters Gigina Necchi Campiglio and Nedda Necchi, in 2001, has become after the restoration works (carried out by the architect, Piero Castellini, nephew of Piero Portaluppi) and the opening to the public in 2008, a house museum able to return to the public the main achievements of Portaluppi and Buzzi. The exteriors, in particular, have undergone important interventions, mainly attributable to the plant adaptation of the complex. The intent was to restore the original image of an urban villa with a park. The exemplary trees of yew, beech, magnolia and plane trees have been maintained according to the original design of the park, as mentioned pre-existing with respect to the purchase of the Necchi Campiglio, while the dense undergrowth has been enriched under the aegis of the FAI, by new botanical choices, such as *Hydrangea quercifolia*, *Sarcococca confusa*, *Begonia grandis evansiana*, and the perennial evergreen herbaceous *Pachysandra terminalis*, planted by the company Piante Spertini of Laveno Azienda Agricola Brianza. The vegetable garden (replaced in recent times by a rose garden) has also been restored – by Fratelli Ingegnoli and Casa Verdi – in the place where it was already present in the past for the needs of the Necchi Campiglio family (Società Agraria Botanica Burdin Maggiore), and where aromatic plants, vegetables, and flowers such as zinnias, asters and roses coexist, to be cut for the decoration of the house. Then there is a part of the nursery with fruit trees, a real small orchard,

with apple trees, pears, apricots, olive trees, vines. The materials of the pool and the seasonal flowering borders around it have been recovered, and the historic lighting system has been restored. New services have been added in the park, the book-shop in the former greenhouse, the ticket office in the old garage, and the cafeteria on the tennis patio. To further contribute to the new museum vocation of the complex, a new glazed pavilion (by arch. Piero Castellini) has been built, in 2015, in the original iron fence of the former tennis court.

Conclusions

Historic parks and gardens are considered particularly important in providing inhabitants and visitors with multiple benefits, primarily cultural, fostering identity and heritage values for citizens and visitors alike. At the same time, the urban built environment and the Natural Capital as an active part of this complex ecosystem are called to respond to evolving environmental, social, and economic challenges that must urgently be addressed.

Climate change is certainly the major threat of the Anthropocene, producing resilience erosion, resource depletion, and diffused degradation. The negative impacts of adverse meteorological phenomena, such as floodings and droughts, are increasingly affecting cities and regions at multiple scales, drastically reducing both the functional traits of urban and peri-urban green blue infrastructure, and the overall quality of life of the inhabitants. Increasing levels of air and soil pollution, water scarcity, urban heat islands, and widespread presence of insect pests and plant diseases are progressively impacting urban and peri-urban ecotones. Heritage urban gardens and parks are particularly vulnerable to extreme events, and deserve particular attention from decision-makers, planners, and designers, in terms of existing resource protection as well as innovative “regenerative” interventions, such as tree planting and pavement “de-sealing”.

Nowadays, the practice of historic gardens and parks restoration is still mainly based on faithful reproductions of original design features, leaving little space to innovation and specific climate adaptation strategies. Past experiences developed in Italy – like the recent renovation case studies of Villa Ottolenghi and Villa Necchi Campiglio, as well as the works by the “pioneers” Pietro Porcinai and Maria Teresa Parpagliolo – demonstrate, on the contrary, that environmental design strategies and solutions can effectively reverse the observed negative trends, specifically targeting climate adaptation (short-term) and mitigation (long-term) goals, bringing back multiple benefits provided by nature to people and the environment.

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2.5 The salvaging of the Alpine cultural heritage involved in natural disasters

Communities' engagement and the role of knowledge in the Cheers project

G. PESARO¹

Introduction

One of the main features of the Alpine Region are its outstanding natural and cultural resources. The morphological and geographical characteristics of this territorial area and the natural environment have shaped the life and the economy of the local communities over the hundred years. Due to a number of quite easy natural passages through the mountains, the alpine region is also peculiar for the transnational relationships and exchanges built up by the alpine populations in different countries. These dynamics produced, in many cases, similar economic activities, architectures, pieces of arts, handicrafts and communities' traditions, among which common languages spoken by communities in different countries, some religious customs and food dishes (object of several European funded projects under different funding programs like the Interreg Alpine Space and the LIFE).

The richness of the resources and the variety that characterizes the alpine area can therefore be observed under the double perspective of a unique, quite homogenous, macroregion and of a system of local specificities. From the one hand, the Alpine Macroregion is recognized by the European Commission, as in the programs ESPON, EUSALP and Interreg Alpine Space, as a system of territories with common characteristics and a history connecting them. It becomes, therefore, object of common policies. On the other hand, it is important to highlight

and valorise the different development paths, as well as diversified are the current images of the Alpine areas in terms of quality and characteristics of individual socio-economic systems (Pesaro, 2012). Assuming the UNESCO perspective (UNESCO, 1982) as a reference for more precisely focusing the cultural heritage as the target of the CHEERS project, common characteristics can be envisaged in alpine territories, both tangible and intangible. Values are related to individual elements as well as to the cultural heritage system as a whole. The alpine traditional way of life, production and consumption models, history, culture and the outstanding natural environment and landscapes can be well perceived in the different typologies of tangible and intangible cultural heritage spread around and, in some cases, in very isolated locations. Because of the same geographical localization, geomorphology and characteristics of the environment that gave birth to the alpine cultural heritage, the heritage resources themselves are often undermined by a wide range of risks and natural hazards, such as floods, earthquakes, fires and avalanches. It becomes more and more important to identify and implement tools able to increase and ameliorate knowledge about the hazards themselves and the characteristics they take in this specific environment. Moreover, it is crucial to better understand and share how to slow down the increasing vulnerability of cultural heritage pieces according to their specificities, which have to be protected not only as human capital but also as witnesses of the past of the Alpine people. As in any other territorial area, it is expected that local and overlocal initiatives will be proposed and implemented in such a way as to favour the development and implementation of governance and management tools capable of reconciling the needs of protection with those of activation and enhancement of local heritage in its particular context. For sure, the prevention to cope with natural hazards would be the best way to protect people, houses and cultural heritage, but effective preparation to face emergencies, lead-time procedures, salvaging and rescue activities are crucial as well, when dealing with a list of assets that risk being lost forever or heavily damaged by disasters. As shown in several regional assessments, even though cultural heritage in the Alps is subject to general local protection, the specific safeguard from natural hazards during the emergency and recovery phases still lacks proper regulatory settings, operational abilities and widely-shared knowledge of the socio-economic value embodied into assets at stake. On the other hand, as it will be underlined in the following paragraphs, there are natural hazards which are more likely to happen in the Alps than in other areas of the Regions belonging to the Alpine Space.

The meaning and aims of the Cheers Project

The CHEERS project, *Cultural HERitageE. Risks and Securing activities*, has been financed by the European

¹ Fondazione Lombardia per l'Ambiente –Università degli Studi dell'Insubria, Varese, Italy.

Commission Interreg Alpine Space 2018-2021 program and implemented by 12 Partners from the six countries that have territory in the Alpine area (Austria, France, Germany, Italy, Slovenia, Switzerland), with the coordination of the lead partner Lombardy Foundation for the Environment.

The objectives of the project refer to the need to develop methods and tools to support the decision-making processes that take place around emergencies due to natural disasters involving cultural heritage, both in preparation and then during field operations. When an alarm is given or a natural disaster that involves or may involve cultural assets has been given, the crisis units that govern the processes and the rescue teams that act on the field have to make decisions quickly and under stress conditions. The decision makers, part of the crisis units, have to be considered as intervention groups, subjects and professional profiles who participate in rescue activities according to their roles and specific skills. In general terms, these are subjects with responsibilities in the protection and management of cultural heritage (at different territorial levels), management and governance of the territory, civil protection and rescue activities and other subjects often mobilized during emergencies at local and over-local levels. The object of the decisions is the set of intervention strategies and organization of field operations, in relation to the characteristics of the ongoing natural events and of the elements of the cultural heritage threatened by the impacts of the events. Furthermore, decision-making processes must take into account conditions related to the availability of resources and time, the safety of people and the availability of updated and accurate information and knowledge. All this by operating within the strict rules that regulate the protection and management of cultural heritage in all Alpine countries and with interventions made more complex and difficult because of the specificities of the mountain territories and the limited accessibility to many sites. These decisions deal with the approach of the "tragedy of the commons" (Dietz, Ostrom and Stern, 2003). When decisions about common and public goods, like the cultural heritage, have to be taken, governance requires not only factual information but also information about uncertainty and values. If decisions have to be taken rapidly because of the risk situation and with high responsibilities looking at a so highly valuable heritage the question becomes: *"if the rescue team has just a little time and not enough resources to salvage all the CH at risk, what should be recovered first?"*. And, because of scarce resources or time, this means to face trade-offs: *"what the rescue teams will have to leave should they not be able to salvage everything?"*.

The goals of the project, in general terms, can be summarized in the following three points: (i) the development of tools and guidelines to strengthen the protection and salvaging of Alpine cultural heritage in

case of crisis or natural disaster; (ii) the strengthening of the knowledge about the values and vulnerabilities of the Alpine cultural heritage exposed to natural hazards and the reduction of the vulnerability itself during the emergency and post-emergency phases; (iii) the production of tools supporting decision-making processes and education and training activities in order to improve effectiveness and promote the participation of local stakeholders before and during emergencies affecting cultural heritage.

It is important to underline that the project activities were always carried out in close contact with the territories and the main stakeholders and competent institutions in relation to the complex topic addressed. The approach was very operational, to understand: (i) the real availability of knowledge and information about the objects of analysis and their shapes and usability as a basis for decision-making processes; (ii) the main needs of territorial governance in preparation and during emergencies.

The Cheers Project approach

One of the main characteristics of the project, compared to other research activities in the field of the protection of cultural heritage assets facing natural hazards, is the focus on the emergency phase. When an alarm is given or a natural disaster already took place involving or likely to involve cultural heritage assets, teams constituted by experts in cultural heritage, civil protection and all the other subjects in charge for the management of the crisis at the local and over-local levels have to be organized and make decisions (figure 1). This under pressure because of timing issues and of resources, information and knowledge availability and under the strict regulations which characterize the cultural heritage management and handling at any time and conditions in all the Alpine countries.

This suggests, as in all situations dealing with disasters and crisis, that preparation in peacetime is crucial in enhancing the effectiveness and the efficiency of the salvaging operations. Operations whose quality and success make possible the conservation of cultural assets and resources, which represent a non-renewable and highly valuable heritage.

It is actually important to carefully consider that a damage suffered by a piece of art or an ancient object or building cannot be solved every time by restoring operations and that once a piece of human and territorial history, art and culture is lost, it is lost forever. This makes it clear how much important the availability of good quality and easy-to-access information and knowledge might be during emergencies.

In the Cheers project, these issues are explored focusing on the increase of information and knowledge about the values and vulnerabilities of the Alpine cultural heritage exposed to natural hazards, in order to better organize emergency and civil protection activities and therefore reduce the vulnerability itself during emergency and recovery operations,

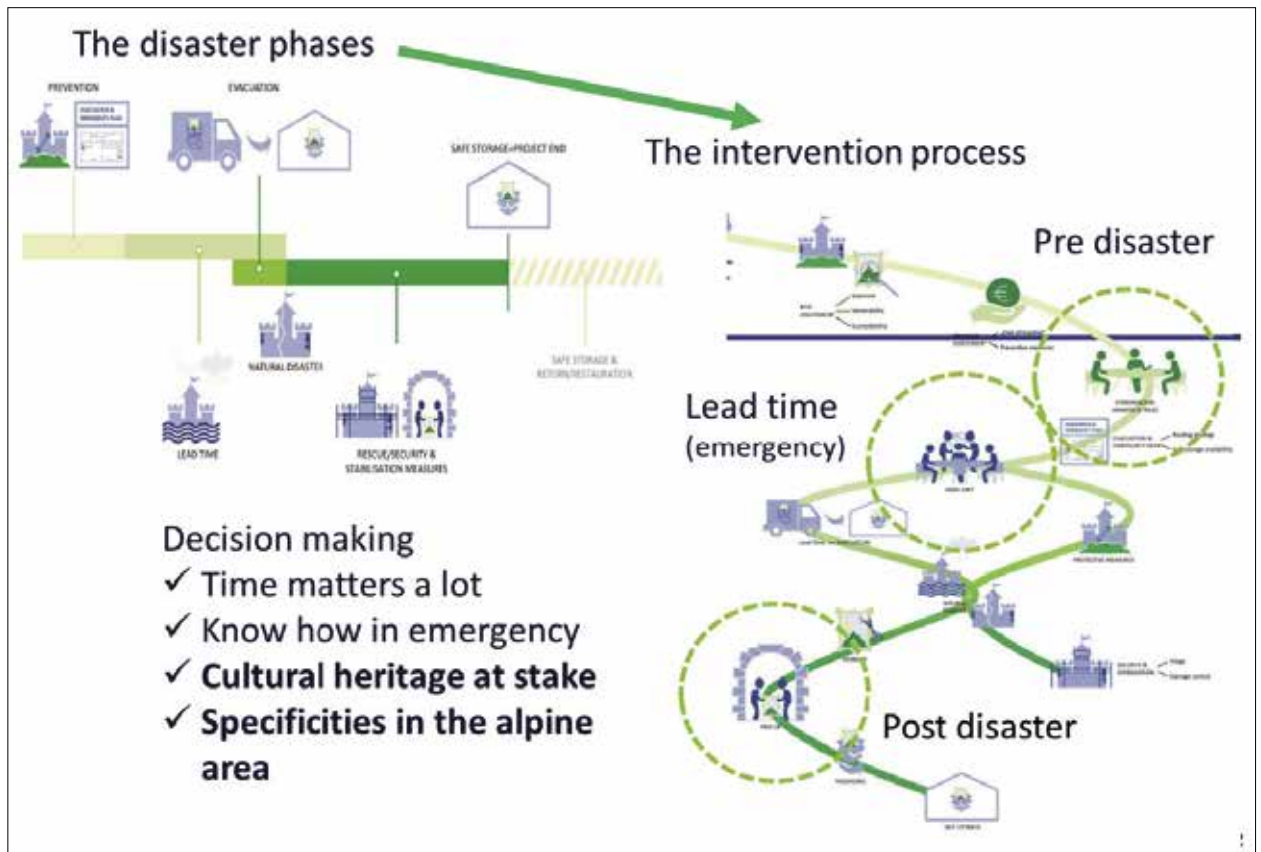


Fig. 1 - The disaster phases and the decision-making processes. Source: The Cheers Project Outputs, available in <https://www.alpine-space.eu/project/cheers>

while enhancing salvaging operations effectiveness. Even if with some differences, in all Alpine Space regions and countries laws and governance rules are in place with reference to the organization and management of cultural heritage facing disasters. Still, during the project activities a common requirement come out about the need to enhance coordination and interactions between the cultural heritage and the natural hazards worlds and expertise. This issue deals not only with the availability itself of the right information pieces, in the right place and in the right time on both sides – cultural heritage and natural hazards – in a certain territorial area. Mainly in preparation, but also during the lead-time (emergency), the effectiveness of salvaging strategies and actions will be enhanced by the capability of all the different categories of experts to deal with the technical contents of the information and to exchange knowledge elements which might be decisive in the organization and management of the on-the-field operations. This in order to better adapt them to the local territorial and geographical conditions and to the specific features and values of the exposed CH assets. The vocabulary itself of the two knowledge fields has to be shared and mutual understanding enhanced.

This means to enhance the opportunities for common work activities during peacetime to better prepare the emergencies and reduce the uncertainties and the lack for information at the local level, including the requirements for dealing with different

cultural heritage assets according to specific laws, rules and governance issues. In figure 2 the knowledge and information flows useful to produce intervention scenarios and support field operations is proposed. The building of a solid knowledge base for identifying and assess the cultural heritage stock at risk and the related characteristics, consistency and values is central in the light of the decision-making processes which take place during emergencies and must become a focus during the preparation phases in peace time, together with the natural hazard knowledge field.

As an example, an increase of knowledge about the characteristics, consistency and values of cultural heritage in a certain site still needs to better match knowledge about the presence of different natural hazards with different characteristics affecting the specific territorial area. More informed decisions could be taken if the governance and management system would be able to better identify at the same time the more fragile, more vulnerable and more valuable² cultural heritage assets according to the need for better identifying the cultural values prone to natural risks.

² More valuable in CHEERS project means what should be saved first according to a system of assessment criteria. The project of course does not discuss CH values per se but embodies many elements, among which, the meaning and importance of a certain CH element for the local communities and the Alpine culture as a whole and the fragility and vulnerability of CH assets.

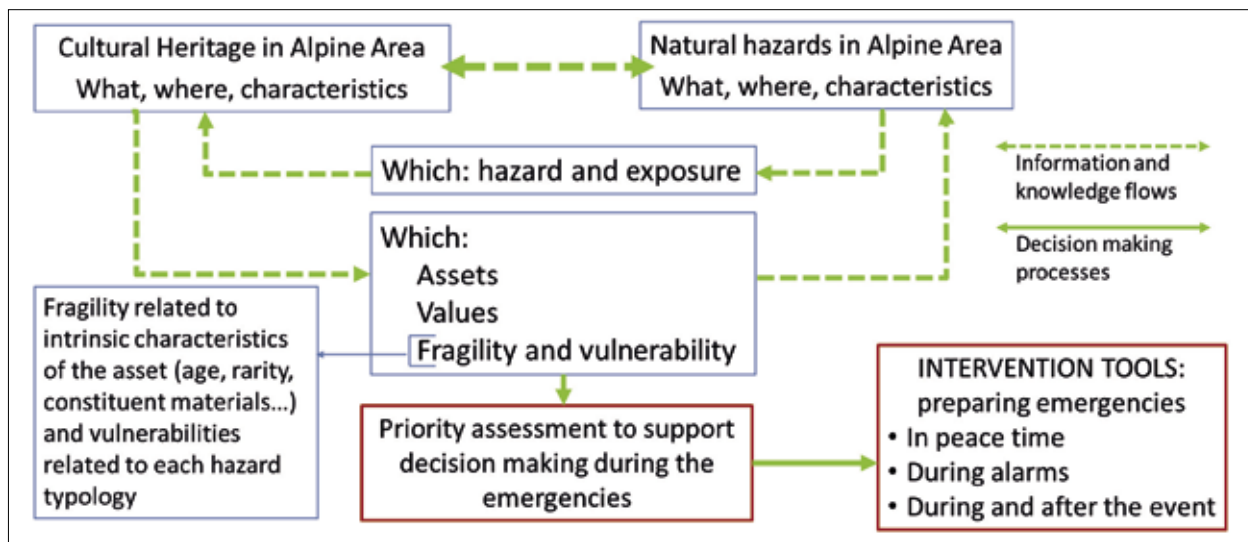


Fig. 2 - Information and knowledge flows feeding priority assessment and decision making for on-the-field operations. Source: The Cheers Project Outputs, available in <https://www.alpine-space.eu/project/cheers/>

Information and knowledge elements in both fields have therefore to be better coordinated and made accessible to all operators in peacetime. Experts and operators should, at their turn, be trained in order to access each other's knowledge approaches, rules and operational issues. Actually, the information required as the knowledge input in the decision making processes synthesized above, should be that able not only to sustain information and knowledge exchanges but mainly to generate a more stable, and easy to access and use, reference for identifying the cultural heritage elements at risk.

As a synthesis of this reference framework, the following principles and working goals have been selected in order to address the project activities and the related outputs and products:

- Propose a strongly multidisciplinary knowledge approach by pushing experts from extremely diversified backgrounds (cultural heritage, restoration, natural risks, civil protection, security, local and supra-local administration...) to challenge themselves on the same level, that of the criteria for making decisions on "what to save first under time and resources constraints" and "how to do it in the best possible way".
- Stabilize the knowledge, information and skills exchange inside information tools and in decision making support tools able to incorporate and make more functional the cognitive and organizational elements necessary to act promptly and effectively in a state of emergency. This, in particular, by stabilizing the different skills and knowledge in tools and methodologies built on the basis of the comparisons between all the experts and the territorial stakeholders whose contribution is necessary to make decisions.
- Do not just simplify but "solve complexity" without losing technical and scientific elements so to make the methodology more easy-to-use and transferable at the local level and in the whole

Alpine Region. Assessment activities as well as activities and interventions in both cultural heritage and natural hazards fields do not only require strong knowledge and sectoral capabilities but are also subject to sectoral laws and strict regulations. This means to be able to find a model able to match expert work, decision makers needs and communities understanding in different ways and at different time, competences and territorial levels.

- Develop a general model to be tailored / re-defined and transferred according to: natural hazards, territorial features, typologies of cultural heritage. This to strengthen and encourage coordination and cooperation between the work of experts, the needs of the governance subjects and the understanding / participation of local communities.
- Territorialize the reasoning about how to maximize effectiveness and efficiency of interventions on cultural heritage prone to natural hazards: (i) better recognizing and valorizing the Alpine cultural heritage; (ii) better mapping of the cultural heritage exposed to different hazards; (iii) building of a local-based and stable knowledge of the disaster risk according to the local territorial specificities and of the related strategies for disaster risk reduction; (iv) better sharing of the knowledge at the Alpine Space level, exchange experiences and develop learning processes useful for all Alpine regions and communities; (v) better cooperating at the over-local level so to increase the diffusion on the culture of preparation of emergencies and salvaging operations in peace time.
- Increase the availability of tools and methods to enhance the active/operational involvement of local communities of stakeholders: (i) awareness about the multiple values of their cultural heritage exposed to natural hazards; (ii) knowledge

about the multiple risks their cultural heritage is exposed to and the related vulnerabilities; (iii) understanding of the need for being adequately prepared to intervene on cultural heritage.

The Cheers tools for the local communities

The combination of these issues led the project partners to work to produce outputs and tools to support decisions based on the construction of real priority lists of cultural heritage at a local level, precisely in terms of importance and value to be used as a reference to guide intervention choices. Of course importance and values strictly connected to the salvaging activities when an emergency occurs and needed in order to sustain the tragic decisions mentioned above.

Strengthening knowledge on the local and territorial specificities, useful for supporting these choices (and in some cases defending them at the end of the emergency period), plays a fundamental role, as it contributes to improving the reaction capacity of the local system and stabilizing the collaboration between all the subjects involved, with different capabilities and roles, in the interventions. The set of knowledge and its sharing between these subjects thus becomes one of the determining factors for minimizing damage and losses of assets, both in absolute terms and in incorporated values. And it is equally evident how, from a perspective of effectiveness and efficiency, the construction of the knowledge base necessary to guide decision-making processes must take place in so-called “peace time”, that is in the absence of ongoing events but in the awareness of the presence of risks for the protection of cultural heritage.

One of the key steps that distinguish this project from others is precisely the definition of tools of this type. Tools in which the project partners tried on the one hand to explain in a clear and above all stable and structured way at a territorial level the knowledge on the exposure and the fragility and vulnerability of cultural heritage and, on the other, to propose a scientific method for defining a list of intervention priorities based on values and vulnerabilities: the greater the value and the greater the vulnerability, the greater the urgency of the intervention to limit damage and losses. The availability of these tools can therefore also represent a useful contribution for institutional bodies that have skills and extensive experience in this sector, as in the case of Italy, where the collaboration between the Ministry of Culture and the Department of Civil Protection is being developed. In 2020, the General Directorate for Cultural Heritage Security of the Ministry of Culture was activated and over time training courses for the protection of cultural heritage in civil protection activities have become more frequent.

The project’s products were designed to be applied at a local level, thus incorporating the information and knowledge necessary to act in each specific context in relation to a peculiar heritage. It was therefore necessary to study how to collect, organ-

ize and make accessible in a permanent and useful way the available information and knowledge contents and possibly identify new ones, as well as better define the conditions of operational use to respond to the problem of identifying clear indications for organizing the sequence of interventions in the best possible way. Following this path, four knowledge building tools and guidelines to be integrated into civil protection plans and, more generally, into emergency planning tools, have been developed, with the aim of collecting all the useful elements to direct action also to the heritage cultural and thus prepare operations according to the specific type of natural event underway or expected. The four developed tools (Cheers, 2022):

- **ATTACH: evAluaTion Tool for Alpine Cultural Heritage (ATTACH)** is a participatory method for assessing the significance of a set of cultural assets that will help establish priorities for intervention in the case of natural hazards, if necessary.
- **FRATCH: the Fast Risk Assessment Tool for Cultural Heritage (FRATCH-Tool)** was developed to identify and assess current and future risks and threats to cultural heritage. The tool represents a multi-stage process that involves several stakeholders in order to establish a common understanding on the topic. FRATCH produces a risk assessment which clearly presents the risks and threats to the cultural heritage/asset and the related hazardous events on the specified site and/or the cultural asset in question.
- **3.2.1 FRAGILITY: this tool is suitable for performing damage and loss scenarios, aimed to support the definition of emergency plan.** If exhaustively precompiled and adequately complemented with FRATCH and other tools for the management of rescue teams, its design allows to be used as a fast dashboard and simple decision support system in the emergency response coordination centre for the prioritisation of cultural heritage safeguard and rescue intervention.
- **THREAT: tool and handbook on fragility and techniques for the preservation of cultural heritage: a tool for vulnerability and risk assessment on cultural heritage (THREAT - culTural Heritage Risk EvaluATion),** developed starting from the same logic as FRATCH, therefore based on the concept of “likelihood” of damage and permanent loss of value that may occur to cultural property. The tool is accompanied by a Handbook, that serves as knowledge and a reference base, on fragility and safeguarding techniques for cultural heritage.

It is not possible here to explain in detail the functioning of the whole of such tools. Worthwhile to say that they respond to the same cognitive needs but require slightly differentiated inputs, depending on different needs and in relation to the resources, skills and basic knowledge available in each terri-

tory. Differences that suggested the project partners to proceed along parallel paths in the experimental development phase, highlighting the importance of three aspects: (i) the way in which the characteristics of cultural heritage are understood, treated and integrated in terms of intrinsic fragility and vulnerability to different natural hazards, especially in relation to cultural heritage elements of a different nature (entire buildings rather than individual monuments or containers of goods, such as a museum, and individual works of art); (ii) the type and detail degree of the necessary cognitive inputs, which show a trade-off between useful detail degrees and ease in retrieving information and between accuracy of results and greater or lesser degree of autonomy of local communities, compared to technical and scientific support, even after a training period; (iii) the processing functions already incorporated and stabilized in the tool itself, so to obtain more or less easy-to-use tools, with a greater or lesser possibility of being transferred to different territorial contexts and with lesser or greater possibility of integrating features strongly peculiar to the local heritage. As far as ATTACH is transversal to the other three tools and is the one directly related to the cultural heritage, it will be better explained in the next paragraph.

A discussion around the values and the prioritization of cultural heritage for salvaging goals: the ATTACH tool

As mentioned above, the choice to strongly highlight the concept of a salvaging priority list was a very important conceptual step within the project. In fact, it is the key tool to support decisions, the careful construction of which requires a series of fundamental steps, especially in relation to the necessary adherence to territorial specificities. The subsequent integration of the list into the guidelines specifically dedicated to cultural heritage in the planning instruments also contributes to increasing the community's perception and awareness not only of the presence itself of a cultural heritage to be protected but also of the different values incorporated in it. Finally, it is important to underline the fact that the priority list tool was accepted, in conceptual terms, by all the competent subjects and stakeholders involved during the work phases of the project. An approach that demonstrates the importance attached to the availability of more structured and scientifically based information and knowledge tools, to address the decision making (the prioritization of cultural heritage components to be salvaged) and strengthens its acceptability towards communities.

The objective of the project obviously could not be to directly question the values of cultural heritage as such. Instead, it was a question of understanding how to assume and treat the intrinsic values of cultural assets understood as the result of two main contributions: the attribution of value given by institutions and experts, competent in the field by role, studies and

experience, and the perception of value that every good assumes for communities and peoples in terms of identity, history and traditions (De la Torre, 2002). Considering this assumption, the project partners, together with experts and stakeholders at different territorial levels, worked on identifying a method of evaluating cultural assets that led to associating each asset potentially exposed to natural hazards with a functional value for the definition of the priority list. This concept of value was developed and understood, within the project, as a product of the comparison between judgments and evaluations of the different subjects and stakeholders who participate in the decision-making process, also integrating the basic elements defined by the regulations in force on the subject of cultural heritage: the first elements of the heritage to be saved are those that have the greatest overall value based on a concrete need for intervention in the face of potentially destructive events.

The methodology was developed considering an evaluation process that takes place mainly in peacetime and in which participants are comfortable sharing their know-how, skills and assessments regarding the set of values integrated into each element of cultural heritage considered. The main tool that incorporates this part of the evaluation process is ATTACH. The tool is presented in the form of a spreadsheet which contains both the cognitive data on local cultural heritage and the categories and evaluation criteria necessary to implement the process of defining a list, ordered by value, of cultural heritage exposed to natural risks in a specific territorial area. An evaluation, as already underlined previously, only functional to the necessary definition of rescue priorities. The value of cultural heritage is captured through a system of different types of values and to some degree adjusted to fit the specific social and ecological circumstances of the Alps. This adjustment is obvious from the list of different types of values, which is to comprehensively outline the total value of the cultural heritage asset. It consists of seven types of values, which are presented in figure 3 (Japelj, Dizdarević, Pesaro and Crotti, 2022).

The work of the evaluation group begins with the attribution of weights to the different value categories mentioned above. Subsequently, for each element of the cultural heritage that one wishes to evaluate, each participant proposes their own evaluation, associating the different categories of value to the asset to varying degrees, on the basis of their own knowledge, role and experience and in the awareness that the process assessment is functional to rescue activities in the event of disasters. All the values thus defined by all the participants are inserted into a spreadsheet with predefined functions and give rise to a score which is attributed to each asset evaluated and which therefore indicates its position in a ranking which represents the first step for the realization of the rescue priority list. One of the most relevant aspects of the method concerns the fact that

Type of value	Definition
Evidential value	Potential of the cultural heritage unit to yield evidence of past human activity (physical remains, written records, archaeological deposits, etc.).
Historic value	Relates to the ways in which past people, events and aspects of life can be connected through the cultural heritage unit to the present. This type covers several aspects such as an illustrative dimension indicating whether it illustrates something particular or distinctive, associative meaning referring to whether the asset relates to a notable family, person, event or movement, and historical importance depicting the historical period which it originates from.
Aesthetic/artistic value	Relates to ways in which people draw sensory and intellectual stimulation from cultural heritage assets either as a result of conscious design or the seemingly fortuitous outcome of the way in which cultural heritage has evolved and has been used over time.
Communal value	Derives from the meanings of the cultural heritage asset for those who relate to it or for whom it figures in their collective experience or memory. Communal value refers to three aspects such as the symbolic meaning of a place for those drawing their identity from it or having emotional links to it, social importance of places people perceive as a source of identity, distinctiveness, social interaction and coherence, and spiritual value, which emanates from the beliefs and teachings of an organised religion or reflect the past or present-day perceptions of the spirit of the place.
Economic value	Derives from the potential of the cultural heritage asset to produce financial dividends for society as a result of direct or indirect economic activities connected to the use and function of the cultural heritage asset.
In-use/fruition value	Relates to the fact that an asset is accessible/open to the community and used rather freely.
Scientific/educational value	Derives from the asset having information or data that (might) contribute significantly to scientific research and academic studies.

Fig. 3 - Types of values used in the ATTACH approach. Source: Japelj, Dizdarević, Pesaro and Crotti, 2022

the evaluation categories and their related weights were shared with and between experts, competent subjects and territorial stakeholders. For this reason, the working groups must be as large as possible, in order to integrate the disciplinary approaches and contributions, the skills and points of view that allow maintaining an adequate balance between global elements and local specificities. In this way, in addition to obtaining a process based on a clear scientific contribution, because it is based on scientific criteria, repeatable and transferable in different contexts, it is possible to integrate a multiplicity of local instances, with different degrees of importance rendered through the association of different weights. The next step consists in cross-referencing the list of cultural assets, ordered by functional value, with the natural hazards they are exposed to.

Conclusions

The topic addressed within the project proved to be highly relevant and produced a lot of interest among the territories and subjects involved during the three years of activity. The fact that the work

focuses on the emergency and salvaging phases, that is, on a set of interventions and operations to be developed in real time on the basis of decisions that require the maximum possible cooperation and sharing, has certainly counted, but the attention to territorial aspects has also played an important role. The inclusion of the territorial dimension was one of the distinctive elements of Cheers, in which the partners worked not only with the aim of producing an evaluation methodology, tools and guidelines valid for application in multiple contexts but also in order to highlight the relationships with the territories in all phases. What emerged was a set of products and results characterized by a "territorialisation approach" which accompanied the reasoning, development and application of the tools and was oriented by objectives and needs of a mainly cognitive nature.

A first element of this approach refers to the need to better understand the Alpine cultural heritage as such, immersed in a territory characterized by natural dynamics and events which put its conservation at risk but which are also, in many cases, one of

its distinctive elements. A second element focuses on the need to better connect territorial knowledge belonging to subjects and areas of attention which, although different from each other such as natural hazards and cultural heritage, must be adequately integrated into territorial governance policies, which obviously also include the organization and management of rescue activities. A third element concerns the need for greater preparedness for emergencies by the territories as a whole, given the fundamental contribution of the knowledge and organization of the territory to support and make cultural heritage salvaging operations more effective, which for people and essential services come immediately after importance. Finally, the activities brought to light one last important aspect, linked to the relationship between local and over-local, expressed differently in the different countries of the Alpine area. In Italy, for example, the role of public bodies at a national level competent in the field of cultural heritage is particularly strong even in the case of emergency management at a local level. The same in Switzerland, where the cognitive and cataloguing activities of cultural assets exposed to hazards were carried out as part of a national initiative. In other countries, such as France, the situation appears completely different and the Cheers project, to some extent, contributed in highlighting the need for over-local level indications and guidelines to better orient local level activities when cultural heritage is involved.

Another important need considered in the project was that relating to the development of tools capable not only of incorporating but also of stabilizing the exchange of knowledge and skills necessary to strengthen decision-making processes. This despite disciplinary approaches and cultural references of different origins and in fields as distant from each other as the protection of cultural heritage and the knowledge of natural risks can be.

Finally, the partners worked so that local actors could directly benefit from the scientific and technical work developed by experts without giving up the complexity that characterizes them. Expert knowledge and complex links cannot and must not be overly simplified, even with the aim of making them more easily usable directly by communities and territories. For this reason, the project has developed a methodology and a set of tools useful for resolving complexity without losing track of the necessary technical and scientific contents. For this

reason, their functioning is based on characteristics that make them more accessible and easier to use in different contexts and moments of decision-making processes, for example with the incorporation of information and evaluation algorithms into spreadsheets developed by researchers. Furthermore, the proposal of three tools for assessing vulnerability and fragility allows you to choose the best combination in relation to the resources available to the different territories.

The results of the whole of the project activities cannot lead to the protection and conservation of all sites and assets involved in natural disasters but they can certainly contribute to mitigating the impact of natural events on the Alpine cultural heritage.

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2.6 Meta-Producing Cultural Heritage Resources

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Introduction

In the rapidly evolving context of the digital era, the challenge of preserving Cultural Heritage (CH) assets while simultaneously adapting them to meet the dynamic demands and needs of urban environments has gained significant prominence.

The paper introduces the “Meta-factory” project, an innovative and multidisciplinary initiative that received an Honourable Mention at the Architectural Competition for the redevelopment of Ladopoulos paper company in Patras organized by the Region of Western Greece. Focused on repurposing the industrial complex, this project exemplifies a holistic approach to addressing the multifaceted issues of CH asset reuse, sustainability, and the preservation of urban collective memory.

The “Meta-factory” project aims to revitalize the Ladopoulos industrial complex, a site of significant architectural and CH value, by harnessing digital technologies and creative production. By doing so, it aims to facilitate the meta-production of cultural assets, transforming them into new material and immaterial resources available for reuse within the Creative and Cultural Industries (CCIs). Simultaneously, this proposal envisions the creation of an urban, mixed-use hub where innovation, high-quality products and services can ensure a dynamic and sustainable evolution for both the city and the region. The paper delves into the comprehensive framework of the “Meta-factory” project, analysing its conceptual foundations, the diverse array of resources it aims to preserve, and its multifunctional components. Furthermore, it explores the significance of maintaining the productive scope of the complex, emphasizing the importance of resource

preservation alongside fostering new uses and user engagement. Economic sustainability is also a focal point, illustrating how this creative hub can serve as a nexus between cutting-edge research and artistic creation, catalysing novel activities and high-value products while supporting and facilitating the local economy.

In conclusion, this paper outlines the need for preserving and valorising CH assets, showcasing how the “Meta-factory” project exemplifies a sustainable approach that not only revitalises urban spaces but also contributes to the creation of novel cultural and creative industry products. By addressing these key aspects, the “Meta-factory” provides a model for fostering innovation, sustainability, and the enduring legacy of Cultural Heritage in urban contexts.

Theoretical background

Digital technologies are altering traditional categories and concepts, which succumb to the fluidity of a rapidly changing world (Mantzou 2017). This new condition poses important questions and challenges regarding the preservation and reuse of Cultural Heritage assets, material and immaterial; practices of the past become obsolete, and novel perspectives offer opportunities for dynamic and sustainable development (Bitsikas et al. 2022, Della Spina 2020; Foster & Saleh 2021).

The theoretical foundations that underpin the “Meta-factory” project emphasise the integration and adaptive reuse of CH assets, especially those linked to the industrial past, sustainability principles, and preservation imperatives in the framework of the concept of “meta-production” (Bourriaud 2006). Bourriaud’s concept of utilising existing cultural materials and reinterpreting, recontextualizing, or remixing them to create new forms of expression resonates with the “Meta-factory’s” approach, as it underscores the importance of repurposing and reimagining existing cultural resources with the use of digital technologies. The “Meta-factory”, in embracing the notion of “meta-production”, can be seen as a dynamic space where cultural assets are not merely conserved but moreover, employed and transformed. It becomes a hub where historical memory integrates with cutting-edge technology, where the past is post-produced into the future. This conceptual synergy enhances the proposal’s capacity to generate innovative and relevant cultural products within the context of sustainable urban regeneration.

Additionally, this adaptive reuse of CH assets is driven by the sustainable and efficient utilisation of Cultural Heritage, aligning with contemporary sustainability goals (Plevoets & Van Cleempoel 2011; Salerno 2020). Adaptive reuse is increasingly recognized for its multifaceted benefits, encompassing economic, social, and environmental dimensions, as it catalyses regeneration and stimulates tourism, fosters a sense of continuity and identity and miti-

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gates the environmental impact of new construction (Claver et al. 2020; De Gregorio et al. 2020).

Industrial complexes, once hubs of production, often fall into disuse and disrepair as a result of de-industrialisation. Their redevelopment presents a unique challenge and opportunity (Gustafsson & Mellar 2018). The “meta-production” of industrial complexes can regenerate declining urban areas, ushering in new economic activities, cultural enrichment, and community engagement (Romeo et al. 2015; Ifko 2016). Furthermore, these initiatives often celebrate the architectural and CH value of industrial buildings, preserving their historical memory while adapting them for contemporary functions. This dual emphasis on historical preservation and urban revitalisation underscores the synergy between preserving CH and achieving sustainable urban development.

“Meta-production” can serve as the driving force behind sustainable urban development, aligning with the principles of continuity, evolution, and adaptation. By harnessing cutting-edge technologies and artistic creation, abandoned industrial complexes can become apparatuses of meta-production, facilitating the reproduction, transcription, and transformation of Cultural Heritage assets. This holistic approach seeks to contribute to urban regeneration while honouring historical and architectural significance and embracing the digital transformation of cultural resources.

“Meta-Factory”

“Meta-factory” constitutes an innovative project, signifying a dynamic and multifunctional urban hub that leverages digital technologies, high-end equipment, and a multidisciplinary approach to facilitate the meta-production of industrial heritage sites and cultural assets. Meta-factory preserves, reforms and reuses the building stock but also its functionality and therefore opts for sustainability and innovation of both material and immaterial heritage assets.

THE LADOPOULOS COMPLEX

The Ladopoulos Complex in Patras, Greece com-

prises industrial buildings and structures, with the majority possessing substantial architectural and historical significance. Their condition is rather good despite the years of neglect, meaning that they can be maintained without excessive financial burden for their restoration. Additionally, the complex encompasses a theatre building, a later addition, and a spacious outdoor area, the result of demolishing the complex’s old warehouses.

The historical memory embedded within the Ladopoulos Paper Industry complex assumes a pivotal role. This complex bears not only the historical imprints of Patras but also of the Greek industry at large. During its heyday, it was the largest paper industry in the Balkans, employing a substantial workforce. Preserving the memory of this space is intrinsically tied to its historical function as a productive hub that engaged numerous individuals. The complex’s historical memory is charged with the characteristics of production and innovation, reaching even international levels, through its pioneering utilisation of contemporary technologies during its operational prosperity.

A noteworthy aspect pertains to the strategic location of the complex, situated on the outskirts of the city and adjoining the port, a vital gateway to both Patras and Greece. This locale affords the complex a vantage point offering panoramic views of the sea, although direct access to it remains limited. Furthermore, the complex establishes a symbiotic relationship with the ongoing revitalisation efforts within the Coastal Front of Patras with the potential for extension should a seamless connection be established. Currently, the complex’s connectivity to both the city and the Coastal Front of Patras faces constraints, mainly due to the absence of appropriate infrastructure, particularly for pedestrians, cyclists, and public transportation.

The broader area holds considerable significance, as it encompasses additional notable industrial complexes that may, in the future, facilitate synergistic interconnection under a unified approach. Such an approach, combining diverse uses and harnessing the potential

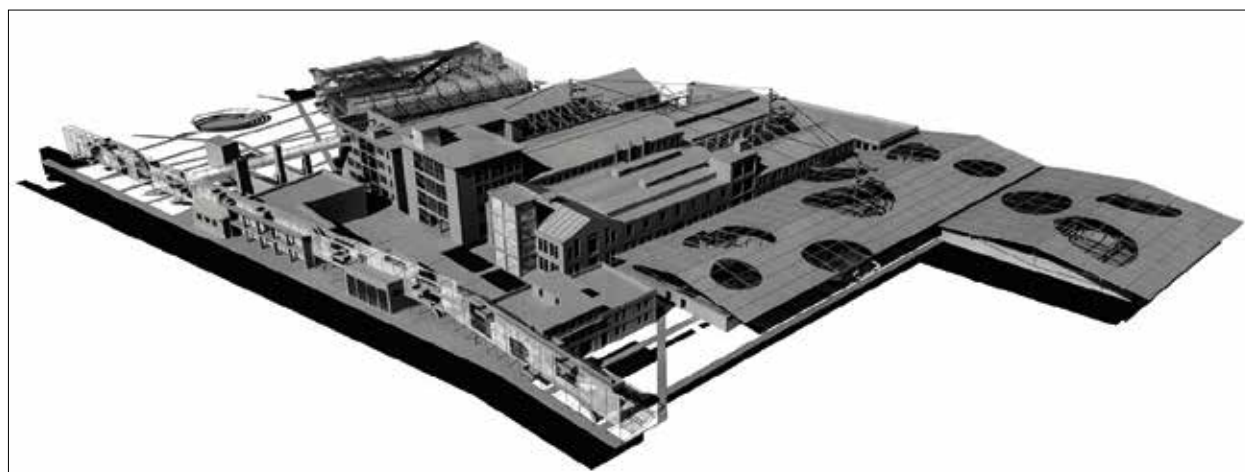


Fig. 1 - General view of the “Meta-factory” project.

of repurposing industrial structures, can transform the entire area into a developing zone. This is important not only for the city's productive and economic vitality but also for its cultural enrichment, educational advancement, and tourism development.

AIMS AND OBJECTIVES

The specific objectives set forth by the Architectural Competition organized by the Region of Western Greece constituted the fundamental questions that the proposal endeavoured to address, such as the preservation of historical memory, the promotion of the complex's productive heritage, the creation of a supra-local node and the empowerment of local and regional economy.

The integration of historical narratives and the preservation of historical memory emerge as primary imperatives. These imperatives are driven by dual considerations—the architectural significance inherent in conserving industrial heritage and the profound socio-economic role that the paper industry played for the workforce, the city of Patras, and Greece. In line with these imperatives, the proposal, through its strategic planning for the complex's utilisation underscores the paramount importance of its productive heritage. It advocates for a meta-production paradigm that seamlessly aligns with the complex's inherent characteristics and the evolving demands of the digital era.

The design is extroverted, centring around the establishment of a node capable of garnering interest not only at the local level but also transcending geographical boundaries. Within this paradigm, the proposed uses are characterized by their diversity and multifaceted nature, forging interconnected fields encompassing culture, production, research, technology, economy, and product promotion, alongside residential, recreational, and leisure aspects. This cohesive blend of functions fosters not only sustainability but also a dynamic evolution of the hub.

Finally, emphasis is placed on harnessing the potential to support the local economy. Central to this en-

deavour is the establishment of a creative hub, strategically positioned to draw upon cultural tradition and to effect its transformation. This transformation is envisioned through collaborative partnerships and cooperation with the University of Patras and the broader regional stakeholders. Together, these entities aim to drive research, and artistic expression, foster technological innovations, and stimulate the creation of products that possess the capacity to support the Cultural and Creative industries within the region.

PROJECT'S CONCEPTUAL FRAMEWORK

The proposal focuses on the concept of reuse, the importance of preserving historical memory, and the opportunity to create an open to the community, urban hub, designed for hybrid use and dynamic development. The industrial buildings of the complex as well as the historical memory of the production area are important resources that must be preserved but also have to be related to new needs and possibilities. The conservation of resources concerns the building infrastructure, the site memory but also other resources such as energy, or even more abstract resources such as views or free, common space. The intended conservation is related to continuity, which presupposes evolution, perspective and change, characteristic features of sustainable strategies.

Furthermore, the proposal is based on the integration of new elements into the existing old ones, fostering the coexistence of diverse functions that complement each other. In this context, multiple functions interconnect and interact, whether by deliberate design or through organic convergence. The proposal favours a course that is fluid, dynamic, and adaptable to evolving needs and circumstances rather than a rigid, meticulously controlled environment. A series of "new elements" are used for this purpose, which have an opposing but complementary correlation with the existing built environment. These elements act as filters and relationship regulators, analysed at different levels. Their common organization creates a unified approach but at the same time, the many

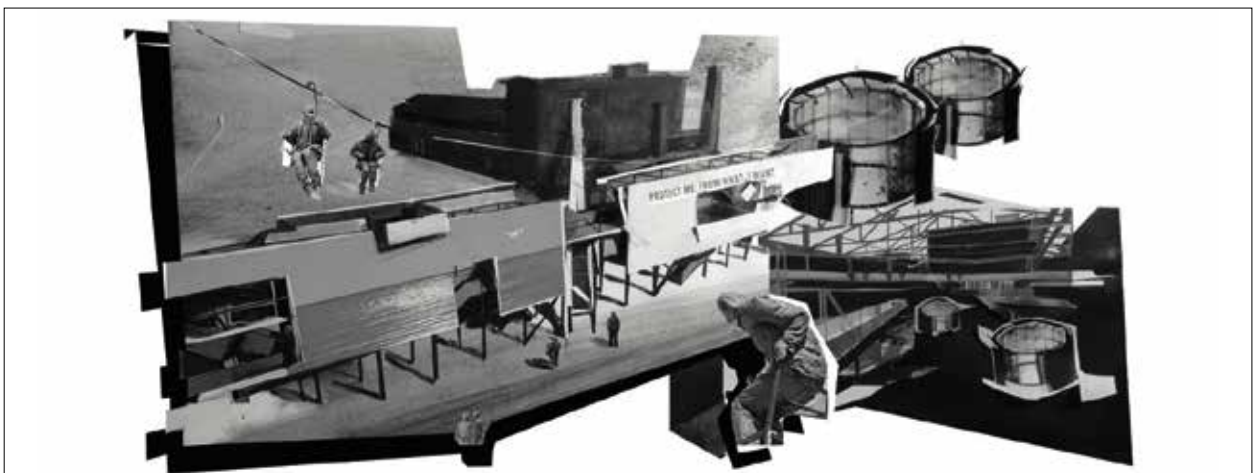


Fig. 2 - Conceptual drawing of the "Meta-factory" project.

different combinations of the distinct levels allow their flexibility and adaptation to the different requirements for each element at each point.

As a result, the project maintains production as its main use. Specifically, it is proposed that the complex host a productive activity that, by using contemporary technologies and appropriate equipment, fits into the logic of the digital meta-production of cultural resources. The reproduction, transcription and transformation of cultural resources lead to the creation of new, immaterial or material elements offered for use by CCIs. Beyond this main use, a series of other uses are proposed which support and feed each other to create a multifunctional hub.

The hub is not limited to the main use of meta-production but includes administrative support, promotion and commercial exploitation of the produced goods and services, educational structures, exhibition spaces, a framework for supporting the creative community (creative hub), multi-purpose spaces, temporary informal housing and forms an integrated business ecosystem. The flexible and effective cooperation as well as the dynamic interaction and continuous feedback of the different fields, research, technological, artistic, educational as well as promotional and commercial are a prerequisite for the successful operation of the business ecosystem. Its connection with the area of Patras is also an important element for the proposal because such a pole can mobilize and utilize

the human resources of the region and also attract interest at a supra-local level, both in relation to human resources and by attracting business, economic and even touristic interest.

At the level of environmental principles, design intervenes to regulate and improve the management of energy resources. A network of green elements finds its place in, around and above various spaces, with green constituting a multifunctional filter for the new elements proposed, improving the microclimate of the plot. Water is another way to improve the bioclimatic function of the complex and the microclimate. In the same logic, various surfaces, mainly horizontal or slightly inclined, welcome solar systems, in order to limit the energy needs of the buildings.

PROPOSAL DESCRIPTION

The core design concept revolves around the preservation of a large part of the existing buildings and the organization of a productive unit that completes a coherent circle and creates a sustainable business ecosystem which will attract the interest of investors, researchers, employees, trainees and visitors. In the periphery of this circle are the other uses that are in contact with the basic circle but can operate autonomously. In an even more open circle are all the open spaces as well as multi-level movements, which organize the complex into a park that combines recreation, sports, games, and social gatherings, with

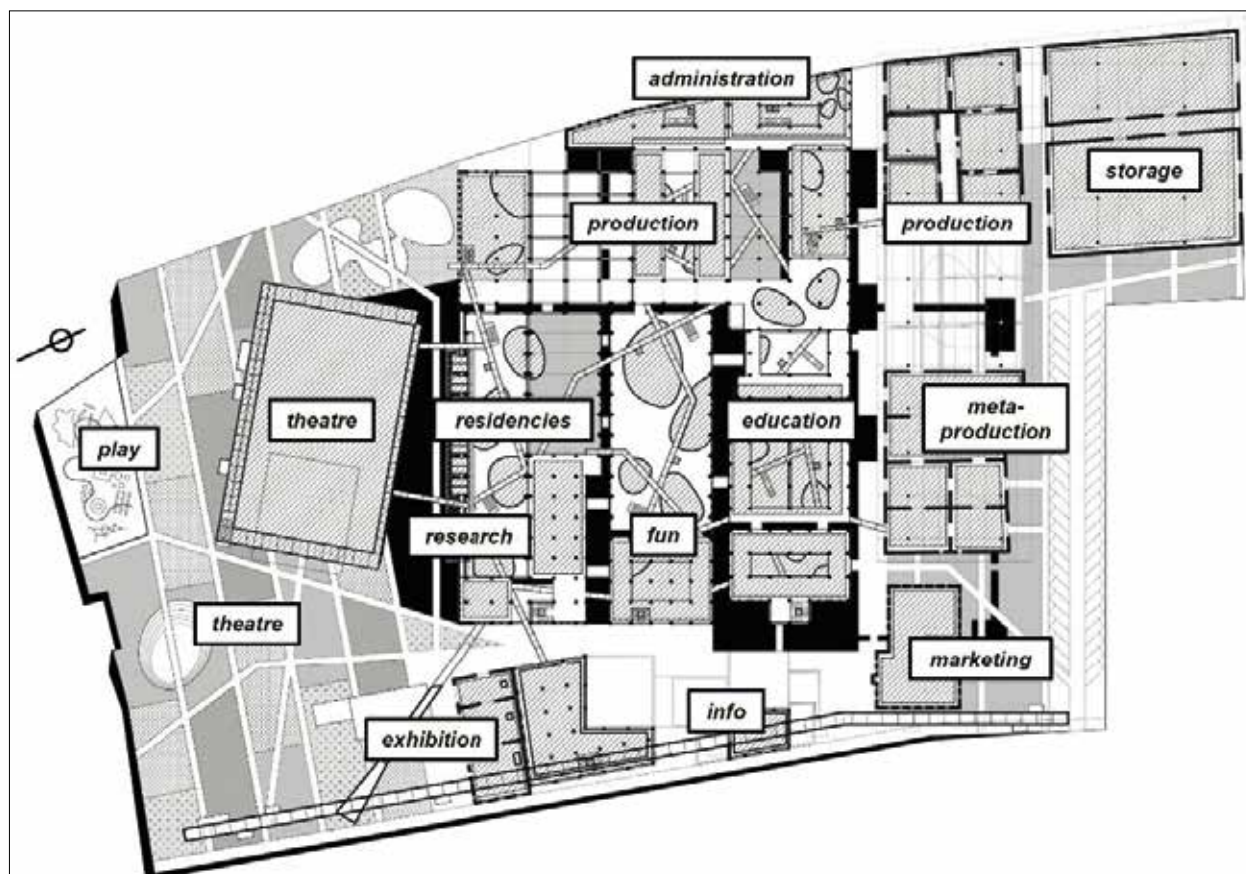


Fig. 3 - Function diagram of the "Meta-factory".



Fig. 4 - Interior views of the proposal.

purely productive, cultural, educational and economic-administrative activities. These circles work like the gears of the “machine”, which are distinct and multi-layered.

The choice of retaining the majority of existing buildings is accompanied by the decision to create a recognizable system for the new elements proposed to complement the building infrastructure. These elements involve additions from scratch, shells for existing buildings or additions to the interior. All the new elements use a common vocabulary, rely on the same aesthetic code and construction system and form a single perception that points to their shared temporal starting point. The construction typology is common but their use and location differ. This system is a filter that can combine several layers or a mediator that is decomposed into individual mediators, thus allowing a multitude of combinations and a diversity of results. In addition, this system carries a series of sub-systems such as plantings, lighting features, information and message display surfaces and solar elements.

The intention is both the piercing of the hard shell and the penetration of nature, which the abandonment of the space has already favoured. Along with the nature that enters the interior, the design supports the extension of the natural to the unused open space, which becomes a park with variations in the use and also in the configuration of its terrain. Important elements of the park are the water zones, the play area, the sports area, a gathering area and also the shifting/folding of the ground on the roof of the theatre to ensure standing with a view.

The interior of buildings preserves the atmosphere and historical memory of the factory. In some cas-

es, the roof is partially removed and exposed, in others, it is inhabited by enclosures, discrete constructions that receive equipment and processes that due to their nature cannot be exposed in the open space. These constructions are multi-layered. It is a deconstructed shell, which can combine and choose different types of permeability: metal frame, metal mesh, plants, polycarbonate plates, and metal curtains. The choice of materials is consistent with the industrial character of the space and aims to reduce the need for maintenance to a minimum. Their morphological counterpoint to the “heavy”, stony and orthogonal interior of the buildings, in which they are placed, relates them to the found space through their contrast which is underlined. Functionally, the concentration of non-public uses in the enclosures frees up the rest of the space, which in some cases is accessible while in others it is visible from above. An external shell is added to the theatre and is also treated with a corresponding construction logic. This shell serves on many levels the compositional approach of the proposal as the theatre building is a newer construction that differs from the rest of the complex. The shell is semiotically recognized as a new construction of the post-industrial period of the complex, creating an element that serves both bio-climatically and functions as a vertical plane, interacting with the horizontality of the ground of the park, and receives movement as well as standing points. The intermediate space of the shell includes stairs and ramps that lead to the roof of the theatre, which unfolds an additional ground for the function of the park, at a much higher level and with a privileged view of the sea. The same deconstructed, layered mediator mode is used here but adapted to



Fig. 5 - View of the theatre's shell.

the needs of the shell, with monitors and cameras added to its functions. The content of the projections is connected to what is happening in general in the complex and also to the movement of people in the intermediate space.

A screen-wall is placed on the facade of the complex, which also follows the same logic as the vertical part of the theatre shell and combines all the elements mentioned there as well as larger screens. On the screens, facing the port, the sea is "reflected" which at ground level cannot be seen outside the port. The screen itself is a circulation system, parallel to the street, while it is connected to an entrance almost transverse to its axis that transports the visitors to the high level of the proposal, i.e., to the roofs of the buildings or even above them. This level is an extension of the park, where one can move and have an unprecedented supervisory relationship with the wider area and elsewhere can stand or get down both in external parts of the proposal and in exposed internal ones.

The view of the sea which is generally blocked at ground level is technologically reflected on the screen-wall but also becomes visible and revealed

when one moves up through the use of a suspended system of carriages, which refers to the cranes in the port, and which serves the park even when the buildings are closed. Movement at this level, i.e., above the buildings, gives the possibility of an overall perception of the complex and also of the area in which it is located. The playful nature of both this movement and the possibility of entering the interior from above through closed tubes/slides intensifies the visitor's experience and makes it memorable. At the same time, on a level above the ground, a system of catwalks with stairs enables movement and visual perception of spaces that, due to their equipment and activities, are not accessible to the general public.

At this high level, another intervention is made. A large canopy, on the south side of the complex, acts on one hand as a unifying element for less important buildings, but also a semi-outdoor space/square that is created between them. This canopy is necessary due to the condition of the buildings but in addition, it transforms the existing situation of half-collapsed roofs into an organized and planned proposal, having holes that sometimes allow light (polycarbonate),

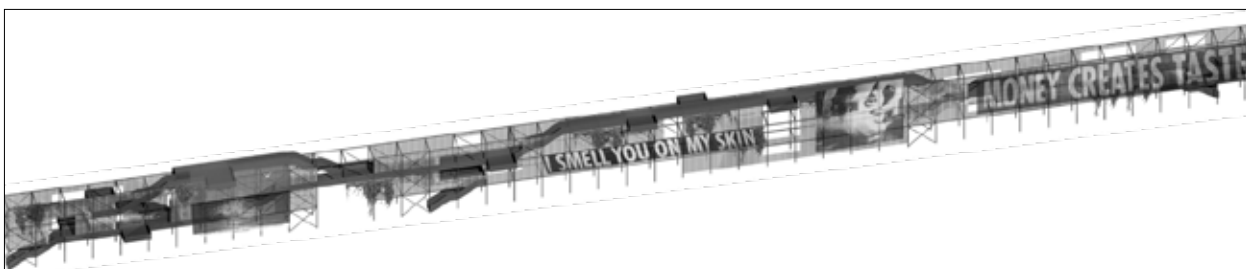


Fig. 6 - View of the screen-wall.

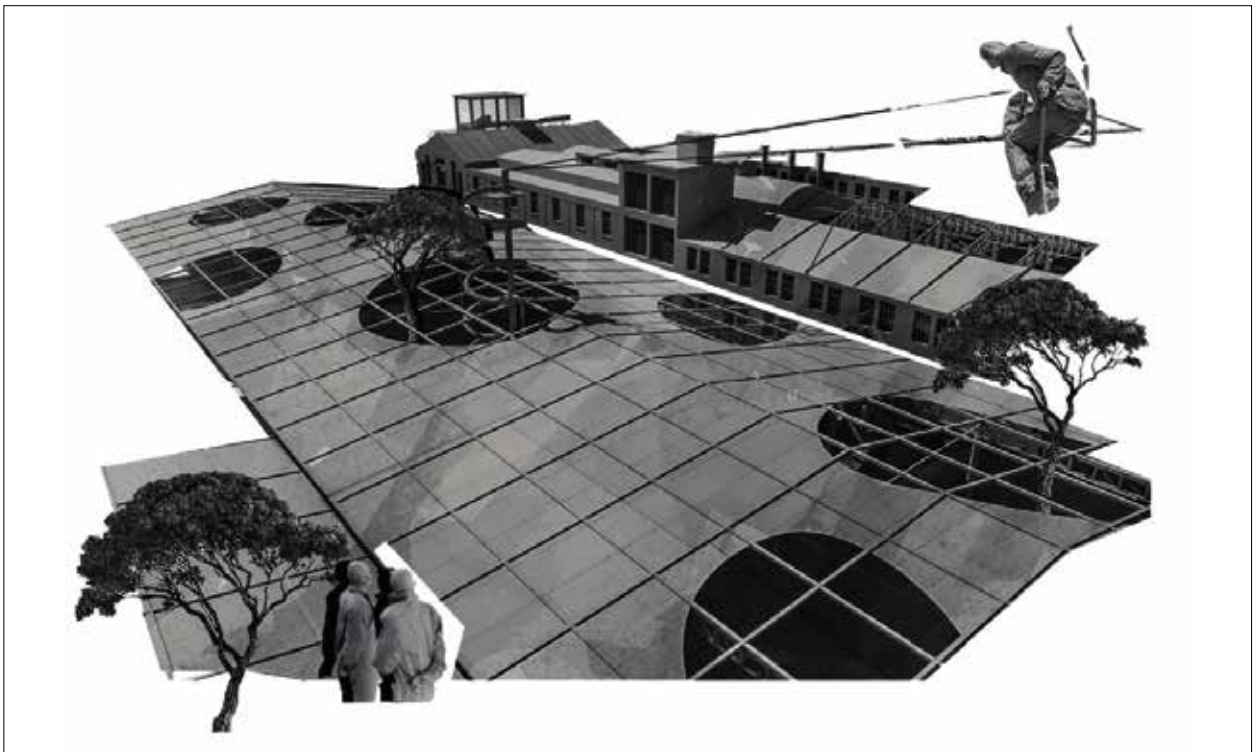


Fig. 7 - The proposal's canopy.

sometimes wind and rain but not large objects (mesh) and sometimes through them the planting rises above the canopy. In terms of energy, this canopy creates optimal conditions for the buildings below it, while solar thermal systems are also used here, to improve the energy performance of the complex.

The structure of the proposed meta-production unit is organized, as is also done in industrial units, in smaller cores. The input core includes spaces related to digitization, i.e., photography, photogrammetry and 3D scanning of small and large objects as well as researcher working spaces and meeting spaces. The core of digital processing and meta-production includes workshops for digital conservation and restoration, 3D animation, digital recording of books and manuscripts and 3D modelling. The core of production (fabrication) includes workshops for mould, glass, precision metal cutting, 3D printing, routing, Laser and water jet cutting, 3D cement printing, flat printing, foundry, large-scale stone lathe, conservation, painting, textile and additionally training/practice and multi-purpose spaces. The management & marketing core includes promotion, branding, trade, administration and public communication functions (creative hub storefront), while storage areas are also planned. Spaces more open to the public, exhibitions, gatherings, an archive, and a museum with digitized exhibits of cultural heritage but also products of the meta-production process, complete the cores. Education is also an important element as both on a general level the hub will be open to educational visits, presentations and acquaintance with the technologies but also on a specialized level there will be residencies, for further

training and gaining experience. For this reason, a small number of residences are planned, which are "suspended" and integrated into the premises of the workshops. The residences combined with the restaurant, cafe and bar as well as the functions of the park make the complex as a whole an integrated unit of production but also limited integrated living. A centre for the city and a hub for the creative community that finds there the possibility to be established and developed in relation to research, production and technology but also to meet with the wider community in relation to education, culture, recreation and daily living.

Conclusion

The "Meta-factory" project offers a comprehensive approach to addressing the significant challenges of preserving Cultural Heritage (CH) assets, promoting sustainability, and revitalising the urban public space. At its core, the project emphasises the preservation and adaptive reuse of CH assets, exemplified by the redevelopment of the Ladopoulos industrial complex.

An innovative dimension of the "Meta-factory" project is its incorporation of digital technologies, high-end equipment and manual labour to facilitate the meta-production of cultural assets. This approach represents a paradigm shift, enhancing traditional industries and aligning production processes with the contemporary demands of the creative and cultural sectors. By transforming CH assets into new material and immaterial forms suitable for reuse by CCI, the project conserves CH and positions it as a catalyst for economic growth and innovation.



Fig. 8 - The proposal's canopy.

Moreover, the envisioned urban, mixed-use hub that the “Meta-factory” project proposes, reimagines underutilised industrial spaces, fostering dynamic growth and sustainability.

However, the “Meta-factory” project is not without its challenges and limitations, including the seamless integration of digital technologies into traditional industries and the need for sustained innovation. Despite these challenges, the project holds significant promise, serving as a compelling model for urban transformation that preserves Cultural Heritage, promotes sustainability and drives economic growth. Its multidimensional approach is not only relevant to Patras but also offers valuable insights for global urban contexts facing similar complexities and opportunities.

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2.7 Game engine-based visualization of climate change hazards in heritage

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Introduction

The cultural heritage of an area is a representative characteristic of the area's traditions, culture, and evolution. For this reason, it is important to ensure the safety of cultural heritage aspects (i.e., tangible, and intangible cultural heritage). Tangible cultural heritage defined from UNESCO as the total of the cultural properties to include artifacts, monuments, groups of buildings (i.e., traditional settlements), archaeological sites, and the scope of environments as natural properties (Ahmad, 2006). Thus, tangible cultural heritage is more prone to hazardous human activities and climate conditions than the intangible cultural heritage.

Climate change is a severe problem of our era and threatens to negatively affect the tangible cultural heritage. In most cases, the climate change is due to pollution from daily human activities. For this reason, the tangible cultural heritage entities, such as the artifacts, monuments, and archaeological sites at historical city centres or near industrial zones are more vulnerable to climate change conditions due to the hazardous pollutant factors from the industrial zones or heavy transportation. These pollutant factors combined with atmospheric and environmental phenomena (e.g., acid rain, extreme heat temperature, etc.) can significantly damage the tangible cultural heritage. Thus, it is of great importance to estimate the magnitude of these factors in accordance with the atmospheric and environmental conditions and inform the public (i.e., public awareness).

The rapid development of computer graphics, game engines, and artificial intelligence provide an advanced environment for rendering, visualizing, navigating, and simulating high fidelity 3D models of archaeological sites and monuments. Moreover, the

development of automated photogrammetric algorithms like Structure from Motion permits the development of Digital Twins and Building Information Models. Thus, the combination of the aforementioned technologies along with the real-time and high-quality rendering and realistic environments, which are provided by a game engine provide a well-defined solution for visualizing, navigating, monitoring and informing the general public about the negative impact of climate change phenomena upon the tangible cultural heritage.

In this work, we propose a methodology for the development of a serious game simulator, which permits to users to visualize and navigate on a tangible cultural heritage digital twin model. In addition, the simulator is accompanied by a menu, which provides a short description about the monument as well as information about several climate change phenomena (i.e., acid rain, extreme heat temperature). As a case study, we experimented with the Theatre of Epidaurus, which is a part of the Asclepius Sanctuary, located in Peloponnese region in Greece. Following the proposed methodology, we developed a serious game simulator using Unreal Engine 5 in under 72 hours, with zero cost. The whole process was based on free and open-source software and tools.

The rest of the manuscript is organized in the following sections: (a) Related Work – presenting a short literature review based on the technologies we are going to use in this manuscript; (b) Proposed Methodology – provides a brief description of our proposed methodology, including also alternative approaches; (c) Experimental Setup and Results – describes the workflow that was followed during the development of the serious game simulator and presents the serious game simulator; and (e) Conclusions – concludes this manuscript.

Related Work

The monitoring of 3D space using the technology of Digital Twins and Building Information Models has been investigated thoroughly. This technology is used widely in heritage monitoring under the term of Heritage Building Information Model (H-BIM) (López et al., 2018) for several applications. Mahami et al. (2019) propose an automated tangible cultural heritage monitoring system based on photogrammetric Structure from Motion (SfM) and Multi-View-Stereo (MVS) algorithms to build a daily model for an archaeological site of interest and compare it with previously created models indicating possible damage in the structure. Similarly, Tsilimantou et al (2020) provide a multidisciplinary documentation process for generating 3D H-BIM meshes.

Digital Twins and Building Information Models can be further extended by the interactive environment of the game engines (Kavouras et al., 2023a and 2023b), which can improve the navigation and visualization of the 3D mesh model and the surround-

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ding environment. Serious games' development for H-BIM interactivity has been proposed in some works as well. An indicative example can be the work of Fabrizio Banfi (2021) where he proposes the development a serious game based on Virtual Reality (VR) and Augmented Reality (AR) technologies to further improve the situational awareness and knowledge, which is provided by a H-BIM 3D mesh. Argiolas et al. (2022) in their work investigated, also, the development of VR and AR serious games for enhancing the educational and communicative aspects of H-BIM.

Considering the available literature, this manuscript contribution can be summarized as follows:

- We investigate the difficulty for developing a serious game simulator, using completely free and open-source solutions.
- We examine the advantages and disadvantages of generating a 3D mesh by collecting data from web-based sources like social media (e.g., Twitter, Facebook, YouTube, etc.).
- We provide in the simulator descriptive information about the monument and possible climate change phenomena, which can cause damage to tangible cultural heritage.
- Our architecture considers inclusive groups of people, who are unable to read the descriptive information due to limited or no vision, using an artificial intelligence text to audio algorithm.

Proposed Methodology

The main scope of this manuscript is the development of a serious game simulator for visualizing and navigating 3D mesh geometries of tangible cultural heritage entities (i.e., H-BIM). This can be achieved by a three-step process: (a) Data collection; (b) H-BIM Creation; and (c) Simulator creation. The first two steps are serialized aiming to generate the 3D mesh geometry and they can be repeated for producing several 3D meshes based on different tangible cultural heritage artifacts, monuments, or archaeological sites, while the third step is independent and refers to the development of the simulator using some kind of game engine programming language.

Figure 1 illustrates the architecture of the proposed methodology as described in the previous paragraph. Furthermore, the figure includes indicative examples of free and open-source technologies, software, or algorithms, which can be used for successfully executing each step. The combination of these technologies (i.e., H-BIM and Simulator) will produce the serious game simulator. Other technologies can be also included to the serious game for providing additional applicability to the serious game simulator.

The data collection is the first step of the proposed methodology and can be achieved either by web-based sources (Kavouras et al. 2023c) or on field data collection. In most cases, the final dataset will be a series of overlapping images circling

the tangible cultural heritage artifact, monument, or archaeological site. The size of the dataset depends on the complexity of the tangible cultural heritage's structure, as well as the standards about the accuracy of the 3D mesh geometry (H-BIM). Additional geospatial data (e.g., depth maps, distances, etc.) can also be collected for maximizing the detailed geometry and fidelity of the produced H-BIM approaching as possible the real geometry.

The creation of the H-BIM 3D mesh geometry can be achieved by further processing the collected dataset. This can be achieved by a variety of applications and algorithms. The photogrammetric algorithm Structure from Motion (SfM) is widely accepted in archaeology (Willis et al., 2016) for generating H-BIM 3D meshes. Moreover, free and open-source software like Meshroom can effectively solve the SfM problem, producing a basic 3D mesh geometry. Usually, this geometry contains noise (i.e., floating islands), which can be removed by further editing on a 3D software editor (i.e., Blender). The 3D software editor provides additionally several tools to further improve the H-BIM. Texture enhancement (Kavouras et al., 2023c) can be also applied by using an image editor like GIMP.

The simulator can be created using either a standalone programming language (Kavouras et al., 2023d) (i.e., Python) or a programming language connected to a game engine like Unreal Engine 5, Unity, or Godot Engine. Game engines provide the necessary tools for visualizing and navigating (Kavouras et al. 2023b) both 2D and 3D spaces, thus the development of the simulator can be achieved easier than from scratch development. Moreover, game engines provide real time and high-quality rendering systems along with build in environments for material creation and editing, and a variety of other features (e.g., particle systems, visual effects, sound effects, etc.). All these tools can be combined with the previously created 3D mesh geometry in an interactive way for maximizing the user's experience.

The combination of the H-BIM 3D mesh geometry and the simulator result to the serious game production. In this point, the serious game simulator can visualize and navigate the 3D mesh geometry. The simulator can be expanded further by the addition of several features and technologies. These technologies can include: (a) an interactive menu that provides information about the monument and the climate change phenomena that causes damage to tangible cultural heritage; (b) text to speech artificial intelligence features which permits the audio "read" of any text, making the application for everyone, including people with limited or no vision; and (c) artificial intelligent speed to input, which is based on speech recognition technology, that can help people with limited or no vision to interact with the application, without needed help from a third person. Finally, the serious game simulator can be packaged for a variety of platform, which are sup-

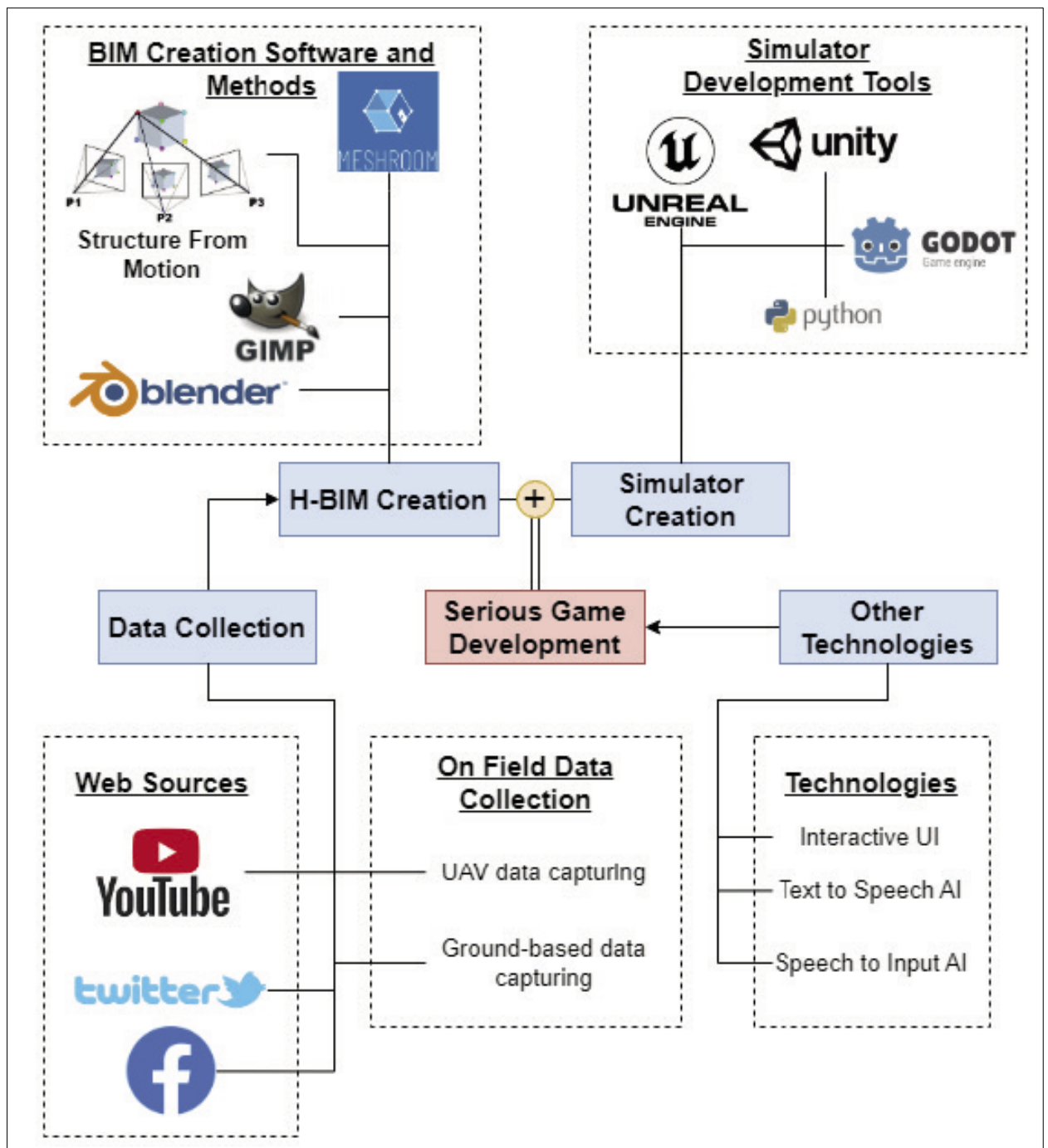


Fig. 1 - The proposed methodology architecture. The development of the serious game simulator is a three-step process: (a) Data Collection; (b) H-BIM Creation; and (c) Simulator Creation. Other technologies can be also applied to the serious game simulator for enhancing the user experience and interactivity.

ported by the game engine and distributed either online (e.g., Google Drive, Cloud Sharing, etc.) or offline (i.e., workshops).

Experimental Setup and Results

For this manuscript, the Ancient Theatre of Epidaurus, which is a tangible cultural heritage monument, was selected as the case study. The Ancient Theatre of Epidaurus (Figure 2) is one of the best preserved and most familiar monuments of ancient Greece and located on the Sanctuary of Asklepios in Peloponnese (Greece), south of modern Epidaurus (Nea Epidavros), across the Saronic Gulf from Athens (Rawson, 2005). The theatre was constructed

in the 4th century BC and is most recognized by its aesthetic and acoustic characteristics (Vassilantonopoulos et al., 2011). In 1988 it was inscribed on the UNESCO World Heritage along with the Temple of Asclepius (WHC).

The primary goal of this research is to examine the difficulty of creating a serious game simulator by following the proposed methodology, which described in previous section. The serious game simulator will be able to visualize and navigate through a previously generated H-BIM 3D mesh geometry. Moreover, the serious game simulator will include an interactive menu providing a brief description about the Ancient Theatre of Epidaurus and additio-



Fig. 2 - The Theatre of Epidauros, which located on the Sanctuary of Asklepios in Peloponnese (Greece), south of modern Epidauros. It was constructed in 4th century BC and was inscribed on the UNESCO World Heritage in 1988.

nal information about climate change phenomena that can damage the monument (i.e., acid rain and extreme heat temperature). In addition, the serious game simulator is able to support the text to speech utility based on artificial intelligence, for taking into account inclusive groups of people with limited to no vision.

The example of the case study follows through the steps of the proposed methodology as described in previous section and illustrated in Figure 1. Thus, the first two steps are the data collection and the generation of the H-BIM 3D mesh geometry. Moreover, the case study will also examine the development of the simulator by minimizing the cost to zero. This can be achieved by using web sources for the data collection and free and open-source software able to solve the Structure from Motion algorithm, during the 3D mesh creation. Note that similar results can be achieved by using proprietary closed source software as well.

For data collection, a YouTube video (Geopahas, 2021) of a drone footage over the Ancient Theatre of Epidauros was downloaded. The length of the video was 2 minutes and 14 seconds in a ratio of 30 frames per second. By further processing the video, 134 image frames were extracted, forming the dataset. However, this dataset's first and last frames were removed because they contained noise (i.e., description letters) or they didn't include information (i.e., blank frames in black colour). Thus, the final dataset was considered by 132 image frames.

The 3D mesh was produced by using the free and open-source software named Meshroom, which solves the Structure from Motion algorithm. The result of the Structure from Motion algorithm was a rather noisy 3D mesh (i.e., the mesh was rotated randomly and contained noisy geometries like floating islands, etc.). This 3D mesh was further processed in a 3D software editor named Blender, which is also free and open-source software. The postprocessing of



Fig. 3 - The Theatre of Epidauros inside the serious game simulator. The user can rotate around the monument, as well as zoom in and out of it.



Fig. 4 - The serious game simulator is further expanded by an interactive menu. The user currently can select between a short description of the monument, acid rain and extreme heat temperature options, which inform him about the monument and the climate change hazards. Text to speech is also available for inclusive groups of people with limited to no vision. In this figure it is selected the description of the monument.



Fig. 5 - Similar to Figure 4 the user selected the Acid Rain option.

the 3D mesh included: (a) The removal of the noisy geometries; (b) the correction of the rotation of the Theatre of Epidauros so that the Z-axis can be perpendicular to the orchestra (or thymeli) of the theatre (i.e., the center of the theatre); (c) the correction of the scaling of the 3D mesh to match reality (i.e., 1:1 scale factor); (d) setting the pivot point of the 3D mesh at the center of the orchestra. In addition, texture enhancement was also applied using GIMP editor, for indicating details of the 3D mesh geometry. The final 3D mesh geometry (H-BIM) exported

as an FBX file format, which is compatible with Unreal Engine 5.

The simulator was developed inside Unreal Engine 5 game engine, by using C++ programming language, which is compatible with the engine. In this prototype version, the user is able to interact with the monument by rotating around it and zooming in and out of it. Finally, the serious game simulator is completed by importing to the engine the H-BIM 3D mesh geometry and apply the simulator mechanism as well as additional features including: (a) an inte-

ractive user interface (UI) menu providing information about the monument and the climate change phenomena that can cause damage to tangible cultural heritage; and (b) text to speech utility based on artificial intelligence for inclusive groups of people with limited or no vision. In this case study, the serious game simulator is at a prototyping stage, thus only "Acid Rain" and "Extreme Heat Temperature" climate change phenomena were included.

The resulted serious game took less than 72 hours of work for its development and zero cost. Figure 3 illustrates the H-BIM of the Ancient Theatre of Epidaurus inside the simulator's environment. It is observed that the model is well approaching the geometry of the real Theatre of Epidaurus (Figure 2). However, a disadvantage of generating the H-BIM using web sources is that the UAV footage may not be close enough to the monument, thus minor details are unable to be generated on the final 3D model. In this case study, the vertical distance of the bleachers of the Ancient Theatre of Epidaurus could not be calculated due the flight height (i.e., scale of the image) (Fernández-Hernandez et al., 2015) of the UAV while capturing the monument and was rendered as a continuous slope.

Figure 4 illustrates the simulator's menu that includes the description of the monument, and the climate change hazards for the tangible cultural heritage. In this figure the description of the monument is selected by pressing the first from top button on the left side of the screen. Similarly, Figure 5 illustrates the short description of the Acid Rain's definition and its impact to the exposed stone or marble monuments or archaeological sites. Text to speech artificial intelligence added as well. This utility permits the usage of the serious game from inclusive groups of people with a variety of visual impairments (i.e., limited or no vision).

Conclusions

Summarizing, this work describes a methodology for developing a serious game simulator for visualizing and navigating tangible cultural heritage artifacts, monuments, or archaeological sites. In addition, the serious game simulator provides information about the monument, as well as for climate change hazards that can negatively affect the tangible cultural heritage. The advantages of the methodology which proposed in this manuscript are that:

- The proposed technologies are free and open source, which significantly minimizing the cost of the whole process. Paid applications can also be used as an alternative, but they are not a necessity for the proposed methodology to work.
- In less than 72 hours a working serious game simulator was developed, including the 3D mesh creation, which means that the methodology can be easily used for simulating several tangible heritage artifacts, monuments, or archaeological sites, including their descriptions and possible

hazards that can cause damage to them.

- An accurate 3D mesh can be created using web sources like social media (i.e., facebook, twitter, YouTube).
- Using artificial intelligent technology, the simulator can also be used from people with limited or no vision. This utility provides inclusiveness features increasing the number of people who can use the serious game simulator.

A minor disadvantage can be the non-rendered details of the tangible heritage artifact, monument, or archaeological site during the structure from motion algorithm due to a poor dataset. However, this methodology is still at an early stage and the developed serious game simulator is still at a prototype stage. Further research is needed, combining data and technologies from more sources for both in 3D mesh generation and in the simulator's development.

Further research can include the simulation of the climate change phenomenon to the tangible cultural heritage artifact, monument, or archaeological site. This feature in combination with visual effects provided by the engine can help to better understand the negatively impact of the climate change hazards.

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