The Role of the Economic Evaluation for an Effective Management of Cultural Heritage Assets. Case Study of a Historical Building in Arezzo (Italy)

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Abstract. Cultural heritage preservation in Italy has evolved beyond traditional conservation, emerging as a strategic approach to sustainable urban development. Historic buildings are currently considered as dynamic spaces that serve multiple societal functions, integrating social, economic, and environmental objectives aligned with the United Nations Sustainable Development Goals. Adaptive reuse represents the primary strategy for transforming abandoned structures, enabling communities to preserve historical identity while generating new economic opportunities. This approach recognizes cultural heritage as a multi-faceted resource capable of creating jobs, revitalizing urban landscapes, and supporting community well-being. This study provides a critical examination of the appropriate evaluation approaches to be implemented for the valorization of cultural heritage assets, offering a global blueprint for transforming historical properties into living, economically viable spaces that honor historical significance while meeting contemporary societal needs.

Keywords: NRRP · Adaptive use · Cultural heritage · Property valuation

1 Introduction

One of the main challenges currently affecting cultural heritage assets is represented by the increasing number of buildings that have lost their original function and are subsequently abandoned [1]. In the context of urban transformations, the adaptive reuse of existing assets has gained growing attention in recent years. This trend is driven both by the large availability of underutilized or vacant properties and by the need to identify new economic drivers for urban areas that have lost their original function and competitiveness [2]. The conservation of historic-architectural heritage requires an integrated approach that combines material restoration with economic valorization to ensure long-term sustainability. In particular, valorization aims to enhance the intrinsic value

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O. Gervasi et al. (Eds.): ICCSA 2025 Workshops, LNCS 15895, pp. 175–188, 2026.
https://doi.org/10.1007/978-3-031-97651-3_12

of cultural assets or reveal their latent potential, which is especially crucial for degraded historic buildings. This process unfolds along two key dimensions: *conservative restoration*, focused on structural and material recovery, and *adaptive reuse*, which assigns new functions to restored spaces. The selection of compatible uses is essential to ensure the economic sustainability of conservation efforts, transforming the asset from a passive object of preservation into an active resource capable of generating cultural, social, and economic values [3]. In this way, valorization emerges as a vital tool to reconcile heritage preservation with contemporary needs, ensuring its accessibility and transmission to future generations [4].

In the current economic context, the enhancement of existing real estate assets and the redevelopment of degraded urban areas represent a significant opportunity to: *i)* restore abandoned and/or deteriorated properties, *ii)* initiate large-scale urban regeneration initiatives, *iii)* stimulate local productive systems, and *iv)* foster national economic recovery [5, 6].

Cultural heritage, in particular, has emerged as a key driver of sustainable development within the European policy framework, playing a crucial role in fostering economic growth through the principles of the circular economy [7]. Its importance is explicitly recognized in the United Nations 2030 Agenda for Sustainable Development, particularly within Goal 11 (promoting inclusive, safe, resilient, and sustainable communities), Goal 4 (ensuring quality education), and Goal 8 (advancing sustainable economic growth, including cultural tourism) [8]. Conservation and adaptive reuse strategies contribute not only to preserving historical memory, but also to enhancing the quality of life and community well-being by creating jobs, conserving natural resources, and revitalizing urban areas that host heritage sites.

However, ensuring the financial feasibility of these initiatives requires innovative financing and management models. Given the economic constraints faced by public administrations, Public-Private Partnerships (PPP) have become an essential tool for the effective implementation of conservation and regeneration projects.

With reference to the different PPP procedures, all fundamentally focused on the sharing of the three core "R" components – resources, responsibilities, risk –, the enhancement concession, introduced by Art. 3-bis of the Law Decree No. 351/2001, is an effective tool able to bridge the financial deficit that characterizes the Italian balance sheets. In particular, the enhancement concession provides that the property ownership remains public for the entire duration of the agreement and the public subject resumes the full availability of the property at the end of the concession period with each improvement, addition and modification made on it by the private subject [9].

2 Aim

The research aims to develop and analyze a financial model that assesses the feasibility of enhancement initiatives for cultural property assets. To illustrate this, a case study is analyzed, that highlights the most significant aspects regarding of restoring vacant properties, specifically by examining the current dynamics and investment opportunities in Italy.

This financial model will focus on improving quality of life and generating opportunities within cultural centers by developing. It will include a business plan that is essential for demonstrating the economic return on investment for private investors.

The work is divided as follows. In Sect. 3, the reference framework related to Public-Private Partnerships is presented, outlining their key principles and applications in the context of cultural heritage enhancement. Section 4 introduces the case study, providing an overview of the selected building and the proposed redevelopment strategy. In Sect. 5, a market analysis is carried out, examining both demand and supply dynamics, as well as the potential impact on the local real estate and economic environment. Section 6 focuses on the development of the Discounted Cash Flow Analysis (DCFA), by verifying the financial feasibility of the redevelopment initiative. Finally, in Sect. 7 the conclusions are discussed.

3 Framework

Italy holds a preeminent position in the global landscape of cultural heritage preservation, boasting sixty UNESCO world heritage sites that embody an unparalleled synthesis of historical depth and natural beauty. These sites, comprising 54 cultural and 6 natural properties, constitute a complex and multifaceted patrimony of human achievement and environmental significance [10].

Despite this distinguished record, many historic assets face pressing challenges related to conservation and functional obsolescence in contemporary society. The Forget Heritage project [11] represents an exemplary initiative addressing these issues, fostering public-private cooperation models designed to rehabilitate abandoned cultural sites. By leveraging collaborative frameworks and private sector investment, such initiatives facilitate the transformation of underutilized historic buildings into dynamic and sustainable spaces that safeguard cultural memory while fostering economic development.

In this context, innovative financing and management strategies have become indispensable in urban redevelopment. In particular, Public-Private Partnerships (PPP) – structured cooperative arrangements between public administrations and private entities – have emerged as a fundamental mechanism for ensuring the viability and effectiveness of cultural heritage interventions [12].

These frameworks are predicated on contractual agreements where private entities assume responsibility for delivering public services while bearing the associated technical, financial, and operational risks [13]. These collaborative models offer multiple advantages, including:

- mobilization of private capital, enhancing investment capacity and ensuring the economic feasibility of project [14];
- balanced public-private cooperation, fostering shared objectives and sustainable intervention strategies;
- efficient property management, optimizing adaptive reuse strategies to maximize economic, social, and cultural benefits [15].

This strategic paradigm underscores Italy's commitment to preserving its exceptional heritage while simultaneously adapting it to contemporary functional and socio-economic demands. The approach extends beyond conventional conservation methodologies, reconceptualizing historic assets as active components of urban and economic regeneration. Through the integration of advanced conservation techniques, innovative economic instruments, and multi-stakeholder governance models, the Italian government has been establishing a global benchmark for the sustainable valorization of cultural heritage.

Nevertheless, adaptive reuse initiatives in the field of cultural heritage present significant complexities. From an economic perspective, these projects are characterized by high levels of uncertainty and financial constraints. From a social standpoint, heritage assets possess an intrinsic identity value, necessitating interventions that are sensitive to historical authenticity and community engagement. As a result, rigorous and transparent analytical methodologies are required to anticipate and mitigate technical, procedural, and financial challenges associated with their redevelopment.

The failure of several public-private heritage initiatives in recent decades has underscored the necessity of developing quantitative performance assessment indicators, aimed at monitoring project effectiveness throughout the duration of contractual agreements [16]. In this regard, the DCFA technique is widely employed to evaluate the financial sustainability of investments, ensuring their long-term economic viability.

Through the use of a multidisciplinary and integrated approach, the public-private partnership comes forth as a key tool in harmonizing cultural heritage preservation with the challenges of sustainable development to ensure that historical properties remain a driving force behind economic regeneration, social integration, and cultural stimulation in the modern urban environment.

4 Case Study

The case study examines the redevelopment initiative of a disused building located in the central administrative area of Arezzo (Italy). Taking into account that the ownership is public and, for the complexity of the property, the involvement of a private investor is needed, the intervention is assumed to be carried out through a PPP procedure of enhancement concession.

Arezzo is a municipality with a population of 96,535 inhabitants, situated in the Tuscany region. The property under analysis is positioned in a semi-central area of the city, specifically in the northwestern quadrant of the municipal territory, near *Porta San Lorentino*, which is historically associated with the *Porta del Foro* district.

4.1 Description of the Current State

The asset was previously utilized as office space for the municipality; however, it is currently unoccupied. The property is a monumental neo-Mannerist building located in the historic center of Arezzo. Originally commissioned in 1447 and attributed to the renowned architect Michelozzo, the palace was conceived as a symbol of status, mirroring but not rivaling the grandeur of the Medici residences. Over the centuries,

the building underwent multiple ownership changes and functional adaptations, serving as a diocesan seminary and several religious until 1935. Subsequently, it housed the police headquarters and provincial administrative offices, before being acquired by the University of Arezzo. Currently, the building is owned by the *Fondo Investimenti per la Valorizzazione (FIV)* and is used as a multi-level public office space.

The palace consists of three floors above ground and a basement level. The facade features a rusticated portal with an overlying balcony, windows adorned with kneeling consoles and curved pediments, and decorative elements in gray stone (Fig. 1). The interior is characterized by an elaborate sgraffito decoration, with fluted pilasters and ornamental motifs such as festoons and cherubs (Fig. 2).



Fig. 1. Main facade of the building.



Fig. 2. Building's inner courtyard.

The structural system is composed of load-bearing masonry, and the layout is organized around a central staircase. The ground floor includes an entrance porch, an external courtyard, multiple rooms, and service areas, while the upper floors are arranged with offices, hallways, and additional facilities, all connected by an elevator system (Figs. 3 and 4).

The basement accommodates storage spaces, technical rooms, and a heating plant. Positioned within a medieval urban fabric, the building integrates harmoniously with its surroundings, maintaining its historical significance while adapting to contemporary uses.

4.2 The Enhancement Project

The overarching strategy for revitalizing the existing building involves a thoughtful blend of preservation and innovation. The structure's external appearance will be maintained while its interior is transformed to accommodate a diverse range of uses, including a media library, offices, conference rooms, learning rooms, a gym club, commercial spaces, and underground parking (Table 1). Additionally, the facility will feature fifty residential rooms, twenty single and thirty double ones, organized into cohesive housing units. Additionally, plans include the enhancement of the underground parking facility to meet the needs of residents and visitors alike.

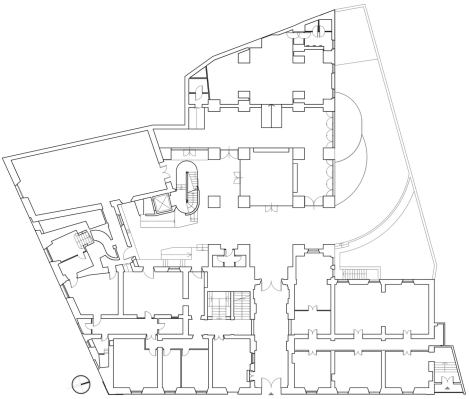

Fig. 3. Type plan of the ground floor before the redevelopment intervention.

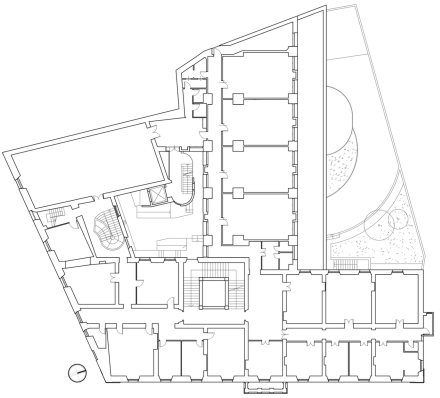

Fig. 4. Type plan of the elevated floor before the redevelopment intervention.

Table 1. Functions provided by the project and their (current and final) ownership.

Function	Current ownership	Final ownership
Student housing units	Public	Private
Restaurant		Private
Learning room		Public
Conference room		Public
Office		Private
Parking space		Public
Gym club		Private
Canteen		Public
Laundry		Public
Commercial space		Private
Space for Art & Entertainment		Public
Media library		Public

The mixed-use solution not only enhances the property's functionality, but also cultivates a vibrant community atmosphere that supports both living and learning.

This transformation aligns with the broader goal of revitalizing degraded neighborhoods, by integrating student housing with businesses and public services to create vibrant community environments.

Key strategies include: restoring buildings in harmony with their surroundings; introducing new public services; enhancing functional mixes through student residences and co-housing options; promoting social solidarity through these new functions (Figs. 5 and

6). By combining these elements, communities can foster diverse needs while nurturing social cohesion.

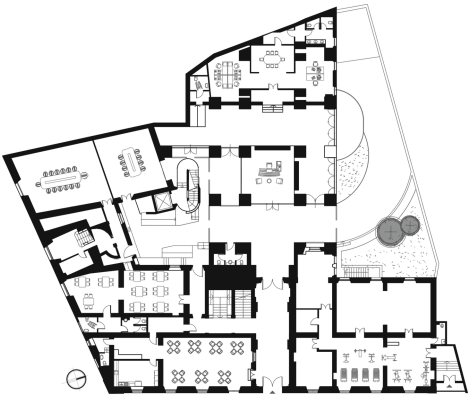

Fig. 5. Type plan of the ground floor after the redevelopment intervention.



Fig. 6. Type plan of the elevated floor after the redevelopment intervention.

5 Market Analysis

5.1 Italian Context

The Italian government has pioneered a revolutionary approach to abandoned buildings, transforming urban landscapes through innovative strategies that seamlessly integrate urban regeneration, community engagement, and economic revitalization. By developing sophisticated legal frameworks that empower citizens to collaborate directly with municipal authorities, Italy has reimagined abandoned spaces as dynamic resources rather than static liabilities.

Cities like Turin, Naples, and Reggio Emilia have emerged as laboratories for this transformative approach, implementing groundbreaking policies that convert derelict properties into multi-purpose community hubs, cultural venues, and entrepreneurial spaces. The Co-city project [17] exemplifies this strategy, enabling community-driven management that addresses broader social challenges such as urban decline and economic marginalization. By viewing abandoned buildings as potential platforms for social mixing and collaborative development, the Italian government has developed a nuanced model that not only rehabilitates physical infrastructure but also rebuilds social connectivity and economic resilience.

5.2 SWOT Analysis

The redevelopment of historical buildings presents both opportunities and challenges in fostering sustainable urban development. A SWOT analysis (Table 2) highlights key factors influencing this initiative. Strengths include the site's cultural and historical significance, its strategic location, and its potential for mixed-use development. However, challenges such as high restoration costs, regulatory constraints, and structural limitations must be carefully managed. On the opportunity side, increasing demand for sustainable urban spaces, funding possibilities, and growing interest in adaptive reuse provide strong incentives for redevelopment. Nevertheless, threats such as market fluctuations, bureaucratic delays, and the complexity of balancing modern functionality with historical integrity must also be considered.

Table 2. SWOT Analysis for the project site.

Strengths [+]	**Weaknesses [−]**
• Situated mid-way between Florence and Perugia • Mediaeval village with a unique cultural heritage • Integration of naturel elements in the urban landscape	• High Traffic (to verify) • High living cost • Poor public transport
Opportunities [+]	**Threats [−]**
• Economic powerhouse • The manufacturing of gold, tourism and services are considered vital for the local economy • Strong tourism industry	• High earthquake risks • Highly susceptible to landslide • Critical infrastructures

5.3 Demand

There is a growing need for sustainable urban environments that integrate cultural heritage into development strategies. Cities increasingly seek to enhance social cohesion, environmental sustainability, and economic growth by repurposing historical assets. This demand is driven by both local communities seeking an improved quality of life and global frameworks such as the UN's Sustainable Development Goals (SDGs), which

promote cultural heritage as essential for resilient and inclusive cities. The rising interest in adaptive reuse and cultural tourism further reinforces the demand for innovative redevelopment approaches.

5.4 Supply

The availability of historical buildings suitable for adaptive reuse represents a unique supply-side factor in this sector. Preserving these structures while integrating modern uses allows cities to merge heritage conservation with contemporary urban needs. However, regulatory constraints and the structural limitations of heritage buildings pose challenges for their adaptation. Despite these hurdles, repurposing such spaces aligns with circular economy principles, extending the functional lifespan of existing structures while reducing environmental impact. Additionally, public and private funding opportunities can support these initiatives, making adaptive reuse a viable and sustainable solution for urban regeneration.

By strategically addressing these strengths, weaknesses, opportunities, and threats, this redevelopment initiative aims to demonstrate how cultural heritage can be successfully reintegrated into the contemporary urban fabric, creating spaces that are both functional and historically valuable.

6 Valuation

6.1 Implementation of the DCFA

The financial feasibility of the redevelopment initiative has been evaluated using the DCFA [18]. For the implementation of the assessment technique, multiple key factors have been taken into account, that are essential for the enhancement of cultural assets, including the project's location, the market analysis, management strategies, and overall economic and financial considerations. Specifically, the analysis involves *i)* assessing the costs and the revenues associated with both the implementation and operational phases of the project; *ii)* calculating the cash flows generated over the analysis period from a private investor's perspective; *iii)* determining financial performance indicators to verify the feasibility of the initiative (Net Present Value – *NPV* and Discounted Payback Period – *PbP*).

Equations (1) and (2) synthesize the mathematical expressions for the calculation of the *NPV* and the *PbP* [19].

$$\sum_{t=1}^{T} \frac{F_t}{(1+r)^t} - K = NPV \tag{1}$$

$$\sum_{t=1}^{PbP} \frac{F_t}{(1+r)^t} - K = 0 \tag{2}$$

where *Ft* represents the cash flow of the investment in the period *t*, *r* is the discounted rate, *T* is the analysis period.

The financial model evaluates benefits for public administrations and private investors, identifying any extra-profit or burden for investors that can support public services. It also assesses the impact of the initiative on local communities, including the creation of new opportunities, while identifying potential redevelopment projects that contribute to community revitalization. For the analysis, as it is a multifunctional structure, semi-annual periods have been considered, evaluating a total of 60 semesters, corresponding to a payback period equal to 30 years, i.e. an ordinary timing of a concession period. The discount rate has been determined at 7.20% per year (3.6% per semester), by taking into account the ordinary expected returns in the relevant sector and the various risk factors (context, property, tenant, etc.) that are specific to the case under analysis.

Costs. To determine the expected costs, the following unit parameters have been adopted.

Fixed costs incurred by the property:

- Administrative Expenses: 2.00% of actual gross revenues, pertaining to property management costs, annually paid and variable according to the revenues. The total amount is €1,958.13.
- Provision for Extraordinary Expenses: 0.50% of the total cost of new construction for the entire property.
- Insurance: 0.10% of the total cost of new construction.
- Registration Taxes: 0.25% of the annual revenues, to be paid annually and variable according to the revenues.
- Lease Commission: 10% of the first annual revenues, as a commission on rentals for the commercialization activities of property agents, to be paid only upon formalization of the related contracts. This cost amounts to €9,790.66 and is incurred in the second and third semesters of the analysis period.
- Vacancy Rate: 2% of the annual rental fee.

Construction costs: unit cost by the square meters allocated to each function, resulting in the total construction cost. To assess the total construction costs per square meter for inclusion in the payback period table, we divide the aggregate of the total costs by the total number of square meters (2,859). This calculation yields a value of €722.90/sqm. The total construction costs amount to €2,066,880. This figure provides a clear and concise representation of the construction costs associated with the project, facilitating further financial analysis and decision-making.

Financial Charges: it has been considered that for the entire initiative, the investor activates a bank credit line at an annual rate of 6.5%, resulting in consequent differential financial charges, determined on the progressive positive cash flows, spread in the considered analysis period. The total amount corresponds to €134,347.20.

Professional Fees: these are payments made in exchange for specialized services provided by qualified individuals. The fees are equal to 9% of the construction costs. Considering all the different intended uses, the total amount is €186,019.20.

Overheads: they refers to the ongoing business expenses not directly attributed to creating a product or service, and they are assumed equal to 3% of the construction costs.

They represent any expense incurred to support the business while not being directly related to a specific product or service. The total amount is €62,006.40.

The total investment cost amounts to €2,449,252.80. By analyzing this value on a per-square-meter basis, stakeholders can gain a clearer understanding of the capital intensity of the investment and make informed decisions regarding resource allocation. Therefore, the cost per square meter is €856.68/sqm.

Revenues. The revenues primarily derive from the rental of private spaces, including residential units, office and co-working spaces, as well as commercial and restaurant areas. The rental rates for each unit, categorized by type of use, have been determined through a multi-parametric market approach, specifically applying the Sales Comparison Approach method (SCA). It is the most widely used method for estimating the market value of residential properties [20]. This method is based on the comparison between the housing characteristics of the property being valued (subject) and the attributes of similar real estate properties that are already sold (comparable properties) to determine the most likely selling price of the subject property (Fig. 7). The analysis determines a parametric cost for different types of use: €8.65/sqm per month for residential spaces, €14.47/sqm per month for office spaces, and €9.15/sqm per month for commercial areas. By applying a weighted percentage based on the surface area of each function relative to the total area, an average unit rent of €9.07/sqm per month is obtained. Considering a total surface area of 1,800 sqm, the total revenues amount to €16,317.77 per month.



Fig. 7. Localization of the subject (the biggest circle) and the identified comparables (residential ones in orange, commercial ones in pink, office/co-working space comparables in green). (Color figure online)

Results. If the *NPV* is positive, the financial threshold for the private entrepreneur will be satisfied, and the value of NPV will represent an extra-profit for the private investor over the minimum expected return on investment.

As shown in Fig. 8, the *PbP* determines the time required to recover from the initial investment, while extra-profits are expected to begin after the 24th year (total additional profits of €3,947.56). This suggests the potential for public investment while ensuring manageable costs for private investors.

Furthermore, assuming a concession period of 30 years, the project will generate an extra-profit (NPV) of approximately €313,000,000. This amount could represent an element of negotiation between the public administration and the private investor. For the public sector, it represents potential investments in public infrastructure, such as green areas and public spaces. For the private investor, it indicates an additional burden that can be managed due to the verified financial feasibility of the project.

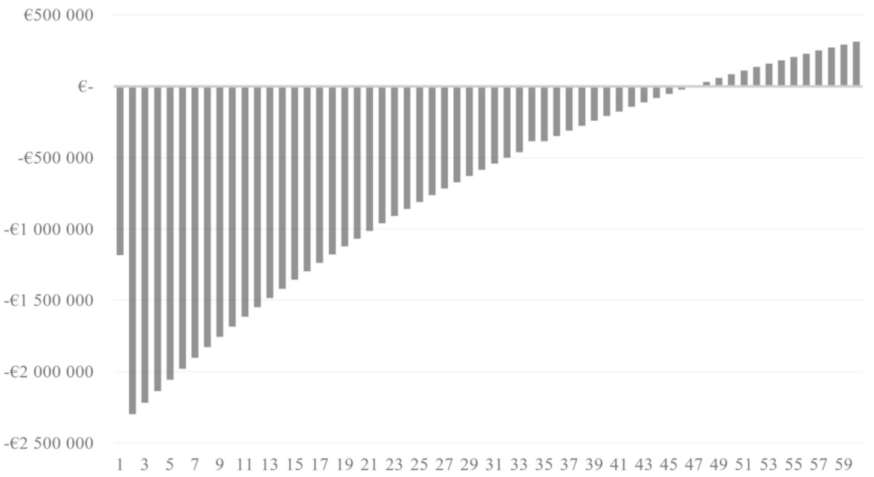

Fig. 8. PbP graph with extra-profit generated starting from the 24th year (47 semester).

7 Conclusion

The adaptive reuse of historical buildings represents a fundamental opportunity to ensure both their conservation and economic sustainability. However, such initiatives often face challenges related to the need to preserve cultural heritage while making investments financially viable. A key factor in evaluating the feasibility of these projects lies in quantifying the "added value" generated by redevelopment, which can be decisive in attracting private investors. These actors, beyond recognizing the cultural and social significance of the initiative, can directly benefit from the financial returns associated with the provision of services and the competitive advantage derived from integrating historical assets into the urban and economic fabric [3]. Moreover, when the initiative is private, the Italian Code for cultural assets and landscape (Law Decree No. 42/2004) acknowledges its contribution to social solidarity, allowing for potential public support mechanisms.

Within procedures of Public-Private Partnerships as the enhancement concession, the analysis carried out in this work has outlined the economic convenience of investing in

the adaptive reuse of underutilized historical buildings. The results have highlighted how such initiatives, when carefully planned, can generate positive financial returns while simultaneously enhancing cultural heritage and contributing to urban regeneration. The redevelopment process does not merely ensure the physical preservation of the asset but also repositions it as a dynamic space that creates economic, social, and environmental value.

The challenge is to combine the quality of design with financial convenience, by developing a new culture of projectuality and construction of these structures, that *i)* pursues how to seek innovative solutions, *ii)* does not flatten out on "empty containers", *iii)* is able to generate "win-win" initiative from an environmental, social and economic points of view.

Note. The current study has been developed within the current research P.R.I.N. Project 2022: "INSPIRE – Improving Nature-Smart Policies through Innovative Resilient Evaluations", Grant number: 2022J7RWNF.

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