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Original article

Cultural and religious heritage enhancement initiatives: A logic-operative method for the verification of the financial feasibility

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ABSTRACT

The relevance to develop effective interventions for the enhancement and reuse of the disused religious heritage is increasing. In the present research, a logic-operative method for the verification of the financial feasibility of a redevelopment project is proposed. The articulation of the developed methodological approach into six steps is explained. Moreover, the defined method is applied to a functional reconversion project related to a former church located in the city of Bologna (Italy) and to be carried out through the Public Private Partnership (PPP) operational tool. In particular, the new intended use to be introduce in the religious building is identified consistently with the current needs of the communities and by examining the reference market demand and supply at different scales (urban, regional and national), in order to define adequate uses able to respect the historical identity and past memories of the asset, to enhance its monumental forms and to become a significant new landmark for the territory. The outputs obtained from the implementation of the proposed method attest the feasibility of the initiative from the private investor point of view. In this sense, the method can constitute a useful tool for Public Administrations to define transformation sustainable strategies on the deconsecrated heritage.

1. Introduction

The complex of religious movable assets (paintings, statues, furnishings and sacred ornaments) and properties (churches, monasteries, ecclesiastical palaces, abbeys, etc.) - including not only those of the Catholic Church - is fully part of the Italian cultural heritage. In general terms, the religious assets are characterized by a specific physiognomy and are worthy of a special discipline and protection, not only for their intrinsic cultural or historical values, but also for their strictly religious meaning, both they are currently at the service of the faithful's worship, and if the original function is no longer carried out and they are considered "exclusively" monuments. In fact, the term "cultural property of religious interest" - introduced for the first time in the Italian legislation by art. 12 No. 1, par. 2 of the Agreement of 18 February 1984, which modifies the Lateran Concordat [1] - refers not only to the assets belonging to ecclesiastical bodies, but also all those that, regardless to the owners, are characterized by the simultaneous two interests presence: the first is cultural, protected by the State, as the material evidence with "civilized values"; the second is religious and, therefore, protected by the Church [2].

In the Italian context, the art. 9 of the Code of the Cultural and Landscape Heritage - introduced by the Legislative Decree No. 42/2004 [3] - regulates the protection functions that the Ministry and the Regions must carry out with reference to the cultural properties of religious interest. In addition, the Law No. CCCLV of 25 July 2001 [4], on the cultural assets' preservation, disciplines the obligation of cultural assets inventory, by prescribing rules for their conservation, integrity and safety, issuing strict norms on their sale, exports and discovery.

The need to safeguard the cultural heritage owned by religious entities - considerable for assets quantity, quality and diversification - arises essentially from the awareness that these properties are the evidence of a culture that has had a significant impact on the countries culture formation and development.

In recent years, the topic related to the enhancement of cultural heritage of religious interest has assumed an increasing relevance within the national and international scientific and public debate. In this context, the development of interventions to renovate and exploit the religious assets aimed at making their use complete and adequate should be based on the effective collaboration between the religious entities and the government, regional and municipal sectors.

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The centrality recognized in the Italian legal status to the enhancement and use activities, which are added to the protection and safeguarding of the religious cultural heritage operations, has led to a specific division of the roles between State, Regions and local autonomies, by distinguishing between the preservation functions and the recovery and use actions. In this sense, the 2001 reform of Title V of the Italian Constitution [5] has highlighted the exclusive legislative competence i) of the central State for the protection of the cultural heritage, ii) of the Regions for the enhancement of cultural and environmental heritage and the promotion and organization of cultural activities and iii) of the Municipalities for the administrative functions.

The complexity of the authorization procedures linked to the religious buildings' reuse interventions is high, mainly for the assets that maintain the religious dedication (i.e. the *holy benediction)*, although they are disused. In this sense, in the Code of Canon Law [6] a set of ecclesiastical constraints for these categories of buildings has introduced. In particular, the Canon 1222 of the Book IV – part III Title I "the holy sites" - disciplines the secular uses in the sacred buildings, by claiming that "If a church cannot in any way be used for divine worship and there is no possibility of its being restored, the diocesan Bishop may allow it to be used for some secular but not unbecoming purpose". Instead, no "religious limitation" to the future intended uses is provided in the case of disused buildings that have lost their dedication (named deconsecrated buildings). The prominent public attention to the valorization of properties in disuse collides with the caution shown by private investors to be involved in the disused religious buildings redevelopment initiatives, due to both the connected high costs and the existence of historic-architectural constraints that impose the preservation rather than an effective enhancement. Furthermore, ecclesiastical restrictions require "eminently social" new functions to be introduced in the property to be converted. This very often leads to a dilation of the bureaucratic process required to obtain the planning authorization procedures, that, in the situations in which public funds are involved, can jeopardize the respect in the timing of the expenditure of the resources allocated.

Over the years, the lack of a universal and generally shared practice to be implemented for the disused religious heritage redevelopment has led the drafting of different documents aimed at guiding the choices in these interventions. The 2018 "Guidelines: Decommissioning and ecclesial reuse of churches" [7] contain a series of practical recommendations, by inviting the ecclesiastical authorities to share decisions with the local communities, and highlight the need, before the new use definition, to study the transformation process that has determined the current building conditions, in order to evaluate the further transformations in compliance with the historical architecture and to consciously and respectfully include the reuse in a long-lasting community history. Furthermore, several studies on the sacred sites have been developed by the main advisory bodies (International centre for the Study of the Preservation and Restoration of Cultural Property ICCROM, International Council on monuments and sites ICOMOS, International Union for Conservation of Nature IUCN), mainly related to the conservation of "Living Religious Heritage" (2003 ICCROM Forum), the "establishment of an International Thematic Programme for Religious Heritage" (2005 ICOMOS General Assembly), the protection and enhancement of sacred heritage sites, buildings and landscapes (2011 ICOMOS General Assembly).

At international level, the issue of the reuse of the religious heritage is the focus of numerous researches aimed at deepening the problems connected to these building transformation interventions in the context of the regeneration policies of the built space [8–12].

In line with the defined topic, Davison and Russel [13] have underlined the advantages that could be obtained from the involvement of young people in the decision-making processes related to the development of the urban environment, in particular with reference to abandoned religious buildings. D'Aprile [14] has outlined a brief overview of the main modalities of implementing the adaptive reuse of disused ecclesiastical buildings, by showing that only a conservation approach centered on the tangible and intangible values expressed by the property can provide a valid framework for dealing with the growing redundancy of disused religious sites.

With reference to the Carlisle Memorial Methodist Church located in the city of Belfast (UK), the research carried out by McPhillips [15] in 2012 has aimed at establishing the role and influence of a disused religious building on the local identity (mainly youth one), by detecting the youth aged 11–14 are better connected to buildings that provide them with a sense of security or entertainment function (i.e. home, shops and cinema). In the context of Karpas peninsula (Cyprus), Berkay and Vehbi [16] have intended to recommend a comprehensive strategy for the architectural conservation of nine monasteries which, starting from their refurbishment, includes proposals for the reuse of buildings. The same geographical context of Cyprus has been analyzed by Ozay G. and Ozay N. [17] to discuss the topic of the reuse of the historic buildings, firstly by studying specific examples of buildings belonging to different architectural periods and converted into new uses and, then, by presenting the overall conservation approaches. Likewise, by describing three churches that have remained intact in the Karpas peninsula in Cyprus, following the conflict in 1974, Saifi and Hülya [18] have studied the relationships between heritage and conflict, by focusing on the reuse of religious architectural asset in war events that resulted in the displacement of communities. In particular, the selected case studies have pointed out the significant solution offered by the adaptive reuse to the threat of decay in the context of a prolonged conflict or with deep economic straits.

The issues related to the functional reconversion of abandoned historic churches have been investigated by Ahn [19] i) examining the sacred buildings transformed into secular ones, ii) demonstrating the relevance of public involvement in renovation projects, iii) exploring the role of building types (e.g. social/cultural, institutional, commercial, and residential) in these interventions, by means of specific space physical changes connected to the new functions.

The rehabilitation of the churches should be focused on the definition of uses solutions that respect both the original form and intended use, i.e. its initial identity. Thus, Mørk [20] has assessed different projects, to draw up a priority list based on various use options, in order to support the congregations, the local planning authorities and the heritage organizations in their evaluation processes.

In Russian context, Sedova et al. [21] have analyzed the modalities by which the urban tissue can be redeveloped through the existing cultural heritage by introducing sustainable vernacular solutions able to meet the needs of modern society. Moreover, Pizzoli et al. [22] have dealt with the question of the reuse of churches that have lost their main function, by concluding that one cannot think of an indiscriminate adaptive reuse that ignores the historical stratification but the promotion of enhancement operations capable of preserving the social role and historical value of the building should be carried out.

Currently, the need to functionally relocate disused religious buildings located in urban areas is found in different contexts and constitutes the leitmotif of several studies. Van Leeuwen [23] and Kiley [24] have clearly claimed that the best function of a historic church is its original function, by admitting the reuse of the building volume as a successful conversion strategy to avoid the irreversible demolition. In the context of the enhancement processes

of abandoned buildings, Tajani [25] has attributed a crucial role to the definition of the most appropriate intended use: in his research, he has proposed a model for selecting the most convenient method of intervention (sale or transfer in use) on the basis of the financial needs of the subjects (public and private) involved in the transformation initiatives carried out through the Public Private Partnership (PPP). In this regard, it should be highlighted that the forms of cooperation between the public sector and the private investors constitute an essential condition for the implementation of these interventions, mainly due to the current economic situation characterized by the limited availability of public monetary resources and the need to optimize the allocation of available capital, as well as the cogence to include subjects with better managerial and management skills in the redevelopment processes of public real estate assets.

In fact, Manganelli and Tajani [26] have proposed a management model of the public assets within the PPP procedures, based on the logic of Operations Research and able to identify the highest and best use solution, i.e. that which maximizes the utility functions of the parties related to the requalification of a public property.

The present research concerns the mentioned topic and intends to illustrate the financial feasibility analysis carried out with reference to a functional reconversion intervention of a former church located in the historic center of the city of Bologna in the Emilia-Romagna region (Italy).

The paper is structured as follows: in Section 2 the research aim is clarified. In Section 3 the innovative logic-operative method for the verification of the financial feasibility of the cultural heritage enhancement interventions is illustrated. In Section 4 the application of the proposed methodological approach is carried out: the analyzed case is introduced, and the current conservative state of the building and the redevelopment project are described. Then, the assumptions of the financial analysis are introduced, the costs and revenues items are reported, the Discounted Cash Flow Analysis (DCFA) is implemented and the results are interpreted. In Section 4 the conclusions of the work are discussed, and the further development are pointed out.

2. Research aim

In the present research the relevance of developing financial feasibility analysis to define effective initiatives on the built asset is highlighted. In this sense, a structured logic-operative method for the verification of the financial feasibility of the cultural heritage enhancement interventions is developed. The systematic methodological approach is applied to a proposal of functional reconversion intervention related to an Italian deconsecrated church and carried out through the PPP operational tool. In particular, following the description of the disused building and the analysis of the existing market demand and supply for the identification of targeted intended uses to be introduced, the verification of the intervention sustainability from the private investor point of view is developed through the DCFA [27,28]. Firstly, it is hypothesized that an “enhancement concession” procedure (i.e. a particular public-private cooperation tool that allows for the concession of a property owned by the Public Administration or local authorities to private subjects for a period of up to fifty years) is implemented [29]. According to the assumptions made in this analysis, the investor will bear the investment costs (for the restoration and functional reconversion of the building) and will manage the introduced activities for a period of thirty years. At the end of this period, the property will become fully available for the public entity (which will maintain ownership for the entire duration of the concession) with every improvement, transformation, addition.

3. Materials and methods

The recognition and the safeguarding of the tangible and intangible values associated with religious properties raise many debates on the modalities for these buildings’ protection and their transmission to the future, simultaneously meeting the current needs of the communities. The conservation and adaptive reuse of the disused ecclesiastical assets constitute significant strategies for transferring the knowledge, historical identity and past memories of the religious heritage.

The methodological approach for the verification of the financial feasibility of a transformation intervention on a building belonging to the cultural/religious heritage proposed in the present research is organized in sequential and ordered steps. The importance to structure the standardized logic-operative method to be followed is high, due the need to obtain rationale and valid results in terms of financially feasible enhancement initiatives.

The steps of the proposed method are listed below:

i. Description of the current state of the building to be redeveloped, aimed at analyzing the structural, esthetic and decorative features;
ii. Description of the adaptive reuse project, aimed at illustrating the main interventions to be carried out and at identifying the intended use to be introduced in the building;
iii. Explanation of the main assumptions on the main subjects (private and public) involved in the transformation initiative;
iv. Assessment of the initiative costs (investment costs and management costs);
v. Assessment of the initiative revenues;
vi. Implementation of the DCFA and determination of the main financial performance indicators to verify the enhancement project feasibility from the private investor point of view.

4. Application of the method

4.1. Description of the building current state

The disused former church of San Barbaziano is located in the historic center of the city of Bologna, at the corner between via Cesare Battisti and via Barberia, by occupying a prestigious position in the urban context. The urban area is easily accessible from any part of the city and from the main hubs, thanks to an extensive and efficient transport connection system. Fig. 1 shows the localization of the analyzed religious monument in the historic center of the city of Bologna.

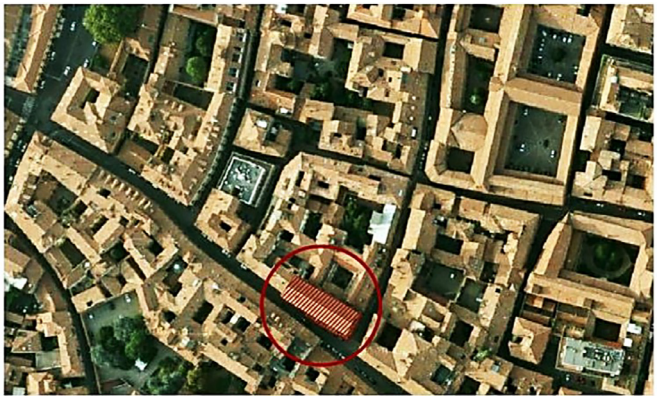

Fig. 1. Localization of the former church of San Barbaziano (in red) in the historic urban context of the city of Bologna. Source: https://earth.google.com/ Authors’ own elaboration.

Fig. 2. The former Church of San Barbaziano. Source: https://www.beniculturali.it/.

The deconsecrated church of San Barbaziano (Fig. 2) is currently owned by the Superintendence for Architectural Heritage and Landscape.

The building was built between 1608 and 1612 by Pietro Fiorini to replace the old church of the homonymous convent, considered unsuitable for the new worship requirements defined by the Council of Trent. From its origins, different intended uses have been introduced in the church: in 1797 the complex was expropriated and sold to private subjects who transformed it into a warehouse. In 1806 the parish of San Barbaziano was united with that of Saint Savior and in 1870 the property ownership passed to the military property which continued to use the building as a warehouse, also transforming it through the realization of a mezzanine. In 1947 the building was given to a private company, which used part of the surface (about 270 m^2) as a garage, while the remaining part was used as a military depot. In these years a small apartment was also built and located between the chapels on the left. In 1968 the church was designated among the national assets of historical-artistic interest and was subjected to improper use until 1994. On 11 September 2006, after several years of decommissioning and abandonment, the Superintendence for Architectural Heritage and Landscape has obtained the acquisition of the entire building from the State Property [30–32].

The church is composed of a single nave on which eight side chapels overlook (four on each side), some of which are part of the original church and incorporated into the new building.

The single nave is punctuated by three spans, of which the first and third are shorter, surmounted by a barrel vault, whereas the second one is square and is covered by a cross vault. Ionic pilasters mark the internal space of the nave, on the sides of which lower Doric pilasters are included, to support the arches for access to the side chapels covered by barrel vaults. The nave ends with the presbytery and the choir areas, respectively surmounted by a barrel vault and a cross vault on a rectangular base.

Fig. 3 shows the plan and two isometric views of the building.

Due to the long period of improper use and the several functions included in the building over time, a large number of the decorations has disappeared, and the property is currently in a very bad conservative state (Fig. 4).

4.2. Description of the adaptive reuse project

The functional reconversion of the former church of San Barbaziano aims at the introduction of a multisensory and multimedia museum in the context of the city of Bologna. In specific terms, the intervention will concern the structural consolidation, the restoration and the reuse of the building.

Due to the widespread cracking state of the property, the refurbishment and structural reinforcement of the walls and roof will constitute the first operations to be carried out. A summary of the most relevant interventions is reported below:

- Structural consolidation of the masonry in correspondence with the superficial cracks by means of injections of binder mixtures;
- Reinforced plaster with basaltic fiber mesh;
- Complete renovation of some portions of the buildings;
- Sewing of cracks using the “scuci-cuci” technique;
- Realization of the top anchorage using steel profiles of the masonry;
- Preliminary regularization of the extrados vaults and subsequent surface reinforcement;
- Repair and reconstruction of the architectural elements;
- Replacement of all the technological systems, the furnishings and equipment.
- Realization of new wooden connection;
- *Ex novo* realization of new waterproofing of the roof.

In order to identify the intended use to be introduced in the building, the analysis of the existing market supply and demand has been carried out with reference to the urban context of the city of Bologna, on an urban scale, and more generally, on the regional and national level. In particular, the demand analysis has been developed through direct (administration of questionnaires, surveys, etc.) and indirect (examination of the ordinary behavior of the habitual and occasional users of the place) investigations,

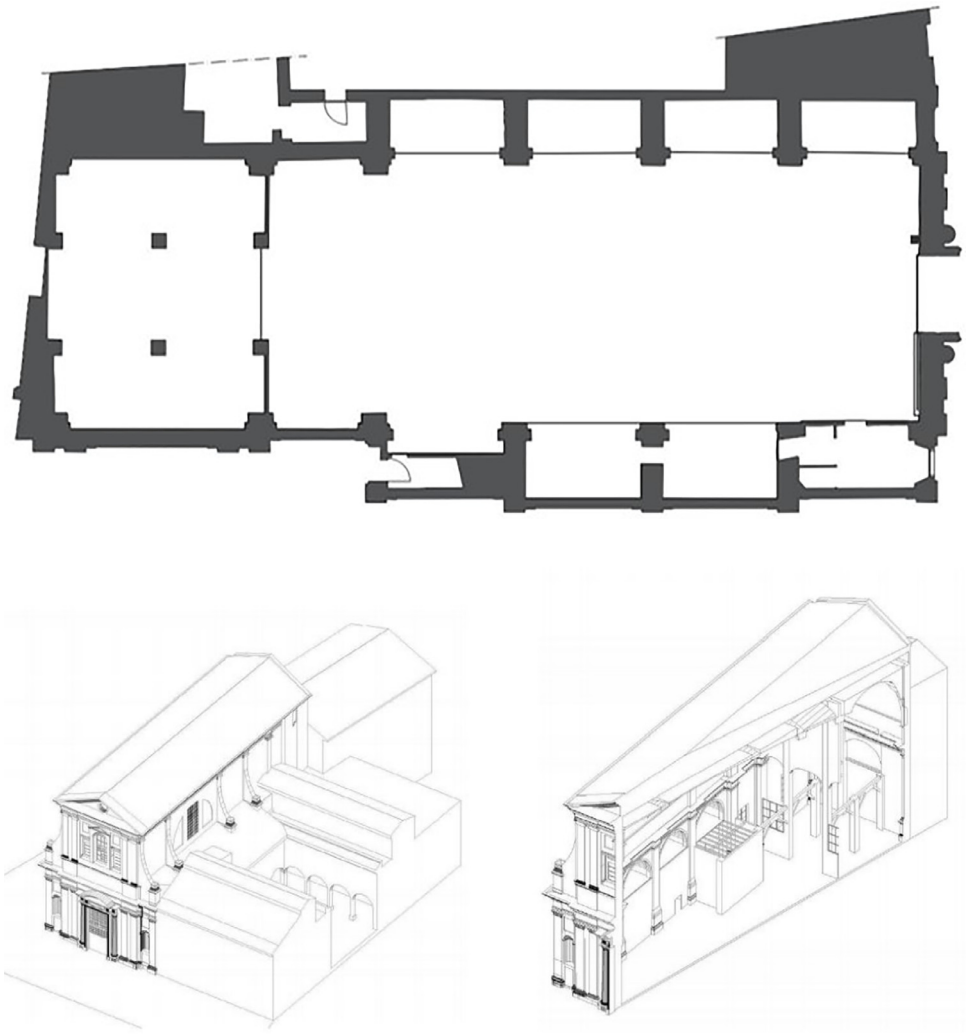

Fig. 3. Plan (up) and isometric views (down) of the building. Source: Authors' own elaboration.

to detect the main currently not satisfied and/or recent needs of the local community. On the other hand, starting from the outlined framework of needs, the analysis of the existing market supply allows the verification of the current presence of similar uses, the possible interactions between them and the impacts that the new realization (the analyzed project) could determine on the status quo. In general terms, these analyzes should lead to the definition of intended uses that are i) consistent with the expressed needs, ii) feasible from an urban planning, technical, procedural, financial and economic point of view. The functions to be introduced in the analyzed building are effectively integrated into its religious connotation, not distorting its original identity and enhancing its monumental forms.

The choice of the defined intended use (multisensory and multimedia museum) has been performed in line with the results of the developed market surveys (related to the tourist flows and the existing museum supply in the considered geographical context [33–36]) and with the structural and architectural characteristics of the building. In particular, the museum will include a permanent exhibition, spaces for temporary exhibitions on the (mainly) local artistic production of Bologna typical goods, and a tasting area for the sale of long-life food, packaged or made at the moment products.

Therefore, the museum space will allow both local communities and tourists to enjoy a new interactive experience suitable for all types of users. The intended uses to be introduced in the building are schematized in Fig. 5.

4.3. Main assumptions

The analysis of the financial feasibility of the reuse intervention carried out from the private investor (promoter of the initiative) point of view presupposes the definition of different hypotheses and the assumption of some parameters which can be summarized as follows.

In the context of the PPP procedures for the effective redevelopment intervention of the former church of San Barbaziano, the hypothesis assumed in the present research concerns the implementation of the enhancement concession procedure.

The period of the analysis is equal to thirty years, divided into four phases. In the first phase (coinciding with the first year of the analysis period) the planning, administrative and bureaucratic operations aimed at obtaining the necessary authorizations will be developed; in the second phase - regarding the second and third years of the concession -, the realization of the intervention will be carried out (construction phase). From the fourth year to the eighth one the development phase will occur in which the gradual start of the introduced functions is expected. In this step, it is assumed a development index equal to 20% in the first year of the development phase, that is the fourth year of the entire analysis

Fig. 4. The bad maintenance conditions of the internal space of the former church. Source: Authors' own photographic report.

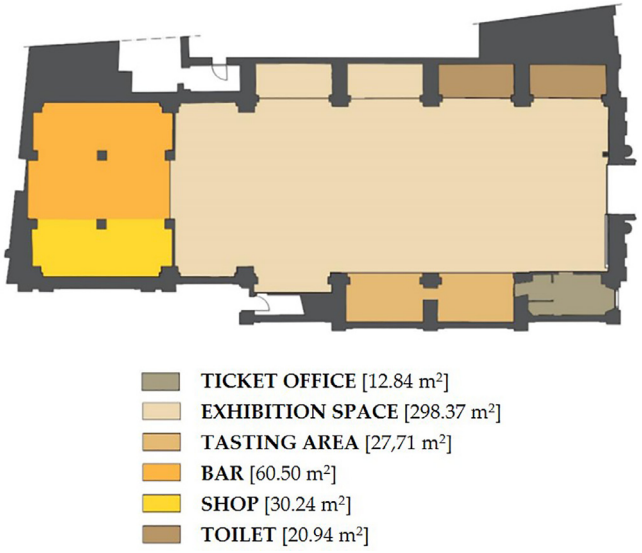

Fig. 5. Intended uses provided by the adaptive reuse project. Source: Authors' own elaboration.

period, to 40% in the second year of this phase, i.e. the fifth year of the concession period, to 60% in the sixth year of the considered period that corresponds to the third year of the development phase, to 80% in the fourth year of the development phase, i.e. the seventh year of the thirty year period, to 90% in the last fifth year of the phase, i.e. the overall eighth year of the concession period. From the nineth year, the planned activities will be fully operational and, thus, the revenues for the private equal to 100% are assumed.

In the present research, the financial analysis is carried out at constant prices, by using the current market prices in the year (2022) to which the evaluation refers.

The financial feasibility verification is developed through the implementation of DCFA. In this sense, after the costs and revenues assessment, the cash flows should be determined. Thus, the actualization operations are carry out in order to compare monetary amounts (negative, i.e. the cost items, and positive, i.e. the revenues) that occur in different times and, in their initial form, cannot be used for the financial feasibility examination. In the present analysis, the discount rate (fundamental for the actualization operations) is obtained by analogy as the sum of three components: the first represents the return that the private operator would obtain by using the capital invested for the considered transformation project into risk-free alternative investments, the second one concerns the expected inflation over the implementation period of the initiative, the last one (the third component) is related to the investor's additional compensation for the incurred risk (i.e. a risk premium for the private involved in the initiative). The first two components can be expressed by the average annual nominal rate of return on third-year government bonds, i.e. in the present case equal to 3.5% of the long-term treasury bonds (BPT) in December 2022. The third component is assumed as 2.5%, by taking into account the Bologna real estate market dynamism and the specific intervention typology: the interval [2%–3%] in which the rate of the risk premium for real estate investments ordinarily falls is considered. By the sum of the two rates (3.5% + 2.5%), the discount rate to be used in DCFA is determined equal to 6% (= 0.06). In particular, this value represents the minimum annual return rate expected by the investor and, thus, considers the risks of similar initiatives in the reference market. The riskiness of the specific intervention is analysed by consulting different reference reports, the revenues volatility, the initiative size, the reference sector in which the intervention is included, the ranking of the urban context in

Table 1
Construction costs of the considered adaptive reuse project.

Parametric construction cost [€/m²]	Floor area [m²]	Total construction cost [€]
1241.70	450.60	559,497.25

which the project is located, the "bankability" of the investment, in terms of its leverage associated to the initial capital percentage to be borrowed [37].

Furthermore, the present financial evaluation is performed without considering the impact of taxes and duties (IRAP and IRES), in order to obtain a generally valid result that is independent of the legal nature of the private operator and the consequent specific tax regime.

4.4. Assessment of the initiative costs (investment costs and management costs)

For the implementation of the DCFA, the cost items to be included in the evaluation concern the investment costs (i.e. the sum of the total construction costs and the general costs) and the management costs of the activity in its operating phase.

4.4.1. Construction costs

Given the very bad conservative state of the building (in structural, esthetic and decorative terms), a significant renovation project has been defined.

The construction costs assessment has been carried out by developing a synthetic estimate, i.e. by using the data reported in the "Building typology prices" list [38] and the price lists of public and private works, used in the Emilia-Romagna region at the time of the evaluation [39], in order to obtain a parametric cost.

All the estimated amounts have been then validated through an informal survey carried out among the main construction companies operating in the area and the reference market operators.

Given the preliminary design level to which the present evaluation occurs, it should be pointed out that the costs assessment constitutes a synthetic estimate, that will be replaced by an analytical one in the subsequent design levels, for which the technical detail degree of each project component is higher and it will allow the quantity measurement and the costs determination of all the single workings of the project.

Table 1 shows the estimated parametric construction cost, the total floor area of the building and the assessed total cost.

In the present analysis, it is specifically assumed that 40% of the construction costs amount is loaned by a credit institution. The debt capital will be returned in ten years in annual mortgage payments of a constant amount, at an interest rate of 4.5%. The assumed rate takes into account the total construction costs, the size of the borrowed amount, the financial guarantees offered by the debtor and the period of the loan and it is consistent with the interest rate usually applied for similar initiatives in the reference market.

4.4.2. General costs

The general costs category includes the items related to the technical and general expenses. The former pertain to commitments for design, work management, testing, etc. and the amount has been estimated assuming a 6% incidence on the total construction cost. On the other hand, the general expenses concern the payments for setting up the operation, the consultancies' fees, etc. and they are assessed equal to 3% of the total construction cost. Among the general costs, the financial charges include the price for the use of the borrowed capital. It should be pointed out that, both for the technical and general expenses and for the financial charges, the assumed percentages are consistent with those generally used in the analyzed geographic context.

Table 2
General costs of the considered adaptive reuse project.

General expenses	3% of the total construction cost	16,784.92 €
Technical expenses	6% of the total construction cost	33,569.84 €
Financial charges	Σ Interest payments on debt capital	59,035.51 €

Table 3
Staff salaries.

Staff	Annual unit cost [€/month]	Total annual cost for 13 months [€]
No.1 - Information/ticket office attendant	1700	22,100
No. 2 - Tasting area employees	1700	44,200
No. 2 - Bar attendants	1250	32,500
No. 1 - Shop assistant	1250	16,250
No. 1 - Security guard	1590	20,670
No. 2 - Cleaning staff	1215	31,590
TOTAL		**167,310.00 €**

In Table 2 the estimated general costs are reported.

The assessed total investment costs, defined as the monetary amounts required to start up the initiative, is equal to € 668,887.52.

4.4.3. Management costs

The management costs category includes i) insurance costs (estimated equal to 0.1% of the total construction costs), ii) the provision for extraordinary expenses (= 0.75% of the total construction costs), iii) the registration tax due on the lease (calculated as 1% of the annual rent), iv) commissions on the lease (= 10% of the annual rent to be paid as a one-time sum), v) vacancy and non-collectability (determined as 2% of the annual rent), vi) utilities services and purchase of raw materials (calculated equal to 12% of the annual revenues in full operating phase), vii) staff salaries. The management costs have been determined taking into account the operating costs ordinarily burdened by analogous activities carried out in similar buildings in size and age and by consulting local market operators.

With reference to the staff salaries, an assumption has been developed both on the expected employees' number and on their salary amount, by considering the ordinary and average wages in the national and local reference market and the Italian legislations according to the contractual frameworks.

Table 3 shows the expected management costs related to the staff salaries.

The sum of the mentioned different management cost items and the staff salaries determines the total annual management costs (estimated equal to € 201,714.51).

4.5. Assessment of the initiative revenues

With reference to the analyzed adaptive reuse project, the revenues will derive from the direct management of the museum spaces (i.e. from the sale of tickets) and from the indirect management of the spaces intended for the bar and shop (i.e. from the annual rent).

In order to assess the revenues from museum direct management, an investigation of the market supply of similar spaces in the same urban context has been carried out for the estimation of the ticket price. Furthermore, the potential annual and fully operational attendance has been determined by analyzing the average annual flow of visitors to museums located in the city of Bologna and with similar floor area. The analysis has also concerned the tourist flows trends at different scales, i.e. in the Italian context, in the Emilia Romagna Region and in the city of Bologna.

Table 4
Assessed revenues of the considered adaptive reuse project.

Revenues from direct management			
Ticket price [€/each]	Annual visitor number [n.]		Annual revenues [€]
15	20,000		300,000.00
Revenues from indirect management			
Unit rent [€/m^2 * month]	Opening period [months]	Floor area [m^2]	Annual revenues [€]
40	12	90.74	43,555.20

	PLANNING, ADMINISTRATIVE AND BUREAUCRATIC PHASE	CONSTRUCTION PHASE		DEVELOPMENT PHASE					FULL OPERATIONAL PHASE					
	1	2	3	4	5	6	7	8	9	10	11	...	29	30
Construction costs														
Building refurbishment and reuse		167,849.18	167,849.18											
General costs														
General expenses	16,784.92													
Technical expenses	33,569.84													
Mortgage payment	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44				
TOTAL INVESTMENT COSTS	78,638.19	196,132.62	196,132.62	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44	28,283.44				
Management costs														
Insurance				559.50	559.5	559.5	559.5	559.5	559.5	559.5	559.5	...	559.5	559.5
Provision for extraordinary expenses				4,196.23	4,196.23	4,196.23	4,196.23	4,196.23	4,196.23	4,196.23	4,196.23	...	4,196.23	4,196.23
Staff salaries				167,310.00	167,310.00	167,310.00	167,310.00	167,310.00	167,310.00	167,310.00	167,310.00	...	167,310.00	167,310.00
Registration tax due on the lease				435.55	435.55	435.55	435.55	435.55	435.55	435.55	435.55	...	435.55	435.55
Commissions on the lease				4,355.52										
Vacancy and non-collectability				871.10	871.10	871.10	871.10	871.10	871.10	871.10	871.10	...	871.10	871.10
Utilities services and purchase of raw materials				8,245.32	16,490.65	24,735.97	32,981.30	37,103.96	41,226.62	41,226.62	41,226.62	...	41,226.62	41,226.62
TOTAL MANAGEMENT COSTS				185,973.23	189,863.03	198,108.36	206,353.68	210,476.34	214,599.01	214,599.01	214,599.01	...	214,599.01	214,599.01
TOTAL COSTS	78,638.19	196,132.62	196,132.62	214,256.67	218,146.47	226,391.80	234,637.12	238,759.79	242,882.45	242,882.45	214,599.01	...	214,599.01	214,599.01
Revenues														
From direct management				60,000.00	120,000.00	180,000.00	240,000.00	270,000.00	300,000.00	300,000.00	300,000.00	...	300,000.00	300,000.00
From indirect management				43,555.20	43,555.20	43,555.20	43,555.20	43,555.20	43,555.20	43,555.20	43,555.20	...	43,555.20	43,555.20
TOTAL REVENUES				103,555.20	163,555.20	223,555.20	283,555.20	313,555.20	343,555.20	343,555.20	343,555.20	...	343,555.20	343,555.200
CASH-FLOWS	- 78,638.19	- 196,132.62	-196,132.62	- 110,701.47	- 54,591.27	- 2,836.60	48,918.08	74,795.41	100,672.75	100,672.75	128,956.19	....	128,956.19	128,956.19
DISCOUNT RATE	6%													
IRR	11%													
NPV	€ 477,295.06													

Fig. 6. Development of the DCFA. Source: Authors' own elaboration.

For the determination of the annual rent connected to the building portions that will be licensed for use to third parties (bar and shop), the data on the market transactions published by the Observatory of the Real Estate Market and Estimative Services of the Italian Revenue Agency [40] have been consulted. In particular, the real estate prices database - with reference to the urban micro-zone in which the former church is located, the intended use of 'shops' and the first half of the year 2022, has been examined. Furthermore, the detected average values have been validated through direct surveys of local market operators (real estate agents, notaries' offices, sales offices of design studios, etc.).

Table 4 summarizes the estimated revenue items (from direct and indirect management).

4.6. Results

In order to verify the financial feasibility of the adaptive reuse project, the development of the DCFA is shown in Fig. 6.

The outputs obtained from the implementation of the DCFA allow to attest the financial feasibility of the initiative for the private investor. In particular, the main performance indicators (Net Present Value NPV and Internal Rate of Return IRR) assessed by considering the discount rate equal to 6.0% (as indicated above) highlight the convenience for the investor to take part in the PPP operation.

5. Conclusions

The initiatives of religious buildings functional reconversion require specific cognitive analyzes (related to the property construction phases, to the used materials and techniques, to the strengths and weaknesses of the asset, to the existing decorative apparatus, etc.) [41]. These should be carried out prior to the definition of effective transformation strategies. Furthermore, the building conservative state analysis and the selection of possible new uses to be introduced in line with the needs of the community allow to clarify the potential of the existing religious heritage and to address the issue of their disuse and neglect. In the reference literature the numerous contributions focused on the reconversion of the religious heritage in different geographical contexts have attested the existence of a gap between the theoretical approaches for the transformation and management of the religious assets and the current practices, by pointing out the relevance of the integrated approach able to involve all the stakeholders (national and regional administration, Catholic Church, local governments, local

communities and the institutions for the preservation and protection of these buildings) [42–44].

The present research has been focused on the definition of a structured logic-operative method for the verification of the financial feasibility of the cultural heritage enhancement interventions. The main practical implication of the method regards the specification of the role and commitments of the parties (public and private) involved in the initiatives. The step-by-step process of the structured method could support the decision-making mechanisms for the Public Administrations (owners of the property assets to be renovated) and private investors (managers of the new uses of the property assets), by highlighting for each any critical issues and advantages. Indeed, in this typology of procedures, a "cascade" system, by which the operators interact, allows to satisfy the goals of the involved subjects (enhancement of a cultural building and positive spillovers for the communities, financial convenience for the private investors) and to share the risks of the intervention among the parties according to their specific skills and risk appetite [45].

With reference to the building to which the proposed method has been applied, future research insights may concern the application of the Cost Benefit Analysis aimed at assessing the impacts of the considered redevelopment project for the community.

Furthermore, starting from the assumptions carried out in the present analyzed case and the assessed cost and revenue items, a sensitivity analysis could be developed in order to identify the critical variables and to build different scenarios connected to the initiative risks and to the possible outputs variations, caused by unexpected shock or market demand changes. Finally, the analysis carried out could be improved through i) the development of multicriteria analysis aimed at identifying the highest and best use for the local communities, according to multiple criteria (social, environmental, cultural, employment, etc.) and by considering several project solutions, ii) the consequent construction of different "functions scenarios" and the verification of the viability for each of them.

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