Technical and Economic Evaluation of a Building Recovery by Public-Private Partnership in Rome (Italy)

Maria Rosaria Guarini, Claudia Buccarini and Fabrizio Battisti

Abstract The purpose of this article is to present the assessment procedure developed and operatively applied to verify the technical, regulatory, and financial conditions for implementing an intervention for the regeneration of a public buildings through a public/private/partnership operation. The proposed procedure aims to represent a methodological approach to support a public administration in: (i) defining the compatibility and sustainability of repurposing public buildings; (ii) proposing actual sustainable projects for private financing; (iii) assessing the soundness of the potential offers by private parties. Operatively speaking, the procedure was applied to the possibility of transforming a school (owned by the Province of Rome), located in Rome's Testaccio neighborhood.

Keywords Building recovery · Public/private partnership · Appraisal · Financial sustainability · Multi-criteria analysis

1 Introduction

Rome's historic urban fabric (as in many other Italian cities, large and small) has a large number of publicly-owned buildings that are no longer used, or are underused, because they are no longer consistent with the original purposes and/or with the needs expressed by society at large in that given local setting. At the same time, in those same urban settings, it may be necessary to locate new essential functions/services to meet the needs of the local population or of society at large.

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The repurposing of unused public buildings may present an opportunity to avoid further appropriation of land and to meet certain societal needs, as well as to implement processes to capitalize on the asset.

The chronic shortage of public resources to carry out interventions to maintain and/or capitalize on these buildings makes it necessary, more and more frequently, to assess whether to rely on forms of public/private partnership (PPP), in order not to waste this asset or lose it altogether. However, in Italy, the PPP initiatives embarked on by public administration have a high "mortality" rate; many of the concessions put up for bidding are never even awarded. The following are the main causes for this "failure" (Gori et al. 2014):

- Reliance on PPP to replace the traditional procurement contract solely so as to not impact on the level of indebtedness, or to avoid the expenditure restrictions imposed by the domestic stability pact;
- Weakness of preventive analyses aimed at verifying the actual: (i) identification of an intended use that can generate income; (ii) compatibility of the new intended use identified with the characteristics of the building and of the setting, and with the needs expressed by society at large; (iii) financial sustainability of the initiative; (iv) appropriateness of the private operator in taking on all, or part of, the execution of the project and the management of its operational phase.

The aim of this work is structure an evaluation process which identifies all the decision-making variables and benchmarks that characterize the planning and design stages upon which the quality of interventions of building recovery depends.

Hereunder, while complying with the required length of this text, a brief description is first made of the processing operations to be performed in the various phases comprising the methodological approach, followed by a narrative illustration of the results of applying the methodology to the case study: the transformation of a school building, located in Rome's Testaccio neighborhood (owned by the Province), into a youth hostel through a PPP operation, and lastly the conclusions.

2 Methodological Approach

The assessment procedure adopted to verify the technical, regulatory, and financial conditions for implementing the recovery/repurposing intervention, starting from a design idea of transforming/capitalizing a building that is or about to be unused, is organized in the following phases (Fig. 1):

1. Defining the knowledge framework (identifying, gathering, and processing the data needed to define the inputs to be considered in order to pass from the design idea to the definition of the types of intervention to be performed, and of the design solutions to be adopted) regarding: (1.1) the building being transformed/capitalized on (*Local classification/localization historical evolution and size of the building*); technical elements characterizing the building

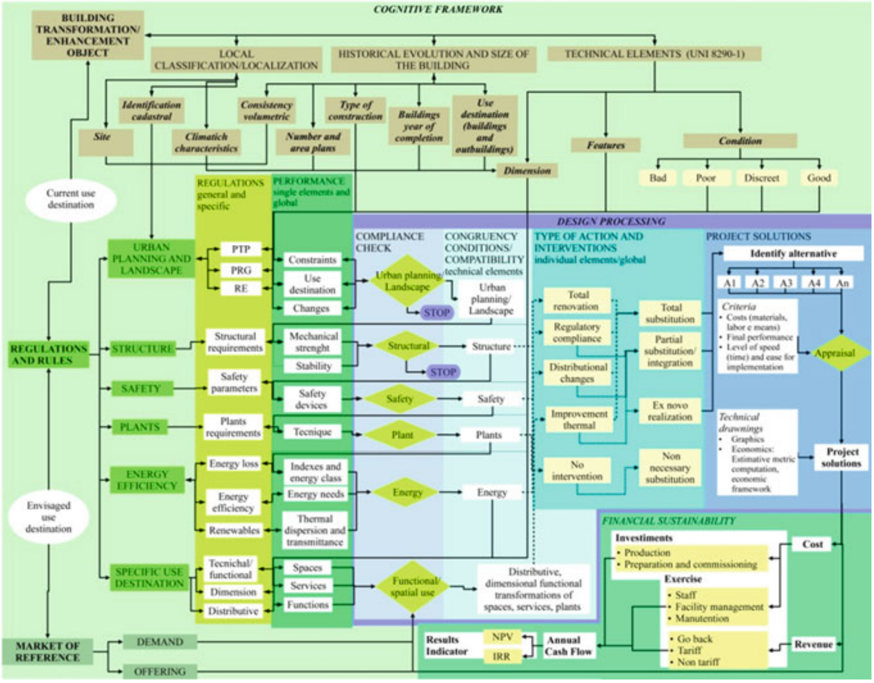

Fig. 1 Cognitive framework

(regulation UNI 8290-1.); (1.2) Provisions of law and regulations: urban planning, environment, and construction (of a general nature), structural (technical regulations for constructions), efficiency and containing energy use, supply and services systems, safety systems; assumed intended use (of the construction and specific functional type); (1.3) Market of reference: with regard to the assumed intended use, collect and analyze information on: supply and demand characteristics and basin (identify the variables explaining demand and supply), tools for quantifying the variables; historic trend of supply and demand; quantify the current needs of supply and demand (determine actual current demand and compare it with the actual current supply, quantify the imbalances and need, estimate the potential demand, estimate the potential demand potential that can be satisfied with the intervention), define the period of the project's economic lifetime (period in which the performed intervention can remain in operation without becoming economically obsolete).

2. Design processing: (2.1) assessments of consistency/compatibility; (2.2) identification of the types of actions and interventions; (2.3) definition and choice of design solutions.
3. Financial sustainability: estimate and describe the distribution of the facility's costs and revenues in the time frame of reference; define how costs are covered;

calculate the two chief summary financial indicators: Net Present Value and Internal Rate of Return (Tajani and Morano 2015).

The construction of the knowledge framework of reference is aimed at identifying and surveying the data needed to measure (with respect to the indicators) and to assess (with respect to the thresholds) the criteria to be complied in developing the design, through verifications of compatibility and consistency; the compatibility and consistency assessments give rise to indications on the types of action and intervention to be implemented for the building's renewal/recovery; consequently, after identifying the various alternative solutions that may be adopted, design solutions may be chosen that are suited to and adequate for responding to the needs that were identified, by specifically assessing the working operations to be implemented, and the consequent costs (Bravi and Rossi 2012). The choice of design solutions will be arrived at by specifying the sub-criteria that enable comparing the alternatives and their working operations on the basis of construction, operation, and maintenance cost, procedures and times for implementation, and the different performance levels that may be achieved (Guarini and Battisti 2014). The procedure is structured in accordance with a logical process that makes it possible to capture the deeper analyses and the assessments to be made in the design's development; it thus has the objective of "codifying": the operations of breaking down or re-composing the elements to be considered, and the assessments to be made in their mutual relationships, using a system of multi-criteria matrices (to be constructed with reference to the assumed intended use of the building being transformed/capitalized on) aimed at producing mutually consistent input/output data by means of an interactive process of design elaboration for the development of initiatives that are: (i) compatible with the regulations in force; (ii) environmentally sustainable; (iii) capable of participating in active markets, and consequently of producing adequate business income capable of mobilizing capital in the construction transformation activities (Morano et al. 2015).

The structure of the operations of breaking down and re-composing the elements to be taken into consideration is also aimed at the implementation, within the BIM, of the system of multi-criteria assessment matrices provided for in the procedure (Nesticò and Pipolo 2015).

The definition of the assessment procedure was structured with particular reference, in accordance with the provisions of art. 3 of the Decree of the President of the Republic no. 380/2001, to interventions of: (i) renovation without demolition and rebuilding (paragraph d, first section); (ii) extraordinary maintenance (paragraph b); (iii) restoration and conservation (paragraph c). It is not considered applicable to all the interventions involving demolition and reconstruction of the building. Since, by law, the considered types of intervention necessarily also involve the energy upgrading of the building being capitalized on, this aspect was given particular attention in describing and developing the procedure. For the time being, the assessments of compatibility and consistency have not gone into detail with regard to those aspects for which verification of the technological components' state of conservation makes it possible to immediately determine (and to exclude in this step in the procedure's development) the intervention actions connected with a significant or complete replacement of the structural-type and/or safety-related technological elements. Indeed, this verification at any rate makes it possible to take into account—in the phase of determining the working operations to be performed, and the consequent costs—modest and immediately identifiable adjustment jobs for that which concerns both portions of structural elements and the fire-protection system.

3 Application of the Procedure to the Case Study: Genesis of the Design Idea

The case study for applying the proposed assessment procedure was the building where the school complex of the "Edmondo De Amicis" Professional Institute for Craftsmanship and Industry, located in Rome at Via Galvani 6/8 and owned by the Province of Rome in 2015. The design idea of purposing the Via Galvani school complex as a youth hostel arose from the closure, in 2011, of Rome's chief youth hostel, located in a building designed by the architect Del Debbio at Foro Italico. This hostel, the only one of these facilities in the capital enjoying a central location, was operated directly by the Italian Youth Hostel Association (Associazione Italiana Alberghi per la Gioventù—AIG) and belonged to the Italian and worldwide hostelling network (IYHF—International Youth Hostel Federation, to which AIG belongs). Also worth pointing out, with reference to the (planned) closure of the current building that is the object of the proposed repurposing as a hostel, is the gradual decline in the number of students enrolling in secondary schools of this kind.

4 Knowledge Framework

4.1 The Building Under Investigation

The building is located in the 1st municipality of the city of Rome, and in particular in the Testaccio neighborhood (Rione). It is registered in the cadastre under folio no. 516, parcels 148, 149, 150. The building is strategically positioned both with respect to Rome's main monuments and with reference to the main road arteries, to the airports and to the railway stations, as shown by the verification made by calculating, in relation to the infrastructure and the means of transport present in the vicinity, the travel times (considering the most appropriate means of transport as the case may be: on foot, by bus, on the underground, etc.) between the building and the points of greatest tourist interest and infrastructure accessibility. This is a strong point for the new facility, considering the city's strong emphasis on tourism. In terms of climate, the building is located in climate zone D.

The property consists of: (i) a main building (Building A), originally (1908) purposed as an elementary school, to which, over time, a series of adjacent buildings were added; (ii) another building (Building B), detached from the first; and (iii) large open spaces and yards between the two buildings, which are a factor of additional quality of the building complex and, in environmental terms, for the entire Testaccio neighborhood. The main building, despite the enlargements and transformations it has undergone, has substantially maintained its original functional and stylistic character unaltered; on the exterior, it is structured in accordance with a very simple classical scheme, with ashlar pilasters, articulated stringcourses, and windows with cornices. U-shaped, it is organized on three storeys above ground and a basement which occupies only a part of the building's footprint. In particular, over the years, the interior and exterior of building A has seen a succession of five phases of construction transformation/enlargement in order to build additional classrooms and laboratories (in 1935, 1936, and 1963), the gymnasium (1941), and a snack bar (1990). Each storey has a useful height of 3.50 m. Table 1 shows the technological elements that characterize the building, the analysis of the state of conservation, and the actions and types of intervention to be implemented. On the whole, the state of conservation of the main building's facades is good, as an extraordinary maintenance intervention was carried out in 2013. The systems possess various states of conservation, depending especially on the year they were made, and for the most part do not comply with current energy-efficiency criteria.

4.2 Rules and Regulations

Examination of the urban planning and construction rules and provisions made it possible to determine as follows: (i) with regard to the regional landscape plan (PTPR), that the area belongs to a Landscape of Urban Settlements (Table "A—Landscape Systems and Settings") and is not subject to landscape protection restrictions; ("B—Landscape Assets"); (ii) with regard to the general urban plan (PRG) (2008), that the complex is located in the setting of the "historic city," and in particular within "fabrics of nineteenth/twentieth-century expansion in blocks (T4)." These fabrics (art. 29 of the PRG's technical implementation regulations) also permit renovation with a change of intended use. Moreover, the building is registered (in the "Quality Paper") among "buildings with a special construction type, in serial arrangement." In line with the municipal regulations in force, since the building has particular urban-planning, architectural, archaeological, and cultural value to be conserved and capitalized on, the design solutions will necessarily have to comply with intervention actions that do not alter the building's external appearance; (iii) with reference to the specific intended use of the intervention, the regulation of reference of the Lazio Region for non-hotel hospitality facilities is dictated in regional Regulation no. 16 of 24 October 2008 and subsequent

Table 1 Technological elements of the building

Technical elements	Classes of technological units	Classes of technical elements	Building A				Enlargement			
			Type	State	Interventions		Type	State	Interventions	
					Action	Type			Action	Type
1. Bearing structure	1.1. Founded	1.1.1. Direct	Dry	G	RA	PI/S	Reverse beams	G	RA	PI/S
		…								
	1.2. Elevation	1.2.1. Vertical	Bricks in tuff blocks	P	RA	PI/S	–	–	–	PI/S
		1.2.2.a Horizontal	Floors in profile of steel and clay	P	RA	PI/S	Floors in brick and cement	P	RA	PI/S
		1.2.2.b Inclined	Floors in profile of steel and clay	P	RA	PI/S	Rampant slabs in reinforced concrete	P	RA	PI/S
2. Closures	2.1. Vertical	2.1.1. Vertical siding	Bricks in tuff blocks	P	IT	PI/S	Bricks box-type	D	MT	PI/S
		2.1.2. Vertical window frames	Iron	B	RC	CS	Iron	G	RC	CS
	2.2. Horizontal lower	2.2.1. Ground floor	Profile of steel and clay	P	IT	PI/S	Bricks and cement	P	IT	PI/S
		…								
	…	…								
	2.4. Higher	2.4.1. Covers	Profile of steel and clay	P	IT	PI/S	Bricks and cement	P	IT	PI/S
	…									

(continued)

Table 1 (continued)

Technical elements	Classes of technological units	Classes of technical elements	Building A				Enlargement			
			Type	State	Interventions		Type	State	Interventions	
					Action	Type			Action	Type
3. Interior partitions	3.1. Vertical	3.1.1. Vertical inner walls	Hollow bricks	P	DC	PI/S	Hollow bricks	D	DC	PI/S
		3.1.2. Vertical interior fixtures	Wood	B	RC	CS		G	RC	CS
		…								
	3.2. Horizontal	3.2.1. Floors	Profile of steel and clay	P	DC		Bricks and cement	P	DC	
		…								
…	…	…								
5. Supply and services plants	5.1. Air conditioning	Absent	–	–	–	RX	Absent			RX
	5.2. Sanitary	5.2.1. Connections	ns	G						
		…								
		5.2.4. Heaters	Cast iron	B	RC	CS	Cast iron	G	RC	CS
		5.2.5. Cold water distribution plus taps	Galvanized pipes	B	RC	CS	Galvanized pipes	G	RC	CS
		5.2.6. Hot water distribution plus taps	Absent	–		RX	Absent	–		RX
		…								
		5.2.8. Toilet	Bad quality porcelain	B	RC	CS	Bad quality porcelain	G	RC	CS
	5.3. Disposal networks (liquid)	Disposal rainwater network	Plastic/sheet	G	–	NO	Plastic/sheet	G	–	NO

(continued)

Table 1 (continued)

Technical elements	Classes of technological units	Classes of technical elements	Building A				Enlargement			
			Type	State	Interventions		Type	State	Interventions	
					Action	Type			Action	Type
		Disposal water network	Lead	P	RC	CS	Lead	P	RC	CS
	5.4. Disposal networks (gaseous)	Secondary ventilation network	Lead	P	RC	CS	Lead	P	RC	CS
	…									
	5.6. Gas distribution plants	Connections	–		–					
		Distribution networks	Galvanized pipes	B	RC	CS	Galvanized pipes	G	RC	CS
	5.7. Electric plants	Connections	–		–					
		Electrical equipments	Not standardized	B	RA		Not standardized	G	RA	
		Distribution networks plus plugs	Corrugated	B	RA		Not sliding	G	RA	
	5.8. Communications plants	Connections	ns	G						
		Equipments	Not standardized	B	RA		Not standardized	G	RA	
		Distribution networks plus plugs	Not standardized	B	RA		Not standardized	G	RA	
6. Impianto sicurezza	6.1. Antifire plants	Connections	ns	B	RA		ns	G	RA	
		Fire detection equipments	Not standardized	B	RA		Not standardized	G	RA	
		Distribution networks and plugs	Not standardized	B	RA		Not standardized	G	RA	

(continued)

Table 1 (continued)

Technical elements	Classes of technological units	Classes of technical elements	Building A				Enlargement			
			Type	State	Interventions		Type	State	Interventions	
					Action	Type			Action	Type
		Alarms	Not standardized	B	RA		Not standardized	G	RA	
		Facility	Not standardized	B	RA		Non a norma	G	RA	
	6.2. Grounding electrical plants	Sinks	Stakes copper	B	RA		Paline in rame	G	RA	
		Collection network	Inadequate	B	RA		Inadequate	G	RA	
	6.3. Lightning protection plants	Catchment network	Atman network	G	no					
		Network	Copper	G	no					
		Sinks	Stakes copper	G	no					
	6.4. Antitheft plants	Absent	–	–		RX	Absent	–	RX	

State: *B* Bad, *P* Poor, *D* Discreet, *G* Good
Action of intervention: *RC* Rebuilding complete, *RA* Regulatory adaption, *IT* Improvement thermal, *DC* Distributional changes
Type of intervention: *CS* Complete substitution, *PI/S* Partial integration/substitution, *NO* Non intervention, *RX* Realization exnovo

modifications and supplements, "regulation of non-hotel hospitality facilities." This regulation defines "youth hostels" as "hospitality facilities equipped for the sojourn and overnight stay, for limited periods, of youths and any parties accompanying youth groups. Parties d with purposes of social, cultural, sport, and religious tourism may also be accommodated. In any event, the sojourn and overnight stay may not exceed sixty days." Art. 4, paragraph 2 of the regulation indicates the minimum functional and structural requirements of the environments, of the hygienic/sanitary services, of the common spaces, of the furnishings, and of the services offered.

4.3 Market Analysis

With regard to the formulated design idea (connected with the tourism market) data were gathered and processed, with reference to 2007–2011, with regard to: (i) the trend in tourism flows, in the structure of arrivals by origin, type, length of stay, and presences in hospitality establishments by country of residence of the customers, on the national level, the regional level, and in the city of Rome (demand); (ii) the capacity of the hospitality establishments, the total and specific number of hospitality facilities present in Rome and in other European cities (supply). In contrast with the increase in hostel-type hospitality facilities between 2008 and 2011, since then, with the closure of the Foro Italico hostel, the supply of hostel-type hospitality facilities in the city of Rome numbered 23 establishments, totalling 978 beds, all located in highly marginal areas of the city. This supply is less than that present in other European capitals that boast a higher number of such facilities and beds (Madrid: 35/1,512; Amsterdam: 45/2,116; Berlin: 83/4,840; Stockholm: 30/1,218; London: 73/4,553; Paris: 128/6,842). The insufficiency of supply was objectively worsened by the closing of the Foro Italico hostel which, before closing, absorbed, with 334 beds (rooms with 2–6 beds, and separate dormitories by sex), a demand of 90,000 overnight stays at the facility a year (85% foreigners, 50% of whom were European and 35% from overseas). Considering that the unsatisfied demand may be estimated at about 300,000 overnight stays per year, the lack of a hospitality facility, also for the Holy Year (2016), is greatly damaging to Rome's image and economy. This shortcoming has already been known for a number of years: to meet the ever increasing flow of tourists heading to the capital, the Lazio Region approved, with Regional Council Decision no. 2/2010, a Three-Year Plan for tourism development (2011–2013) indicating an expansion of hostels. Therefore, in addition to the need to offset, to the extent possible, the shortcoming that had been worsened after the closure of the Foro Italico hostel, the need arose to raise the offerings of these facilities in the Italian capital on a par with those in other major European cities. With the proposal that was formulated, it is believed that about 73% of this demand (65,520 overnight stays) and about 20% of Rome's overall needs, can be reabsorbed.

5 Design Principles and Features

The data on the current state of the Via Galvani building were compared with those obtained from the provisions of rules and regulations on the European, national, regional, and municipal levels of reference for the criteria identified in this assessment procedure. The consistency assessments showed that, to reach suitable level of energy efficiency and profitability of the building, in compliance with the regulations and the urban-planning/environmental regulations in force, it is necessary to proceed with a building renovation aimed at replacing all the building's technological components, except for the structures, slabs, and vertical perimeter walls that are in a good state of conservation.

The definition of the new arrangement of internal spaces [54 rooms (46 normal, 8 for handicap) for 182 beds; 2 tv rooms, 2 restaurants, 1 library] to accommodate the functions of the new intended use as a youth hostel was formulated by taking into account the regulations of regional reference.

Based on the survey of the climate data and of the building's size data, the following was calculated, for the purposes of the building's energy performance in its current state: dispersing surface area (S) equal to 6,881 m^2; gross heated volume (V) equal to 18,095 m^3; and shape ratio (S/V) equal to 0.285.

A special program ("TERMUS") was used to determine the energy class of building A (class F) and of building B (class E) in the current state (ante operam). These values exceed the maximum limits provided for by the regulations in force in the matter of the energy consumption of buildings (compatibility verification). Then, the same program was used to calculate the transmittance and heat dissipation of the technological components of the envelope (walls, slabs, door, and window frames).

Analysis of energy dissipation found that most takes place through door and window frames. These are in fact old-generation frames, in iron, with single 4 mm panes (transmittance equal to 6,389 W/m^2 K), with a performance incompatible with what is required by regulations, and they are thus to be replaced.

The consistency verification of the heating system showed that the heating plant (consisting of two methane gas heat generators, "Biasi 350" model) present in the building fails to meet energy-efficiency criteria; it is thus to be replaced.

The design choices to reduce the building envelope's thermal dissipation, in compliance with the dictates of urban planning (exterior prospects cannot be modified) will have to be made with reference: (i) to exterior coverings, identifying intervention procedures and techniques to be implemented on the internal parts of the building, in order to lower transmittance; (ii) to exterior door and window frames, using new-technology materials with low heat dissipation, but similar in appearance and color to existing ones.

By assessing the possible alternatives, based on criteria related to cost, to the determined final performance, to the degree of ease and rapidity of installation, and to the solution's durability, the choice was made to adopt solutions to:

- Reduce the dissipations through the building envelope: (i) replace existing windows: new-generation frames (Finstral top 90 twin-line classic), triple pane, in PVC and aluminum, with shutter integrated into the panes (total transmittance from 0.90 to 0.98); (ii) insulation of walls: spray insulation to be applied inside the building on the exterior walls, as needed, in different dosages (insulation of exterior walls: Puretan 30; of floor slabs: Puretan 70). This solution has a number of advantages: easy, quick installation, considerable reduction of noise transmission, great ability to adhere physically to almost all construction materials. It is to be pointed out that, as a disadvantage, this solution does not make it possible to eliminate the thermal bridges of the slabs between the stories, and involves the risk of formation of interstitial condensation, due precisely to its application from the inside; (iii) use of high-efficiency systems: replacement of old heating plant (consisting of two methane gas heat generators, "Biasi 350" model), with two new-generation condensing boilers ("Biasi RC3S-510" model), 540 KW each, to heat the environments and for the provision of ACS in building A, and the installation of a new boiler (model "Biasi Multiparva cond 55 SV") in building B.
- Use of renewable sources: recovery of rainwater through the building of a collection, filtering, and storage system in tanks, permitting subsequent use.

To verify the design choices connected with the energy upgrade, the post-upgrade energy class was recalculated (building A: class C; building B class D), and the compliance with the values provided for by the regulations of reference was then checked.

A comparison of the heat dissipation data before and after the upgrade shows a significant reduction (on the order of 1/5) of energy dissipation as a consequence of the design choices that were made. In detail, a total energy dissipation through the walls fell from 10,011.13 W prior to the upgrade to a post-upgrade value of 2,124.78 W.

6 Financial Sustainability

The amounts of the investment costs (total: €3,453,764.60) were estimated as equalling: for construction cost (as per the Bill of Quantities), €2,417,119.10; for building production, €2,777,873.50; for setting up and placing in operation, €273,826.77. The estimate of operating costs took the following into account:

- For the personnel cost (net yearly amount equal to €494,528.00): (i) number of beds: 182 (max. supply, as per the design document); (ii) overnight stays per year (as per the demand estimate), considering the structure's use percentage >80% of the maximum supply of beds in the month of January, in the months between May and October, and the month of December; (iii) number of employees: 15 permanent and 4 seasonal (based on an industry survey by Federalberghi (2013), considering, in terms of employees: permanent: a minimum employee/bed ratio needed for the hostel to operate = 12.5; seasonal: a 20% increase in personnel in the periods when estimated overnight are >80% than the maximum supply; (iv) cost of employees: permanent (€2,400.00/month) and seasonal (€1,954.16/month) determined through a direct survey (2013) on a sample of similar hospitality facilities, considering an average remuneration;

- Operating costs for: (i) maximum number of rooms (104); (ii) monthly operating cost (€/room) determined by a direct survey (2011) at non-hotel hospitality facilities, considering fixed and variable costs (utilities, consumables, insurance, taxes, etc.);
- Ordinary maintenance costs (€9,475.00 per year): the type and cost of the interventions needed to maintain: the efficiency of the systems and the state of decorum and hygiene of interior environments (interior works) and of exterior spaces (exterior works).

In determining the yearly revenues, account was taken of income determined by: (i) overnight stays (direct revenue); and (ii) leasing of commercial premises (indirect revenue). The yearly revenue derived: (i) from overnight stays (€1,760,521.70) was estimated by assuming: (i) number of overnight stays per year (from an estimate made on the yearly distribution of the number of overnight stays supposed for the facility); (ii) average price per overnight stay per person (€30.73), determined considering average prices charged by similar facilities in other European capitals (Madrid, Amsterdam, Berlin, Stockholm, London, Paris); (iii) from the leasing of commercial premises (€161,183.40) was determined by taking account of: the average monthly rent for the leasing of premises (€/m^2 21.30) estimated through a direct survey; m^2 of commercial premises (as per the design document: eight shops all on the ground floor of the building, with sizes varying between 44 and 166.52 m^2). Based on the investment costs, the costs of operation and of ordinary maintenance, the returns and the financial coverage plan, the NPV (€5,833,550.90) and SRI (29.90%) were determined, which are suitable for attracting private resources in real estate re-conversion operations.

7 Conclusions and Further Developments

The proposed assessment procedure, supporting the decisions on reconverting/capitalizing on an obsolete building, enables the technical feasibility and the financial sustainability of the intervention to be verified based on an integrated process of assessments that, with respect to the assumed intended use of the building, takes into account, at the same time: (i) the dynamics of real and potential supply and demand; (ii) formal aspects, morphological constraints, technological components, and state of the building being capitalized on; (iii) regulatory aspects; and (iv) possibility of obtaining energy efficiency, structural adjustment, etc. The "coding" of the operations of breaking down/re-composing the elements to be taken into consideration and the assessments to be made is useful for the development of building transformation initiatives, with a higher possibility of success, giving the obsolete building new uses required by the market. The proposed procedure is structured to permit its future use in the BIM.

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