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A NEW APPROACH TO BUILT HERITAGE SUSTAINABLE PRESERVATION PROJECTS: THE CASE STUDY OF VIPOLŽE CASTLE – GORIŠKA BRDA, SLOVENIA

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ABSTRACT

This paper aims to present a multidisciplinary approach to sustainable preservation practice of the built heritage. It is based on interesting features of the Historic Building protocol by GBC Italia and the Villas project experience: the first is a LEED rating system of sustainability in renovation actions; the second is a research programme on Venetian Villas where a group of economists developed an evaluation method for the assessment of vocationality and sustainability of re-use projects. In both cases was detected the problem of adequate incorporating the cultural heritage values in sustainable preservation processes, what brought to new researches presented here.

Keywords: sustainability, re-use and preservation, built heritage, multiple criteria evaluation, Vipolže castle

UN NUOVO APPROCCIO AL PROGETTO DI CONSERVAZIONE SOSTENIBILE DEL PATRIMONIO COSTRUITO: IL CASO STUDIO DEL CASTELLO DI VIPULZANO – COLLIO SLOVENO

SINTESI

L'articolo vuole illustrare un approccio multidisciplinare alla conservazione sostenibile del patrimonio costruito. Si basa sugli spunti interessanti del protocollo Historic Building di GBC Italia e sull'esperienza del progetto Villas: il primo fa parte dei sistemi LEED e valuta la sostenbilità nell'ambito delle ristrutturazioni; il secondo è un programma di ricerca condotto sulle Ville Venete che ha visto un gruppo di economisti sviluppare un metodo di valutazione della vocazionalità e della sostenibilità nei progetti di riuso. In entrambi i casi è stata riscontrata una certa difficoltà nel considerare adeguatamente gli aspetti legati al patrimonio culturale nei processi di conservazione sostenibile, comportando quindi delle nuove ricerche qui presentate.

Parole chiave: sostenibilità, riuso e conservazione, patrimonio costruito, valutazione multicriteriale, castello di Vipulzano

INTRODUCTION

Sustainability has lately become a crucial topic in various circumstances: from worldwide political debates on future development to the different research programmes. However it has been generally noticed that greater prominence has been given to the environmental component, whereas other sustainability aspects – such as the social, cultural and economical – have often been neglected (McKenzie, 2004). The same can be remarked in architectural field in reference to recent development in technologies, materials and normative standards. The present article will focus on the sustainability problem with regard to the re-use and preservation practice of architectural heritage in general: i.e. buildings of any function and either legally protected or not. As a way of »recycling« the existing built legacy it is already a sustainable activity and will become more and more important in the future due to land scarcity and the increasing amount of degrading constructions and areas.

However in order to plan sustainable interventions all the socio-cultural, economic and environmental factors should be considered simultaneously, but these are often overlooked due to the difficulty of assessment or to the lack of proper methods and devices. In fact, most of the existing literature and practices investigate sustainability-aspects mainly on a theoretical basis, providing suggestions for developing adequate policies rather than offering practical tools for managing concrete actions.

The new approach presented in this paper aims to be an operational tool that could help both designers and decision makers in managing sustainable choices during the preservation/re-use process of an architectural object. The general structure and operative principles shown through the early case study of the Vipolže Castle from the Slovenian Brda[1] - gives an idea of the whole approach.

SUSTAINABILITY AS A COMPLEX PROBLEM

So far most of the researches have tried to investigate the sustainability problem looking for eco-friendly behaviour and green solutions to our needs, often spreading new, advanced technologies that help our ecosystem. However, according to recent studies, there is a misunderstanding or better, a too-narrowed view of the sustainability issue, which should not focus only on the environmental sphere of the problem. In fact, the widely accepted definition proposed by the Brundtland Commission in 1987 affirms that a sustainable development is a 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987, 41). The vagueness of the cited sentence has been well critised by Jacobs[2], who blames it for accomplishing private interests rather than social justice. On the other hand its indefiniteness can be explained as an attempt of including also other disciplines that concern the social, cultural, environmental, technical and economic interpretatation of sustainability. According to McKenzie 'sustainability is now a broad multi-focal agenda' that 'calls for interdisciplinary input and a cohesive view of interrelation of nature, society and economy' (McKenzie, 2004, 1, 5). A similar opinion emerges from the definition proposed by the University of South Australia: 'Sustainability—including sustainable environments, sustainable societies and sustainable economies. This priority would mean attention *inter alia* to issues relating to water use, renewable energy, democratic citizenship, social justice, equity, impact of globalised economies on work and triple bottom line[3] approaches' (McKenzie, 2004, 11); and is again confirmed in Fraser Basin's Council'c Charter[4] and reports 'consideration of social, economic and environmental dimensions, examining the interconnections and integration among these dimensions, and a long-term perspective that does not give preferential treatment to current generations at the expense of future generations' (FBC, 2011, 3).

ENVIRONMENTAL, SOCIO-CULTURAL AND ECONOMIC SUSTAINABILITY

As generally accepted, three sustainability categories can be identified: the common environmental sustainability, the social and the economic one. The first arises from the definition of sustainability proposed by IUCN (International Union for Conservation of Nature), UNEP (United Nations Environment Programme) and WWF (World Wide Fund For Nature) in 1991: 'improving the

1 Collio (it.) or Brda (slo.) is a cross-border region well known for premium-quality winemaking and touristically fascinating due to its hill country, dotted with small villages and vineyards.

2 'The vagueness of the definition (...) allows business and "development" interests (and their government supporters to claim that they are in favour of sustainable development when actually they are the perpetrators of unsustanability.' Jacobs, M. (1999): Sustainable development: a contested concept. In: Dobson, A. (ed), Fairness and futurity: essays on environmental sustainability and social justice. Oxford University Press, Oxford. Cited in McKenzie, 2004.

3 Elkington defined it as a simultaneous condition of sufficiency of all three aspect: 'We need to bear in mind that it is not possible to achieve a desired level of ecological or social or economic sustainability (separately), without achieving at least a basic level of all three forms of sustainability, simultaneously.' Elkington, J. (1999): Triple bottom line revolution: reporting for the third millennium. Australian CPA, vol. 69, p. 75. Cited in McKenzie, 2004, 6.

4 The Charter defines sustainability as 'Living and managing activities in a way that balances social, economic, environmental and institutional considerations to meet our needs and those of future generations.' (FBC, 2009, 5)

BUILDING'S ID

GENERAL INFORMATION OF THE BUILDING		
ANAGRAPHIC	*NAME:*	Villa/Castle Vipolže
	CURRENT PROPERTY:	Republic of Slovenia
	MANAGER AUTHORITY/SITE MANAGER:	Ministry of Education, Science, Culture and Sports
	TYPOLOGY:	isolated villa
	STYLE:	late renessaince, Friulian villa type with Venetian baroque decoration
	YEAR/PERIOD OF CONSTRUCTION:	ca. 1750 (origins: 11th Century)
	AUTHOR/DESIGNER:	unknown
	ORIGINAL USE/FUNTION:	hunter's cottage
	ACTUAL USE/FUNCTION:	multicultural centre
	CONSERVATION STATUS:	restored (June 2014)
LOCATION	*NATION:*	Slovenija (SLO)
	MUNICIPALITY:	Brda
	CITY/TOWN/LOCALITY:	Vipolže
	ZIP CODE:	5212
	ADDRESS & CIVIC N°:	Vipolže, 29
	COORDINATES:	387061,7; 93007,0 (y; x)
	ALTITUDE MSL [m]	106,4
	CLIMATIC ZONE [GG]:	
CADASTRAL DATA	*CADASTRAL MUNICIPALITY:*	2287 - VIPOLŽE
	CADASTRAL MAP/OBJECT N°:	211 (house)
	PARCEL/CAD. UNIT:	529; 530; 531; 532/1
NUMERICAL DATA - site	*LOT AREA [m 2]:*	6469
	COVERED AREA [m 2]:	810
	UNCOVERED AREA [m 2]:	5659
	BUILT AREA [m 2]:	3907,59
NUMERICAL DATA - building	*N° OF STOREYS ABOVE GROUND:*	3
	N° OF STOREYS UNDERGROUND:	1
	TOTAL STOREY N°:	4
	PLANT AREA [m 2]:	905,88
	AVERAGE HEIGHT [m]	15
	TOTAL NET AREA [m 2]:	2102,71
	TOTAL VOLUME [m 3]:	13588,20
TOWN PLAN/LOCAL STRATEGIC PLAN	*ZONE:*	B - special zone
	SPECIFICATIONS:	VIP-BT 1
	NOTES:	turistic purpose
PROTECTION & RESTRICTIONS:	*LEGALLY PROTECTED:*	yes; cultural heritage
	NORMATIVE REFERENCE:	Ur.l. RS, št. 81/99-3867, 55/2002-2687
	FROM DATE/YEAR:	2002
	OTHER RESTRICTIONS:	NO
NOTES:	*OTHER INFORMATION:*	value: 75.245,75 Eur

BRIEF HISTORY

PERIOD	*USE & FUNCTION*	PROPERTY	MODIFICATIONS
11th Century	hunter's cottage and stables	count family from Gorizia (Ita)	\
Middle Ages - 16th Century	representative villa	families Herberstein (1311), Della Torre (1460)	around 1510 was already in poor conservation status and was sometime later therefore totally rebuilt by Thurn (della Torre) family
16th - 20th Century	summer villa	Venetian Republic; noble family Attems (XVIII), Teuffenbach (1912)	1st half of the 16th Century: renovation in Venetian Villas' style after it had been partially damaged; end of 17th Century (before or after fire) was renovated again
WWI	military hospital	\	partially destroyed by a bomb
1948	\	\	hit by fire
50s	\	\	roof reconstruction; ring beam added
post-war period	occasional dance-floor	\	external area is temporarily converted into a dancefloor in summertime; basement is also used by local cultural associations and groups
June 2014	\	Republic of Slovenia	restoration; beginning of 2015 will open a multicultural centre

Figure 1: Phase 1 – knowing the object: building's ID - part 1: General information and history: overview of the first part of the building's ID – here completed with data concerning the Vipolže castle – reporting general and historical information
Slika 1: Faza 1 – spoznavanje arhitekture: osebna izkaznica (ID) stavbe – 1. del: Splošne informacije in zgodovinski podatki: splošni pregled prvega dela ID stavbe – izpolnjene s podatki o gradu Vipolže – kjer so navedene nekatere splošne in zgodovinske informacije
Figura 1: Fase 1 – conoscere il manufatto: carta d'identità (CI) dell'edificio – parte I: Informazioni generali e note storiche: prospetto generale della prima parte della CI dell'edificio – qui completata con le informazioni relative al castello di Vipulzano – dove sono riportati alcuni dati generali e storici

quality of human life while living within the carrying capacity of supporting eco-systems', when the concept of intragenerational and intergenerational equity were first referred to the environment and renewable resources (Melià, 2010, 13; IUCN, UNEP, WWF, 1991, 10).

On the other hand a lot has been written by McKenzie on social sustainability. In his reserach paper it is defined as a 'life-enhancing condition within communities, and a process within communities that can achieve that condition' and it includes equity of access to key

services and between generations, cultural relations and integration, political participation, transmitting awareness of social sustainability, sense of community responsibility and collective identification (McKenzie, 2004, 14-15). Nevertheless, referring to the preservation and re-use practice social sustainability has a slightly different meaning and should rather consider the following aspects: public involvement in the decision process, public usability and benefit derived from an area, collective values and attachment of a community to a building or a site that should be respected and possibly implemented[5]. Community identity is often ignored when talking about cultural heritage (Vitiello, 2012, 68), even if the concept of "heritage" is strictly connected to people's perception and identification of values – aesthetic or other. Therefore the present study has combined the cultural and social component into a single category, the "socio-cultural sustainability".

A serious risk that may occur during the preservation and re-use process of a building is that it may lose its characterising qualities due to an incompatible new use or an unsustainable cost of restoration and maintenance (Galli, Lioce, 2006, 124). An effective economic reuse could guarantee economic feasibility and an "active preservation" of the object through minimal impact on the original asset (Dallavalle et al., 2006, 55). As a consequence, the economic sustainability deals with the problem of using available resources to their best advantage, promoting an efficient and responsible use, likely to provide long-term benefits for the community.

THE METHODOLOGY

The methodology presented is a whole procedure that guides the user through the planning of a sustainable project of re-use, as well as recovery, refurbishment or preservation of a building and its site. As an operative method it is provided with an evaluation model that offers a rational support to its users – i.e. designers and decision makers – in priority and alternative assessment when planning sustainable interventions. Since possible actions, that are more prone to one rather than an other sustainability-aspect – are often in conflict, the aim of this tool is to make the user aware of these contrasts, so that he will responsibly choose which aspect should be privileged. The choice will be definitely in accordance with his own sensitivity, but it could be supported by the evaluation method's results, which assess a weighted »sustainability performance« on the basis of other experts' rating. The user could therefore base his final opinion on a set of alternative scenarios-projects he has previously tested.

The present approach is based on the study of two other experiences that have been appreciated for their inclusive vision of the sustainability problem and scientific approach. The first is the protocol HB (Historic Building) that GBC Italia[6] has been developing since April 2012 and will be probably launched in the first semester of 2015[7]. As part of the LEED (Leadership in Energy and Environmental Design) rating systems HB is a holistic approach to certification based on a flexible model that assesses the energetical and environmental performance of a historic building only in reference to possible actions (Rugginenti and Franchini, 2010, 43-44). Its checklist has offered some interesting inputs – e.g. public use of covered and external area; structural and anti-seismic safety; reversibility of some interventions; construction site management; transport facilities; green technologies and materials; low heat island effect; rational use of water supplies; renewable energy; waste management; material and resource re-use etc. – in the criteria and option-list for the project's sustainability evaluation.

On the other hand, the evaluation model at the base of the method's structure is derived from the Villas project[8] (2006), where a group of economists have built an assessment tool on the case study of Venetian Villas. It is a MC analysis (multi-criteria) derived from the MAVT (multi-attribute value theory) that has been applied to evaluate the sustainable reuse of historical homes and their »vocationality«, i.e. the economic feasibility in reference to different kinds of use: residential, office, hotel (Giove, 2006; Dallavalle et al., 2006a, 2006b). Even if less recent the reliability of this rational method has so far been proved through its adaptation to different situations[9].

STRUCTURE OF THE METHOD

In order to cover the whole re-use/preservation process, the proposed new methodology is divided into three parts: in the first one - »knowing the object« - the user is asked to gather some data about the building and the area, finding out their potentialities and values, that should next be considered in the project. Concretely, a sort of building's ID must be filled, which collects general information and limitation, a brief history including modifications and other interventions (Figure 1) and

5 Similar factors are at the base of the COBACHREM Model (Community-Based Cultural Heritage Resources Management) reported by Susan O. Keitumetse (Keitumetse, 2014).

6 Green Building Council Italia is an association which is working on LEED protocols and rating systems in agreement with USGBC (US Green Building Council) and GBCI (Green Building Certification Institute). More available at: http://www.gbcitalia.org/page/show/i-sistemi-leed-e-gbc?locale=it.

7 As Vitiello observes evaluation techniques that support a »green« design process by looking beyond the energetical performance are continually evolving (Vitiello, 2012, 73).

8 The project Villas is part of the Community initiative INTERREG III B (2000-2006) CADSES 3B074.

9 E.g.: Venice Arsenale (Giove et al., 2011), former industrial buildings (Ferretti et al., 2013) etc.

CONTEXT QUALITY		
LANDSCAPE QUALITY/FRAME	*urban context*	to the North: small town of Vipolže formed by traditional isolated 2/3-storey houses, plastered walls, 2 or more roof slopes covered with roof tiles
	natural context	situated on a hill among vineyards has a great view of the rural surroundings
SITE QUALITY	*character of the lot and adjacent land; historical asset*	historical situation: in front of the building there used to be a meadow and later a garden with a baroque water well, behind an orchard; currently: surrounded by vineyards and trees - there are some centuries-old cypresses that are among the oldest in Slovenia; the entrance is abandoned
ECONOMICAL CONTEXT	*historic or urban centre / commercial / touristic / business / production/industrial site / agricultural / natural and recreational context*	touristic and agriculture: fine wine-production
AVAILABLE SERVICES	*hotel, recreation, commercial, food service etc.*	B&B, agritourism
ACCESSIBILITY	*main infrastructural connections, transport facilities*	local road
SOCIAL VALUE		
HERITAGE AWARENESS	*community's perceiving of the object as a cultural / natural / other type of heritage*	
HISTORIC/TRADITIONAL VALUE	*association with important people / events / ideas; evidence of local / regional / national history*	strategical base in Middle Age, residence of main noble families from this region (business centre of the feudal system), evidence of Venetian influence
COLLECTIVE ATTACHMENT VALUE	*perceived meanings by a community in relation to political / national / cultural sentiment; source of cultural identity or emotional link derived from use*	in the last decades the building and its site have been used for traditional dancing performances and meetings by local people and associations
SPIRITUAL VALUE	*intangible values and meanings related to community beliefs, religion, spiritual practice and sentiment*	\
ARCHITECTURAL QUALITY		
AESTHETIC VALUE	*visual and non visual aspects derived from compositional and attractive qualities: massing, proportions, unity and context integration, colour, texture, material, spaces and views, craftsmanship and execution quality (detailing); picturesqueness*	The exterior seems closed and massive, there is a Venetian compartment of the facade by means of paired windows interrupted by chimneys. Only their pyramidal crowning element give a sense of verticality to the building. Groundfloor windows are protected with iron grating, whereas the ones in the attic are little squares, according to Friulian tradition. There is a central little stair leading to a stone portal, replicated in the piano nobile with a baroque pediment interrupted by a vase.
	decorative elements (exterior and interior)	classic window/door stone-framing, pyramidal chimneys with sphere, moulding, tower quoin, balcony and balustrade
STYLISTIC/TRADITIONAL VALUE	*principal characteristics of a particular class / period of style / tradition;*	Friulian villa with late-renessaince and Venetian Villas' influence; type: castle-villa
RARITY VALUE	*demonstrates uncommon / rare / endangered aspects or it is a special case*	is the only renessaince villa in the countryside in the region of Nova Gorica
AUTHOR VALUE	*association with life / work of an important person / group of architects/designers*	\
TYPOLOGICAL/DESIGN VALUE	*significant plant form / planning scheme / concept; appreciation in press; awards and nominations; innovatory or derived aspects (from important examples)*	The building is an example of a castle-villa: it is a countryside representative residence of a noble family as well as a defense fort; it's plan has a rectangular form with two lower rhomboidal towers that have been added to the sides. The facade follows late-renessaince compartment with the central axe marked by an entrance portal of stone and a collapsed balustrated balcony at the piano nobile. This can be accessed by means of a two-flighted vaulted stair at each ending, whereas the atrium has a square plant covered with an umbrella vault. The first floor has a central chamber and other rooms served by a long corridor. The cellar is a single big vaulted room connected to upper floors and directly to the outside.
TECHNICAL VALUE	*presence of particular materials and construction systems, technology and techniques (traditional / historic / innovative / unique)*	The building's construction materials and systems are traditional, no innovative aspect can be observed. It has stone-masonry walls, finished with plaster (almost absent externally) and whitewash (inside). Wooden floors and roof structure covered with roof tiles. In some cases floorings are mixed or have been replaced - wood, tiles, asphalt.
PRESERVATION DIRECTIVE		
Summurize directive and restrictions from the authority in charge for the object's preservation.	Building's external appearance must be mantained: all decorative elements must be preserved as well as the roof and its inclination. Damaged and irrecoverable elements must be reproduced in accordance to existing models. Infilled windows shall not be re-opened. The balustrade on the balcony must be rebuilt similarly to the one of Rabatta Palace in Gorizia. Inside: stone-portals, vaults and plant grid must be preserved; groundfloor: the aisle must be recreated; first floor: central room must be rebuilt with missing walls. Flooring from groundfloor must be mantained; the one on the staircase must be re-established according to existing model; first floor: asphalt must be removed and replace with approved flooring; underground: asphalt removed and replaced according to new function. Staircase: vaults must be rebuilt; right tower: floor reconstruction; first floor: beam-ceiling reconstruction. Preliminary investigation must be carried out (material composition, mortars etc.)	

Figure 2: Phase 1 – knowing the object: building's ID - part 1: Qualities and values: Table following Figure 1 reporting context and architectural qualities, social values and a summary of the preservation directive.
Slika 2: Faza 1 – spoznavanje arhitekture: osebna izkaznica (ID) stavbe – 1. del: Kakovost in vrednote: Nadaljevanje tabele iz Slike 1; tu so opisane kvaliteta konteksta in arhitekture, družbene vrednote ter povzetek smernic iz konservatorskega programa.
Figura 2: Fase 1 – conoscere il manufatto: carta d'identità (CI) dell'edificio – parte I: Qualità e valori: Continuazione della tabella di Figura 1 con elencate le qualità del contesto e dell'architettura, i valori sociali e un riassunto delle direttive per la conservazione del bene.

BUILDING SPECIFICATIONS - ELEMENTAL CLASSIFICATION

MAJOR GROUP ELEMENTS	GROUP ELEMENTS	DESCRIPTION	MATERIALS	CONSERVATION STATUS - DIAGNOSIS
A SUBSTRUCTURE	A01 Foundations	stone foundations in flysch sandstone and part in limestone	flysch sandstone limestone	\
	A03 Basement walls	massive stone masonry wide from 70 to 130 cm with good quality mortar	flysch sandstone lime mortar	basement walls are very humid due to rainwater drainage in proximity of ehternal basement walls
B SUPERSTRUCTURE (load-bearing)	B02 External Walls	stone masonry and lime mortar, widths: BASEMENT: central building 170-175 cm; east tower 150 cm; west tower 120 cm; GROUNDFLOOR: central b. north 144, south 93-113 cm, lateral 135 cm; east tower 120-135; west tower 120 cm; FIRST FLOOR: central b.: north 115 cm, south 93-113 cm, lateral 110 cm; east tower: 80-120 cm; west tower: 97; MEZZANINE: central b.: north 92 cm, south 93-113 cm, lateral 85 cm.	flysch sandstone lime mortar	lower part of walls are solid and well constructed with bigger blocks, no gaps in mortar were found; whereas in higher levels some walls are partially filled with bricks, frequent gaps in mortar; external surfaces are exposed to atmospheric agents due to lack of plaster layer
	B03 Internal Walls	stone masonry and lime mortar, widths: BASEMENT: 170-175 cm; GROUND FLOOR: 135 cm (central b.-towers), 107-110 cm (corridor-hall), 70-74 cm (between rooms), 46 cm (corridor); FIRST FLOOR: 110-116 cm (central b.-towers), 80-100 cm (corridor-rooms), 62-65 cm (between rooms), 46 cm (corridor); MEZZANINE: 65 cm (corridor-room).	flysch sandstone lime mortar	two transverse walls in first floor have been demolished
	B04 Upper floors	above basement level there is a stone vault (flysch sandstone blocks) supported by longitudinal walls (no horizontal tie bar)	flysch sandstone	good
		above groundfloor there are various brick vaults (umbrella, groin, dome)	brick mortar	no major cracks or subsidence; vaults above southern corridors and stairs are in poor condition (subsidence/collapse); floor above first level is missing
	B05 Roof	dual- (or more) pitched roof, wooden roof truss	timber ?	in good status, ring beam was added in the 50s
	B07 External stairs	S-E stairs in RC	concrete steel	original stone stairs have been replaced
	B08 Internal stairs	stone stairs	limestone	good
	B09 Projections	balcony	\	collapsed
C PARTITION & CLOSURE	C01 Interior partitions	bricks and mortar, widths: GROUND FLOOR: 12-13 cm (corridor), 15 cm (east tower); FIRST FLOOR: 18 cm (east tower).	brick mortar	most of these are infill walls, whereas others are new partitions in the southern corridor
	C02 Internal doors	doors are generally wide 103-124 cm and high ca. 205 cm	\	4/25 are filled in (all on groundfloor)
	C03 External doors	doors are generally single or double-fleated wide 120-172 cm and high about 330 cm	wood	1/9 is filled in; at least 4 are totally missing
	C04 Windows	wooden frame	wood glass; (bricks)	many windows have been filled in with brickwalls
D FINISHES	D01 External wall finishes	external plaster	\	is almost entirely missing
	D02 Internal wall finishes	internal plaster	lime plaster	generally good
	D04 Floor finishes	original ones are brick or stone floorings, in some rooms have been replaced with asphalt or finished with concrete	brick limestone asphalt; concrete	almost half of original floorings have been replaced with asphalt or concrete
	D06 Roof finishes	roof tiles	brick	recently restored
	D07 Doorstep	stone blocks	limestone	good
E DECORATIVE ELEMENTS	E01 External wall decoration	towers' quoin of stone blocks	limestone	good
	E03 External window & door framing	stone blocks	limestone	some are damaged
	E04 Internal window & door framing	stone blocks	limestone	\
	E05 Roof decoration	pyramidal stone chimneys with spherical crowning element	limestone ?	3/4; one collapsed, 2/3 spheres are missing; elements are not properly anchored
		under-roof moulding	limestone Repen	limited portions are damaged
	E06 Balustrade and parapets	balcony parapet	\	missing
F SERVICES & CONVEYING SYSTEMS	F01 Drainage	rainwater is directly dispersed into ground near basement walls	\	see: A03
	F02 Plumbing	sanitary waste management is unknown	\	\
	F03 Heating	fireplaces have been removed	\	removed
	F04 Ventilating & A/C	\	\	\
	F05 Electrical installations	wiring is visible on external facades	\	obsolete
		OMISSIS		
	F10 Protective installation	\	\	\
G SITE EQUIPMENT	G01 Site enclosure	\	\	\
	G02 Site paving (hard landscaping)	\	\	\
	G03 Soft landscaping	\	\	\
	G04 Site services (public utilities)	electricity, water	\	\

Figure 3: Phase 1 – knowing the object: building's ID – part 2: Building specification – Elemental classification: overview of the following part of the knowing phase that investigates technical and technological features of the building, by specifying construction elements, materials, techniques and preservation status. The card reports information of the Vipolže castle before its restoration, as described in the documentation attached to the realized project.

Slika 3: Faza 1 - spoznavanje arhitekture: osebna izkaznica (ID) stavbe – 2. del: Podrobnejši opis stavbe – klasifikacija gradbenih delov: splošen pregled drugega dela iz faze spoznavanja, ki analizira tehnično in tehnološko plat stavbe preko klasifikacije njenih gradbenih delov, materialov, tehnik in ohranjenosti. Kartica navaja podatke grada Vipolže pred restavratorskim posegom in v skladu z dokumentacijo, ki je priložena izvršenemu načrtu.

Figura 3: Fase 1 – conoscere il manufatto: CI dell'edificio – parte II: Specifiche dell'edificio – classificazione degli elementi costruttivi: prospetto generale della seconda parte della fase conoscitiva che analizza gli aspetti tecnici e tecnologici dell'edificio attraverso la classificazione degli elementi costruttivi, materiali costitutivi, tecniche costruttive e stato di conservazione. La scheda riporta i dati del castello di Vipulzano prima del restauro, come desunti dalla documentazione allegata al progetto realizzato.

MACRO-CATEGORY	CATEGORY	ASPECT	OPTIONS & ALTERNATIVE
SOCIO-CULTURAL SUSTAINABILITY	COMMUNITY ENGAGEMENT	public involvement in the decision process	fullfillment of current needs
			respect of people's values[2]
		increase of values	future potential beliefs & rituals
			heritage awareness[2]
		public use & usability[1,2]	covered area[1]
			external area[1]
			socialisation facilities[1]
		social benefit compliance	employment
			social purpose / mission
	CULTURAL HERITAGE	safety & normative	accessibility
			acoustic safety
			fire resistance
			sanitary safety
			structural & anti-seismic safety[1]
		low invasivity[2]	typological scheme[2]
			structures[2]
			finishing & decorative elements[1,2]
			technological systems[2]
		reversibility[1,2]	structures[1,2]
			finishing & protection[1,2]
			interior partition[1]
			decorative elements[2]
			technological systems[2]
		material compatibility[1]	structures
			interior partition
			finishing & protection[1]
			decorative elements
		*recognizability**	*new elements (structure/partition)**
			*gap filling / reconstructions (dec.el.)**

Figure 4: Phase 3 – Tree structure of the sustainability parameters (part 1): the table shows the hierarchical organisation of the sustainability parameters from the macro-category to the options/alternative level.
Slika 4: Faza 3 – Prikaz drevesne strukture trajnostnih parametrov (1. del): na tabeli je prikazana hierarhična ureditev trajnostnih parametrov od makrokategorij do nivoja izbir/alternativ.
Figura 4: Fase 3 – Struttura ad albero dei parametri della sostenibilità (1a parte): la tabella mostra l'organizzazione gerarchica dei parametri della sostenibilità dalle macro-categorie al livello delle opzioni/alternative.

finally a section for social appraisal, context and architectural qualities (Figure 2). A second part reports the elemental classification of the construction with system and material specifications in addition to the conservation status description (Figure 3).

The other two steps are characterised by the above mentioned evaluation procedure that correlates existing parameters and project choices to a set of sustainability criteria. In particular, the second phase – the »vocationality analysis« – is focusing on the identification of a compatible use. Villas' model will be here improved with missing functional types, in order to be applicable to a wider range of buildings, meaning also that it will have to be completely reset. Whereas the last part – the »sustainability analysis« – shows a preliminary project's performance through a scoring (non-monetary) system grounded in both user's and experts' opinion. A previous presented research has brought to a listing of the sustainability criteria that are here grouped in a tree structure merging into three macro-categories: socio-cultural, ecological-environmental and economic-financial sustainability.

THE SUSTAINABILITY ANALYSIS AND PARAMETERS

As just said the sustainability tree is formed by three main sustainability categories that are then divided into categories, aspects (or objectives), options & alternatives and in some cases have also the sub-options/possible actions specification. This level directly influences the evaluation only in the invasivity and transport facilities aspects, where some further information are needed in order to obtain the entry's output value. Otherwise it just offers some suggestions regarding possible intervention or a list of options that may be considered when assessing a certain option & alternative element.

Most of the evaluation procedure is carried out on the options & alternative level, where the user is asked to fill the input column with a value that may give a quantitative or qualitative information about a specific component. The entered score is then automatically elaborated as described in the following section. The elements listed here represent the criteria or alternatives by means of which the project may satisfy a certain sustainability aspect. For instance »coating« and »internal

insulation« are options of the »thermal insulation of the building envelope« aspect.

The aspect level is probably the most interesting part since it defines all the main sustainability objectives that a re-use or preservation proposal should try to achieve. These parameters have been defined on the basis of the two mentioned studies and personal opinion, but also on a preliminary research of the evaluation parameters of modern architectural heritage, for some of the appreciation qualities have been turned into features that a sustainable project should respect. Finally these aspects have been grouped into categories in order to provide an organised structure of the model (Figures 4, 5).

The socio-cultural sustainability is a combination of the community engagement and cultural heritage category (Figure 4). The first one focuses on the public participation in the decision process of a project as already remarked in the Agenda 21 plan; secondly on the increase of values and social benefit that may derive from the new proposal in reference to heritage awareness, employment etc; as last on the possibility for the public to use building's and site's spaces. On the other hand the cultural heritage deals with conservative issues: the first part sums up safety and normative compliance in reference to accessibility, acoustic, fire resistance, sanitary and anti-seismic standards, whereas the second part assesses project's invasivity, intervention reversibility and material compatibility in reference to major group elements[10].

In the ecological-environmental sustainability (Figure 5) following project's performances are assessed: energetical efficiency, ecological impact, environmental quality and construction site management. The first aspect consists of thermal insulation of the building envelope, solar/wind shading alternatives, advantages from solar supply, rational use of water and plant efficiency, which includes the option regarding renewable resources and an overall evaluation of the systems' efficiency. The ecological impact estimates the use of green technologies and materials as well as the heat island effect, whereas the acoustic and luminous pollution are introduced under the environmental quality menu, for they also consider indoor comfort. In addition to these two there are also aspects concerning valorisation of external green areas and transport facilities that favour alternative ecological transportation. As last, the construction site management evaluates the executive phase of the project, where pollution should be reduced, resource usage limited and waste management optimised.

Finally the economic-financial sustainability investigates resource inputs derived from reclamation, purchase and transformation cost and examines the risk, financiability, profitability, maintenance and management aspect of the project.

THE EVALUATION MODEL

The evaluation tool from part II and III follows Villas' MAVT-model, a particular kind of the MCDA (Multiple Criteria Decision Analysis) – 'a valuable and increasingly widely-used tool to aid Decision making in the domain of sustainability assessment and urban and territorial planning, where a complex and inter-connected range of environmental, social and economic issues must be taken into consideration and where objectives are often competing, making trade-offs unavoidable' (Ferretti et al., 2014, 2).

The MAVT adopted has a tree structure which means that each sustainability macro-category from the third step of the methodology splits into categories, then aspects (or objectives) and options & alternatives (Fig. 6). Each option/alternative (a) can obtain a particular value which represents its performance and can be measured or directly expressed by the user. In the sustainability analysis the user fills the INPUT columns (v(a)) according to the following options:

- YES/NO that correspond to 1 / 0
- YES/PARTIALLY/NO respectively 1 / 0,5 / 0
- GREAT/SOME/MINOR usually 1 / 0,5 / 0
- MUCH/SOME/LITTLE usually 1 / 0,5 / 0
- PERCENTAGE INPUT is normalized into a number between 0-1
- NUMBER in reference to a specific unit of measure, which is then turned into a value between 0-1.

In some cases the "value" automatically provided by the model differs from the table above according to a specific function value of an alternative, which processes the input data in order to reflect the importance of the obtained performance. For instance, a little improvement of a certain quality may be far more appreciable than the achievement of its optimum and is therefore represented by a non linear function.

So obtained values are then aggregated into a single score by means of the additive model:

$V(c) = \sum w_i \cdot V_i(a_i)$ /// $V(c) = w_1 \cdot V_1(a_1) + w_2 \cdot V_2(a_2) + w_{12} \cdot V_{12}$

where V(c) is the overall value of the criteria/objective, $V_i(a_i)$ is the alternative's performance as calculated by the system in the previous paragraph and w_i is a weight as defined in NAM (Non-Additive Measures) methods. NAM is, according to Giove et al. one of the most complete and mathematically well-founded MAVT approaches that allows to consider interactions among criteria assigning a suitable weight to every possible coalition of the state of the criteria (Giove et al., 2011).

The numerical value of NAM are obtained by means of a questionnaire submitted to a panel of experts who are asked to express a judgements between 0 and 100

10 Group of functional constructive elements such as structures, interior partition, finishing, decorative elements, technological systems etc. in addition to the typological scheme.

MACRO- CATEGORY	CATEGORY	ASPECT	OPTIONS & ALTERNATIVE
ENVIRONMENTAL SUSTAINABILITY	ENERGETICAL EFFICIENCY	thermal insulation of the building envelope	coating
			internal insulation
		solar (wind) shading	natural barrier[1]
			architectural elements
		advantages from solar supply	passive components
			thermal inertia
			optimisation of natural lighting
		plant efficiency	energy production from renewable resources[1]
			distribution
			emission
			control / regulation
			presence of regenerators
		rational use of water supplies[1]	reduction of water amount for external use[1]
			reduction of water amount for other uses
	ECOLOGICAL IMPACT	green technologies & materials[1]	reuse of existing building material & finishing[1]
			certification of origin & low embodied energy building materials or low toxicity[1]
			bio-based or recycled material[1] or future reuse and recyclability
			local origin / transport[1]
			durability & maintenance
		low heat island effect[1]	roofing[1]
			external paving[1]
	ENVIRONMENTAL QUALITY	low acoustic pollution	indoor to outdoor noise limitation
			plant/system noise limitation
		low luminous pollution[1]	automatic lighting systems[1]
			external limitations[1]
		valorisation of external green areas	reclamation of degraded areas[1]
			historical or local rearrangement[1]
			hanging garden / green roof[1]
			ground permeability
		transport facilities[1]	public transport[1]
			bicycle facilities[1]
			parking facilities[1]
	CONSTRUCTION SITE MANAGEMENT[1]	resource usage[1]	water[1]
			energy[1]
			ground[1]
		pollution reduction[1]	luminous pollution[1]
			acoustic pollution
		waste optimisation[1]	waste management[1]
ECONOMIC SUSTAINABILITY	RESOURCE INPUT	reclamation cost	
		purchase cost	
		transformation cost	
		effects on circulation[2]	
	BENEFIT ON CONTEXT	effects on territory[2]	economic benefits from project on local community[2]
			spread of new economic activities[2]
			increse of economic value of close buildings[2]
	RISK[2] FINANCIABILITY[2] PROFITABILITY[2]		
	MAINTENANCE & MANAGEMENT[2]	programmed maintenance plan[1]	

[1] Parameter derived from GBC Italia - HB Protocol
[2] Parameter derived from the Villas project
* *Parameter modification in reference to Vipolže case study*

Figure 5: Phase 3 – Tree structure of the sustainability parameters (part 2): follows Figure 4
Slika 5: Faza 3 – Prikaz drevesne strukture trajnostnih parametrov (2. del): nadaljevanje Slike 4
Figura 5: Fase 3 – Struttura ad albero dei parametri della sostenibilità (2a parte): segue Fig. 4

for every edge – that is a hypothetical scenario formed by a combination of only worst and optimal situation for every alternative[11] pertaining to a certain criteria/objective (Giove et al., 2011). In the present model such values have been derived from the ones used in the Villas project or have been assigned by the authors.

Unlike the Villas model, the present method is not ascending the tree structure by applying the NAM funtion to each node of it until a final indicator is synthesized, but it will entrust the priority ranking of the objec-

11 Given the fact that n parameters have 2^n possible combinations, which need to be assessed, it is reccomended that parameters are not greater than 5 or 6, otherwise the expert won't be able to express an opinion (Giove et al., 2011).

MACRO-CATEGORY	CATEGORY	ASPECT	ASPECT edge score	OPTIONS & ALTERNATIVES	U.M.	SCORE	INPUT evaluation	VALUE	SUB-OPTIONS POSSIBLE ACTIONS	U.M.	SCORE	INPUT AMOUNT	VALUE
SOCIO-CULTURAL SUSTAINABILITY	COMMUNITY ENGAGEMENT	PUBLIC INVOLVEMENT IN THE DECISION PROCESS	0,75	fullfillment of current needs	Y/P/N	1/0,5/0	0,5	0,50					
				respect of people's values	Y/P/N	1/0,5/0	1	1,00					
		INCREASE OF VALUES	0,85	future potential beliefs & rituals	Y/N	1/0	0	0,00					
				heritage awareness	M/S/L	1/0,5/0	1	1,00					
		PUBLIC USE &USABILITY	0,93	covered area*	%	0-100	75	0,75					
				external area*	%	0-100	100	1,00					
				socialisation facilities	Y/N	1/0	1	1,00					
		SOCIAL BENEFIT	0,22	employment	n	0-n	5	0,37					
				social purpose / mission	Y/N	1/0	0	0,00					
	CULTURAL HERITAGE	LOW INVASIVITY**	0,93	typological scheme**	Y-N	1-0	0,88	0,88	legibility of the original scheme	Y/P/N	1/0,5/0	1,00	1,00
									restoration of original asset	Y/P/N	1/0,5/0	1,00	1,00
									functional coherence with the historic use	G/S/M	1/0,5/0	0,50	0,50
									distribution modification	M/S/G	1/0,5/0	1,00	1,00
				structures**	Y-N	1-0	0,67	0,67	structural substitutions	M/S/G	1/0,5/0	0,50	0,50
									new additions	F/S/M	1/0,5/0	0,50	0,50
									low-invasive instability treatment	Y/P/N	1/0,5/0	1,00	1,00
				finishing & decorative elements**	Y-N	1-0	1,00	1,00	preservation of recoverable finishings & decorative el.	Y/N	1/0	1,00	1,00
									substitution of added layers with finishings similar to original ones	Y/N	1/0	1,00	1,00
									low-invasive degradation solutions	Y/P/N	1/0,5/0	1,00	1,00
				technological systems**	Y-N	1-0	1,00	1,00	indoor/outdoor visual impact	M/S/G	1/0,5/0	1,00	1,00
									compaction and use of existing technical spaces	Y/P/N	1/0,5/0	1,00	1,00

the output value is a decimal number directly turned from the percentage input

the output value is a function value

Figure 6: Phase 3 – Extract from the sustainability analysis of case study Vipolže: the table extract shows part of the socio-cultural sustainability grid. The input data provided by the user are marked with yellow colour (columns "INPUT evaluation" and "INPUT amount"), whereas the framed columns report the value output as calculated by the model. The "ASPECT edge score" is the synthesized indicator of the options/alternative performance ("VALUE" column) and expresses the final score obtained in a specific sustainability aspect.
Slika 6: Faza 3 – Izvleček iz analize trajnosti na primeru v Vipolžah: razpredelnica ponazarja del ocenjevalne tabele iz področja družbeno-kulturne trajnosti. Podatke, ki jih mora uporabnik vnesti so označeni z rumeno bravo (stolpca "INPUT evaluation" in "INPUT amount"), medtem ko so v uokvirjenih stolpcih vrednosti, ki jih model avtomatično izračuna. T.i. "ASPECT edge score" je sintetična ocena, ki izhaja iz točkovanja na nivoju options/alternative (stolpec "VALUE") in izraža končno vsoto, ki jo je načrt dosegel glede na določen trajnostni vidik.
Figura 6: Fase 3 – Estratto dall'analisi della sostenibilità del caso studio di Vipulzano: l'estratto di tabella mostra parte della griglia relativa alla sostenibilità socio-culturale. I dati immessi dall'utente sono individuati dalla colonna gialla (colonne "INPUT evaluation" e "INPUT amount"), mentre le colonne contornate in rosso riportano i valori calcolati dal modello. Lo "aspect edge score" è l'indicatore sintetico delle prestazioni riferite alle opzioni/alternative (colonna "VALUE") ed esprimono il punteggio finale ottenuto in uno specifico ambito della sostenbilità.

tives/aspects to the user himself. In fact, the user could define the weight of each aspect in reference to his own sensitivity and to the case he's facing. This operation should be done before starting the sustainability assess-

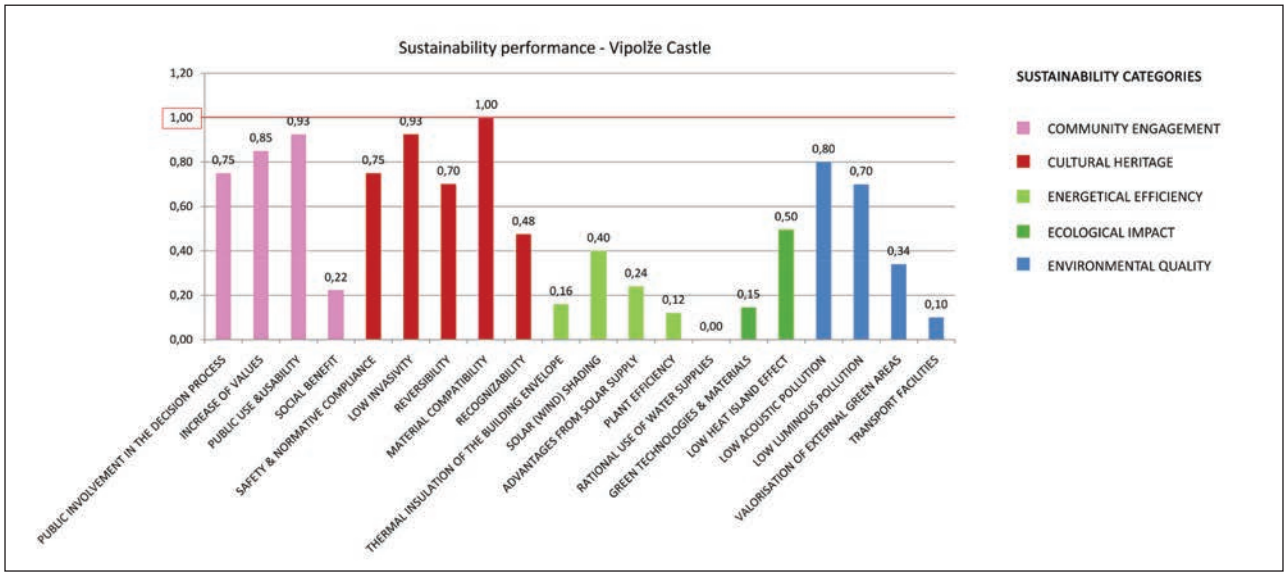

Figure 7: Phase 3 – Diagram of the sustainability performance of the Vipolže castle preservation project: the chart summarizes the scoring obtained by the Vipolže project in each sustainability aspect reported on the ordinate axis, grouped in sustainability categories according to their colour. The assessed performance is easily comparable with its maximum/ideal score equal to 1,00.
Slika 7: Faza 3 – Diagram trajnostnega nivoja konservatorskega načrta za grad Vipolže: diagram prikazuje točke,ki jih je projekt za Vipolže dosegel v posamezni trajnostni kategoriji. Le-te so navedene na abscisi in zbrane v skupine na podlagi barve. Izračunane vrednosti se zlahka primerja z najvišjimi možnimi/idealnimi vrednostmi, ki veljajo 1,00.
Figura 7: Fase 3 – Grafico delle prestazioni di sostenibilità del progetto di conservazione del castello di Vipulzano: il grafico riassume i punteggi ottenuti dal progetto di Vipulzano in ogni aspetto sostenibile riportato in ascisse, raggruppato in categorie di sostenibilità in base al colore. Le prestazioni calcolate sono facilmente confrontabili con i valori massimi/ideali pari a 1,00.

ment of the preliminary project, so that at the end the user would be able to compare the obtained result with his priority ranking.

RESULTS

The above described methodology represents a whole procedure that guides the user through a responsible planning activity starting by understanding the object he's dealing with – an essential phase for a correct approach to the following decisional phases, where a new purpose should be defined first and then a series of intervention choices must be programmed. Right in these two delicate moments the evaluation model intervenes as a support for the decision maker who can rationally make his decisions by comparing potential scenarios with an ideal (though impossible) situation.

The methodology is primarily meant to be used during the planning phase (*in itinere*), but it might also be a support in the alternative-choice *ex-post*, comparing the performance of different projects. However, the following paragraphs comment an ex-post study application that has been tested on an already completed intervention mainly to verify the reliability and the performance of the proposed method.

CASE STUDY: VIPOLŽE CASTLE

The villa has probably been erected on a previous medieval castle of Gorizia's counts by the Thurn family who owned it in the XVIth Century[12]. It is set on the top of a hill among vineyards of the renowned Brda region, with the main facade pointed towards the small village of Vipolže to the North. According to the typological classification by Seražin it is a Friulian villa with late-renaissance and Venetian influence that have been added in later renovations (Seražin, 2006). Though it is also considered a castle-villa for its rectangular plan with a rather little rhomboidal tower on each side. The four-storey building has a big vaulted cellar and three levels above ground, that are served by two staircases at the endings and a rear corridor leading to the chambers. Construc-

12 The construction date has not yet been defined: Dr. Nace Šumi dates the villa at the beginning of the 16th Century, Christoph Ulmer after 1520 and a recent study of its stylistic characters postpones it to the second half of the 17th Century (ZVKDS - OE NG, Mozetič, 2003).

tion materials and systems are traditional: stone masonry walls, wooden floors and roof structure and brick vaults of various forms. The closed and massive appearance of the exterior is refined by the rhythm of the openings classically framed by stone elements, the balcony and its balustrade above the entrance portal, towers' quoin, the continuous under-roof moulding and the characteristic pyramidal chimneys crowned with a sphere of stone (Seražin, 2006; ZVKDS - EO NG, ITEO, 2006).

The building has so far undergone many modifications due to change of use and property or to war damages. Finally it had fallen into disrepair even if it was occasionally used by local communities until the last renovation and structural-reinforcement project. The planning phase started in 2003 - as dated on technical drawings – with no specification on the building's new use. Later in 2006 a feasibility analysis showed that a multicultural centre would be the most suitable option. The building has been completed in June 2014 acccording to the identified purpose, which should be operative from spring 2015[13] (Figure 8).

The project documentation stored by ZVKDS OE NG (Zavod za varstvo kulturne dediščine Slovenije – Območna Enota Nova Gorica) aims to bring the building back to its original image and solve major issues such as dreinage system and structural integrity. The typological scheme has been re-established by removing later partition, adding missing elements as two walls at the first level and the floor above them and substituting vaults with subsidence problems. Structural performace has been enhanced by means of reinforced concrete slabs and lime injections. Finishings and decorative elements have been restored preserving original pieces, improving their anchoring system, reconstructing irrecoverable parts with similar elements and replacing non original floorings with traditional surfaces.

The sustainability analysis of this intervention shows a good performance in the socio-cultural category and a middle-low scoring in the ecological-environmental sphere (Figure 7). Due to missing information the third field – economic-financial sustainability – and some other parameters regarding the construction site management or the aspect »green technologies and materials« have not been defined.

In particular, as shown in figure 7, »the community engagement« area has a very good rating (0,75 to 0,93/1,00) thanks to the public usability of most spaces and the respect of community's values through the choice of a function that can strengthen local traditions and culture as well as increase heritage awareness. On the other hand there is a less encouraging performance in social benefit for the project is not part of a social programme nor it suggests a significant number of new employment positions. However the model has not considered possible positive effects on local economies that could be added to the social-benefit parameters. Great attention has been paid to normative compliance even if the accessibility criterion penalises the aspect's score (0,75/1,00) with its limitation to the visitability feature[14]. The present study case has also suggested some new sub-options in the »low invasivity« aspect: restoration of original asset, substitution of added layers with traditional finishing, quantity of new structural additions has raised the project's rating from 0,83 to 0,88/1,00. Despite this it has also pointed out the necessity of introducing a new aspect among the cultural heritage subcategories – the »recognizability[15]« of both added structural elements/ partitions and integrated decorative apparatus. Even if the material compatibility has an excellent rating, the reversibility performance gets to 0,70/1,00 due to the anti-seismic reinforcement actions (Figure 7).

The energetical efficiency is overall mediocre because of insufficient thermal insulation and lack of energy production from renewable resources – which brings the »plant efficiency« value down to 0,12/1,00. In this case it would be probably better if this option was an individual aspect rather than a specification of the above mentioned parameter.

Finally the »environmental quality« area obtains a good performance in reference to luminous and acoustic pollution limitation, but a bad rating in transport facilities and valorisation of external green areas. Both aspects aim for »green« solutions, that are missed by the study case because of the limited quantity of permeable ground and the particular accessibility[16].

DISCUSSION

Despite the fact that this method testing mainly aimed to verify if the selected parameters were sufficient to evaluate the sustainability performance of different projects/cases, the interesting observation derived by this trial demonstrate how each study case is also able to refine the model bringing out new points of view and potentialities.

In fact, the model application to the above described case immediately revealed through a low scoring the project's weak points – aspects that have been neglected, intentionally or not – as for instance the thermal performance of the building. In addition to this it also suggested

13 http://www.brda.si/znamenitosti/kulturne_znamenitosti/2012051414554311/Vila%20Vipol%C5%BEe/.

14 Available documentation does not reveal any specific features. An exterior visit has demonstrated the existence of reserved parking places and ramps leading to the main entrance, but the outward appearance suggested no internal lifts. Therefore the proposed rating is referred to the "visitability" condition.

15 That is the legibility of integrations and reconstructions.

16 The site is served only by a local road, no bus stops have been noticed. The accessibility condition itself favours use of private cars, whereas environmental amenity indirectly promotes bicycles.

Figure 8: North facade of the Vipolže Castle after its restoration, January 2015 (photo: Marta Lombardi)
Slika 8: Severna fasada Gradu Vipolže po restavratorskem posegu, januarja 2015 (foto: Marta Lombardi)
Figura 8: Facciata nord del Castello di Vipulzano dopo il restauro, gennaio 2015 (foto: Marta Lombardi)

some improvements of the method that could be obtained through the re-arrangement and integration of the parameters or by introducing new specification and features. For example, minimum target values could be added in order to guarantee a minimum standard of sustainability performance; furthermore, some qualitative evaluation (i.e.: 1/0,5/0) could be turned into more detailed quantitative values for a more accurate assessment.

Nevertheless, the Vipolže study case revealed also some gaps in the evaluation model as for instance the situation of indeterminateness, i.e. the impossibility of expressing a value for a criterion, which is not yet acceptable. Since the assessment grid must be fully completed, in order to reduce the influence on the result to the minimum, the user should put in a value equal to 1,00. However, a Boolean function applied to the existence condition of each parameter could adequately solve the problem and add the possibility of tailoring the model to each case – an option that is also present in the GBC HB model.

CONCLUSIONS

It is now generally accepted that sustainability is a complex problem, which can be divided into three sub-categories: the social and cultural component, the ecological – environmental and the economic sustainabilty, that also involves financial aspects. These fields are often overlooked, especially when referring to architectural practice and perhaps it happens due to the lack of suitable project-management tools. For this reason the methodology presented in this paper tries to offer a possible solution to planning sustainable re-use and/or preservation projects. This new approach is meant to be used by designers and decision makers during the design process. Based on the previous experiences of the GBC HB Protocol and the Villas project it has enhanced into a three-step procedure supported by a multiple criteria evaluation model.

The ex post application on Vipolže Castle, presented in the last part of the paper, has been useful to outline

the model's structure and its elements: the building's IDs from the knowing phase have been arranged on the basis of the case examined, whereas in the third part some new sustainability parameters have been added and others re-organised. Moreover the test has also suggested an integration of the model with minimum standards and a Boolean operator, which could indeed prevent the problem of indeterminate records and simultaneously improve the method's flexibility.

Finally, the methodology could certainly be refined through further application of the method on different case studies, where a cyclical testing would lead to a more and more complete approach.

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NOV PRISTOP K NAČRTOVANJU TRAJNOSTNE PRENOVE STAVBNE DEDIŠČINE: PRIMER GRADU VIPOLŽE V GORIŠKIH BRDIH, SLOVENIJA

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POVZETEK

Trajnost je glavni pristop k razvoju sodobne družbe. Kljub temu pa v konkretni praksi primanjkuje ustreznih pripomočkov, ki bi lahko vodili do učinkovitih posegov.

Prvi del članka proučuje pojem trajnosti, ki ga lahko razstavimo na tri različne problematike: na družbeno-kulturno komponento, na okoljski ter ekonomski vidik. Prav na teh kategorijah je osnovana sledeča metodologija, ki vodi uporabnika – naj bo to projektant ali odločujoča oseba – do trajnostnega načrta prenove preko postopka v treh korakih: prva faza je namenjena spoznavanju objekta in njegovega območja, nato sledi analiza "nagnjenosti", ki opredeli najustreznejšo novo namembnost in nazadnje še analiza trajnosti, s katero lahko preverimo dosežke predlaganega projekta na posameznih trajnostnih področjih v razmerju s hierarhično urejenimi parametri.

Članek predstavi in obrazloži glavno strukturo, trajnostne parametre in multikriterialni model evalvacijskega postopka. V zadnjem delu pa kritično komentira metodologijo, ki je bila testirana ex-post na primeru Grada Vipolže, utrjene vile iz Goriških Brd v Sloveniji. S preizkusom se je struktura modela še dodatno izostrila, tako da je pridobila nove parametre ali drugače uredila obstoječe; poleg tega je test tudi pokazal, kako bi lahko nove funkcije privedle do bolj fleksibilne metodologije.

Ključne besede: trajnost, prenova in ohranjanje, stavbna dediščina, multi-kriterialna evalvacija, grad Vipolže

LIST OF ABBREVIATIONS

FBC – Fraser Basin Council
GBC – Green Building Council
HB – Historic Building
ID – Identity card (it.: CI – carta d'identità)
IUCN – International Union for Conservation of Nature
LEED – Leadership in Energy and Environmental Design
MAVT – Multi-Attribute Value Theory
MC – Multi-Criteria
MCDA – Multi Criteria Decision Approach
NAM – Non-Additive Measures
UNEP – United Nations Environment Programme
WCED – World Commission on Environment and Development
WWF – World Wide Fund For Nature
ZVKDS OE NG – Zavod za Varstvo Kulturne Dediščine Slovenije Območna Enota Nova Gorica

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