Perception and evaluation of visual quality of the urban landscape in historic areas

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Abstract

The article addresses perception and evaluation of cultural built heritage and its contribution to the visual quality of urban landscape in order to ascertain the level of importance attributed to heritage buildings and to identify the physical characteristics of existing buildings on sites of heritage value that are more and less attractive to users, as well as the indication of historical and affective values which possibly influenced the user perceptions with respect to environmental and aesthetic quality. Historic areas of two cities were selected as case studies. Piratini represents cities with preserved historic centres, and a pioneering urban legislation; and São José do Norte represents cities where cultural heritage was adulterated due to a lack of legislation to guarantee the preservation of built heritage. The research was implemented through the use of qualitative and quantitative methods in two stages of investigation. The first aimed at gathering elements to define the study area through mental maps and interviews with users of historic areas, which allowed the identification of the strongest positive and negative images of public buildings and urban spaces. In the second stage, questionnaires were administered to evaluate images of urban scenes with different levels of homogeneity. The goal was threefold: to investigate the role built cultural heritage has on the visual quality of urban landscape, to measure the damage to the aesthetics of the city caused by the lack or non-inclusion of issues relating to preservation of cultural heritage in the process of urban planning and to support the elaboration of public policies on the preservation and planning issues. The results indicate the relevance of bringing together experts in the field of preservation of cultural heritage and users of historical areas, emphasizing the importance of user engagement with public policy issues of heritage preservation, which allow the appropriation of cultural heritage by local communities.

Keywords: built heritage; urban landscape; visual quality

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Introduction

In the process of planning and ordering the dynamics of urban growth, cultural built heritage, considered in its full scope and complexity, begins to impose itself as a major component to be considered in the process of evolution and transformation of cities. Despite the statement of its importance, cultural built heritage in most Brazilian cities is absent from public policies and land management. Regardless of national heritage at regional or local level, the Brazilian municipality has constitutional authority and obligation to protect it. However, in most cities, cultural heritage issues are not accepted, understood or prioritized. The lack of control and concern for aesthetic quality and consequences to the visual appearance of cities characterized the problem in this research. Generally the regulatory instruments of projects are directed more to define the constructive potential than the aesthetic quality of new buildings; their insertion into the landscape and compatibility with the pre-existing structures. Consequently, the absence of urban legislation for preservation of cultural built heritage, as well as the absence of regulatory mechanisms and control of urban aesthetics, leads to the destruction of local cultural heritage and the growing disqualification of the landscape and visual appearance of historic cities.

This study investigates the level of importance attributed to the built cultural heritage by the population and identifies environmental aspects and qualities that tend to be more and less attractive to users, when evaluating a set of buildings of a certain area. This establishes the values (architectural, historical, emotional, etc.) present in the area that may influence the perception of its users with respect to urban aesthetics. Moreover, considering that the environmental image affects the attitudes of individuals in relation to urban space, awareness of the visual appearance can be an important component to be considered in the search for improvement in the quality of landscape aesthetics. The literature suggests that built heritage is an essential element in the rescue of pleasant things and transmitters of

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sense of well-being, these being gradually lost in the process of building modern cities, as well as the relationship between man and environment. In the environmental assessment process, historic buildings tend to be perceived positively and aesthetic values associated with formal and symbolic (Lang, 1987).

Usually located in the central areas of cities where changes occur more quickly and frequently, the permanence of historic buildings is considered essential to maintain the sense of continuity of places, while the destruction of heritage buildings and landscape change can affect individuals' perceptions. According to Lynch (1997), rapid changes in the urban environment, added to technical and functional changes, can be emotionally upsetting for the people and disrupt their perceptual image. The study of aesthetics seeks to identify and understand factors that contribute to the perception of an object or a process as beautiful, or how they can provide a pleasant experience (Lang, 1987). Stamps (1989) explains the significance of studies on the visual quality of the perceived environment, based on the fact that the aesthetics of the urban landscape is related to the human need to have pleasant sensations. Thus, one can infer that pleasant surroundings would be potential generators of pleasant sensations. Discovering how to preserve or create these environments perceived positively by the local population should be a constant objective of the urban planning process. Still, studies with an emphasis on cultural heritage buildings (e.g., Azevedo *et al.*, 1999) indicate that the predominance of historic buildings is a reference in the mental process of structuring an urban area, which is related to certain attributes such as the external appearance of buildings, their historic importance and use.

Thus, visual quality contributes to the appearance of cities and affects the well-being of individuals, whose senses are stimulated through continuity, variety and existing formal standards in urban landscape as well as through images compiled from the cognitive process of the individual (Reis, 2002). The evaluative response is directly related to the physical-spatial environment and previous experience of observers and their views, expectations and cultural experiences, involving the processes of perception and cognition. In the evaluative response, perception and cognition have probabilistic relationships with one another and with the physical characteristics of the built environment, resulting from the interaction between individuals and the environment. This model suggests two broad components of the evaluative response – perception and cognition – and two types of environmental variables: formal and symbolic (Lang, 1987). While formal attributes consist of physical elements of buildings that comprise the architectural form used to describe it objectively, buildings and urban space also have symbolic attributes, the result of the experiences and values acquired in the interaction between the individual and the urban landscape. Besides these, there are visual qualities of landscape attributes that transform them into objects of attention, despite the ability of selective vision.

The compatibility of formal and contextual new insertions is also mentioned as an important element in evaluating the urban landscape since the composition of buildings suggests an idea of aesthetic order in visual perception (Reis, 2002). On the other hand, in an urban setting where there was concern about the pre-existing buildings, there may be a great contrast and variety of heights and volumes and this diverse visual environment can generate a confusing, chaotic setting, where individuals may feel disoriented (Lozano, 1988). According to Nasar (1998), cities can increase their positive image evaluation, enhancing the visual coherence or order through a variety of features that can aid in the perception of order, such as readability, repetition, replication features of façades, uniform texture, little contrast between elements or between buildings and their natural context and identifying features and focal point.

Moreover, Lang (1988) argues that some architectural variables carry symbolic meanings, considering their relationship with the dimension of affective experience, such as composition (architectural style), spatial configuration (volume ratio), materials, lighting and the nature of pigmentation (colour). Therefore, numbers of buildings or buildings of a particular style show cognitive relations associated with them as symbols of an idea or historical time, acquiring values that affect aesthetic evaluation, such as historical significance, age, urban references and positive associations with a period in history. Coeterier (1996) highlights the importance of historic buildings as an existential value for people on three levels: place identity, personal identity and group identity; he also argues that historic buildings amplify the sense of community and collective identity. As Lynch (1975, p. 40) remarks, people usually respond favourably to historic sites for a variety of reasons, and he argues that "many historic and symbolic places convey a sense of security and continuity," adding that the character of the personal

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image of time is crucial for individual welfare, as well as to achieve success in time to coordinate the environmental transformation and maintain this image of time.

This article deals with aesthetic issues in the process of visual perception of the built environment related to the built cultural heritage and its contribution to the visual quality of the urban landscape, with the aim of emphasizing the damage to the aesthetics of the city caused by the lack or non-inclusion of preservation issues of heritage buildings in the process of urban planning, as well as gathering input for public policies on preservation and planning.

1. Methodology

The aesthetic response was measured based on the different levels of satisfaction expressed by individuals regarding the formal and symbolic attributes of buildings. The ratings herein are based on the premise that there is interplay of influences between individuals and visual aspects that make up the urban landscape. The role of cultural heritage buildings in the urban setting was investigated in two cities with initial settlement occurring in the 18th century, and with different degrees of preservation: Piratini represents cities with preserved historic centres with a pioneering urban legislation, while São José do Norte represents cities where cultural heritage was adulterated due to a lack of legislation to guarantee the preservation of built heritage.

The research was implemented through the use of qualitative and quantitative methods in two stages of investigation. The first aimed at gathering elements to define the study area by applying the technique of mental maps and interviews to users of historic areas, which allowed the identification of the strongest positive and negative images of public buildings and urban spaces (Figure 1). In the second stage, 113 questionnaires were administered in order to evaluate images of urban scenes with different levels of homogeneity, chosen based on criteria established to meet the objectives of the investigation. Data obtained through questionnaires were analyzed quantitatively by means of frequencies and non-parametric tests. Three scenes from each city were selected in order to accommodate study aims, with the necessary prerequisites being: a) located within areas of study defined in the first stage; b) of different levels of homogeneity in external formal features, with heights and construction times resulting in a more homogeneous scene, mixed (more or less homogeneous) scene as well as an heterogeneous scene; c) representative buildings of cultural heritage (buildings of the ancient period), present in its composition and d) buildings representative of modern period, buildings of the contemporary period and/or adulterated buildings present in its composition.

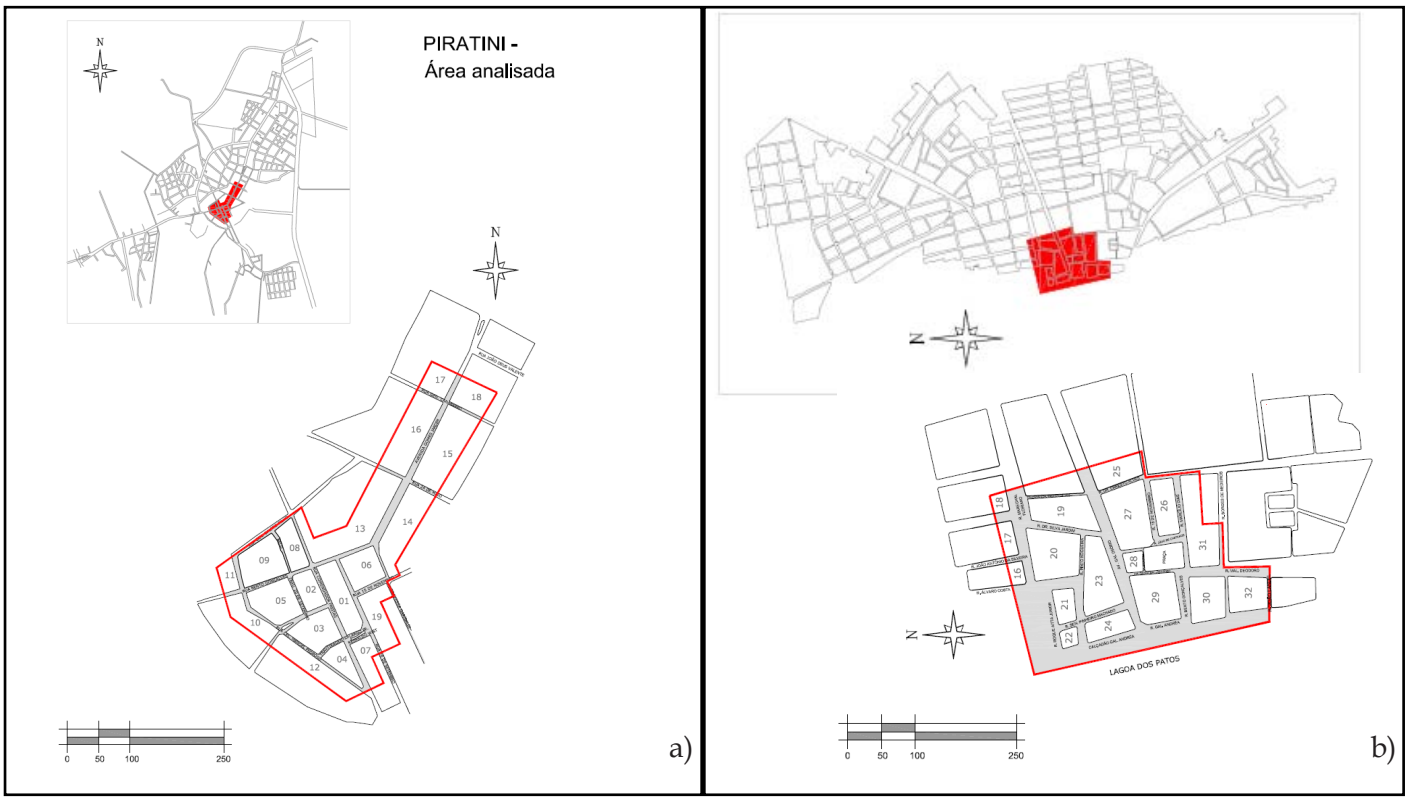

Figure 1. Definition of study areas. a) Piratini; b) São José do Norte.

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For the purposes of this research, different styles and mixtures of styles were classified according to the following periods: a) the early period (until 1930), including the buildings in this period with language influenced by Luso-Brazilian colonial style – the eclectic buildings that anticipated modernism, called 'pre-modernist' by Nauomova (2009), basically corresponding to Art Nouveau and proto-modernist styles; b) the modern period (1930 to 1980), influenced by various architectural currents responsible for the consolidation of the Modernist movement such as Art Deco, the Chicago School, European rationalism, expressionism, and the neo-classical revival (Kiefer and Light, 2000); c) the contemporary period (after 1980), marked by the revision of the modern movement; and finally, d) buildings from any period, disfigured by the loss of their original typological characteristics due to profound changes or replacement of items and construction materials. Regardless of typological classification, this research was focused on identifying building in multiple periods of time in order to verify the role that a cultural heritage building – represented by buildings of the ancient period – plays in determining the visual quality of the urban landscape.

2. Relationship between cultural built heritage and visual quality of the urban landscape

In order to investigate the role that built cultural heritage has in an urban setting, especially if it contributes positively to the visual quality of the urban landscape, the three selected scenes with different degrees of homogeneity were assessed by respondents in each city (Figure 2).

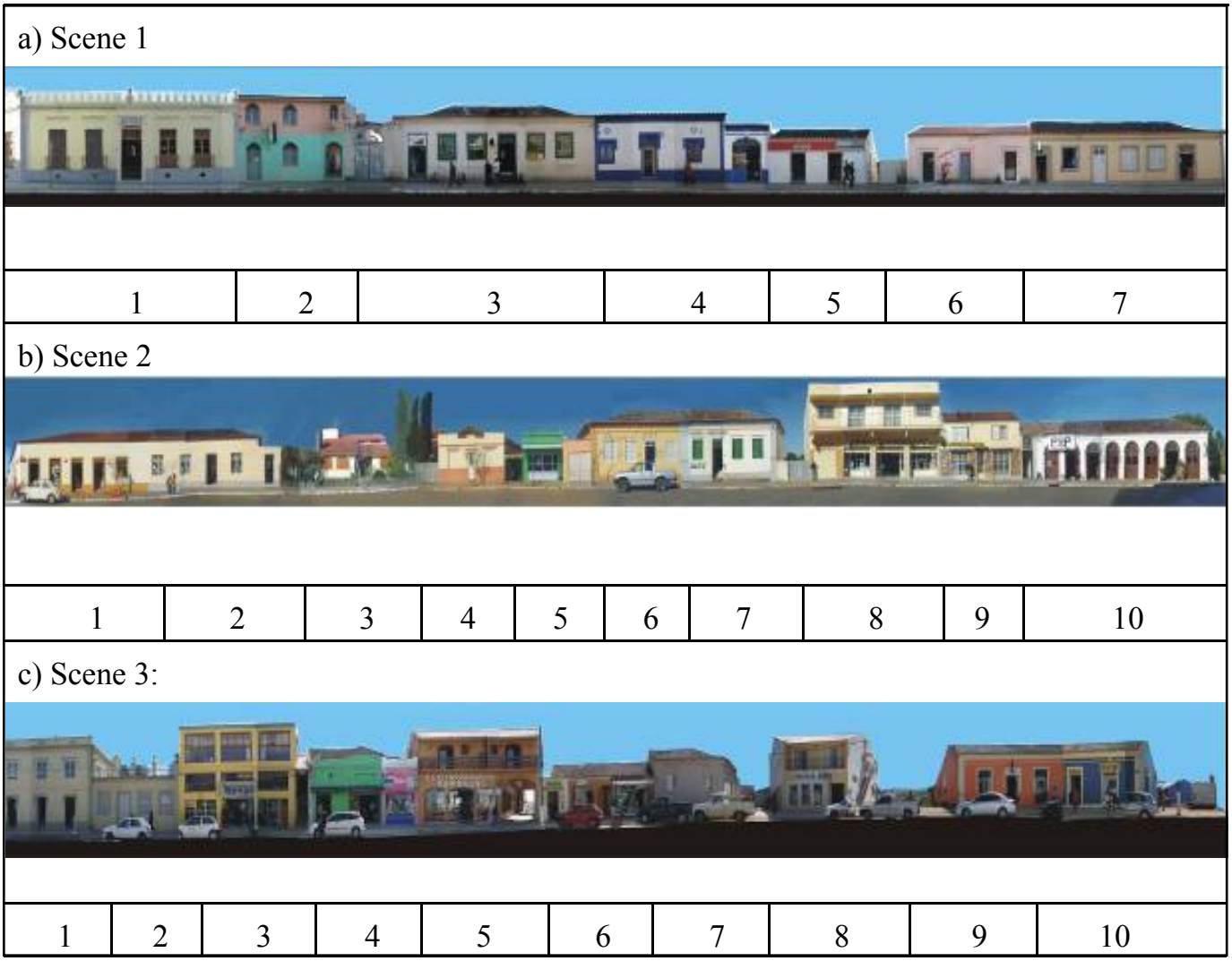

Figure 2. Urban scenes Piratini: a) scene 1; b) scene 2; c) scene 3 (Source: M. Rodrigues and A. Romanini, arquivo IPHAN).

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Positive justifications		Negative justifications	
%	Justification	%	Justification
33.3	Outstanding-Preservation of historic building	19.4	Lack of harmony with colours
19.4	Historic meaning-symbolic value of historic buildings	16.6	Visual pollution-advertisements
19.4	Pleasant appearance; beautiful	13.8	Lack of conservation

Table 1. Visual Appearance scene 1 - Piratini. Justifications related to visual appearance of scene 1 - Piratini.

2.1. Assessment of urban scenes: Piratini

Scene 1- This is the most intact scene in terms of preservations of cultural heritage buildings and also the most ordered (Figure 2a). The buildings that make up the scene are mostly from ancient period. Buildings 1 and 3 are the best preserved of cultural heritage buildings, protected by preservation law. Building 7 maintains most of the external formal characteristics. Building 4 has the characteristic structure of the buildings of Luso-Brazilian architecture and introduction of certain eclectic decorative elements. Buildings 5 and 6 had their roofs and frames changed. Building 2 is the only one from the contemporary period with incorporation of old elements like arches and French-style frames. The first scene was viewed favourably by 70% of the sample of respondents. The main reasons justifying positively and negatively the visual appearance of the scene are shown in Table 1.

The main reason for positive evaluation of the appearance of the scene is 'preservation of old buildings', emphasizing the importance that respondents from Piratini give to cultural heritage buildings. A second positive justification is 'historical meaning' – the symbolic value of historic buildings, indicating meanings and values attributed to built cultural heritage. The same percentage perceives a pleasant visual appearance, allowing pleasantness and beauty to be associated directly with the homogeneity of the scene. The main negative cited is 'lack of harmony in colours', suggesting how this attribute is enhanced by *Piratinenses*. Note also, how the issue of visual pollution caused by lack of regulation in the use of advertising media on the perimeter of the historic centre is perceived by users. Conservation status was the third most frequently cited negative and can not be ignored, as the state of conservation seems to be relevant in aesthetic judgments (Nasar, 1998; Kings and Lay, 2006).

scene 2 – This mixed scene consists of old and new buildings that represent different styles, blending styles and periods of architecture such as the Luso-Brazilian, eclectic, modern and contemporary (Figure 2b). The five buildings of the early period (1, 2, 6, 7 and 10) are protected by municipal law. Building 1 has constructive characteristics of the Luso-Brazilian architecture. Building 2 has the same formal characteristics of traditional building, but its window frames were replaced by French-style windows. Building 3 is a contemporary building, with a retreat of gardens, side setbacks and vegetation that differs from the others. Building 4, from modern period, has straight and trimmed elements. Building 5 suffered several alterations. Buildings 6 and 7 form a single volume and have the structure of the Luso-Brazilian architecture and standard neoclassical decorative details. Building 8 is from the contemporary period and is the tallest, with a balcony running across the front façade that spreads along the promenade. Building 9, with two floors, belongs to the contemporary period and building 10 has a different typology, with a structure of Luso-Brazilian architecture and roof tiles, but with arched and French-style openings.

Positive justifications		Negative justifications	
%	Justification	%	Justification
2.2	Beautiful appearance	6.6	Existence of modern and old buildings
6.6	Existence of modern and old buildings	1.1	Ugly modern buildings/new and ugly
1.1	Outstanding preservation of old buildings	1.1	Visual pollution

Table 2. Visual Appearance scene 2 – Piratini. Justifications related to visual appearance of scene 2: Piratini.

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This scene was viewed favourably by more than 50% of respondents. The main positive and negative reasons given by respondents to evaluate the appearance of the scene are shown in Table 2.

'Beautiful appearance' is the main positive justification, followed by 'the presence of modern and old buildings', which suggests integration between the buildings of different periods. In other words, there was compatibility between the new formal inserts and those already in existence. The integration of buildings from different periods can be considered a major factor in the aesthetic evaluation of the scene which, although less homogeneous than the first, was considered positive for more than 50% of respondents and with a beautiful appearance. The 'outstanding preservation of old buildings' is the third positive justification used, which shows the duality of views on evaluative responses to the appearance of the scene and about what and how, whether positively or negatively, the buildings that compose the scene contributed. 'Presence of modern and old buildings' was considered positive by some but negative for many others, as the main negative justification, which is further reinforced by the second most significant response that considers modern (new) buildings 'ugly'. Visual pollution was negatively perceived by users and exemplifies the intensity with which it can affect the visual quality of the urban scene.

Scene 3 - The most heterogeneous scene, as amended by recent constructions and alterations, was considered one of the 'ugly sites' in the mental maps, because it has three contemporary insertions that altered the structure of this ancient quarter, both external and formal characteristics with respect to number of floors (Figure 2c). Of the five buildings from the ancient period in the scene, four are protected by municipal law (1, 2, 9 and 10). Buildings 1 and 2 have the structure of the Luso-Brazilian architecture, but standard neoclassical elements were added. Buildings 9 and 10 have typical characteristics of the Luso-Brazilian architecture. Building 7 is from the early period. Buildings 3, 5 and 8 belong to the contemporary period. Building 4 is from the modern period and despite having been included in the Inventory of Property, is uncharacteristic. The same happened with building 6, which had the spans and frames replaced.

This scene was viewed favourably by only 23% of respondents. It is the less orderly scene and the only scene of the three where 'ugly' is indicated as an evaluative response. Justifications focused as negative (Table 3). The 'presence of modern and ancient buildings' was the negative justification with the highest frequency, suggesting that in this scene there was no integration between the buildings of the early period (pre-existing buildings) and new inserts. The diversity of styles, different forms of buildings and modern buildings / new profile contributed to the chaotic scene. When the contributions of each building to the visual quality of the scene were evaluated, a similar situation occurred where ancient buildings were favoured and buildings of the modern period and the contemporary period were negatively evaluated.

%	Negative justifications
41.6	Existence of modern and old buildings
36.1	Chaotic scene
25.0	Different formal characteristics of buildings
9.4	Diversity of styles
16.6	Modern-new buildings
11.1	High

Table 3. Visual Appearance scene 3 - Piratini. Major reasons related to the visual appearance of scene 3: Piratini.

2.1.1. Analysis of the aesthetic preference of scenes in Piratini

The order of preference of scene 1s, 2, 3 was confirmed by 66.7% of respondents, while 8.3% preferred order 1, 3, 2. The more homogeneous scene (scene 1) was evaluated positively by approximately 70% of respondents. The second scene was rated positively by over 50% of the sample. The more heterogeneous scene (scene 3) was evaluated positively by only 23% of respondents. Analyzing the results on the visual appearance of the scenes it can be inferred that the greater the degree of homogeneity, more visual quality has the scene, and vice versa. The comparison between the frequencies obtained on aesthetic assessment of each scene shows the trend of positive assessments on the scene 1 and 2 and the most negative evaluations in the third scene.

2.2. Assessment of urban scenes: Sao Jose do Norte

Scene 1 - Despite its peculiar appearance, scene 1 in Sao Jose do Norte represents original structures to a greater extent (Figure 3a). With the exception of building 11, from the contemporary period, the other buildings were all listed by the Institute

Positive justifications		Negative justifications	
%	Justification	%	Justification
37.5	Outstanding preservation of old buildings	20.0	Lack of conservation
20.0	Symbolic value of historic buildings	7.5	Lack of attractiveness
15.0	Existence of modern and old buildings	5.0	Alteration of façades

Table 4. Justifications related to the visual appearance of scene 1- Sao Jose do Norte.

of Historical and Artistic Patrimony of the State (IPHAE). Building 2 has recently been recycled. Buildings 1, 3 and 8 are old, but were adulterated to a greater or lesser degree. Buildings 5, 6, 7 and 9 had façades upgraded into 'deco' style. Building 10 is one of the few terrace houses of the Luso-Brazilian style most preserved, both externally and internally. Building 12 is a corner house of the modern period. scene 1 was evaluated positively by 70% of respondents. The main positive and negative reasons given by respondents to evaluate the appearance of the scene are in Table 4.

The main positive justification highlights the preservation of old buildings and the second deals with the symbolic values and historical significance. The third reason concerns the positive contrast perceived by the presence of ancient and modern buildings. Since this scene was rated negatively by only 5.6% of respondents, the negative perceptions received little justification. The main one was 'conservation status', mentioned by 20% of respondents, followed by lack of attractiveness of the scene and changes made to the façades.

Scene 2– This scene maintains the land structure from the colonial period with a few buildings remaining from the original built heritage, currently adulterated or in poor state of conservation, with modern and contemporary insertions (Figure 3b). This scene was positively evaluated by 55% respondents, while 17.5% considered it ugly. The main

Figure 3. Urban scenes, São José do Norte: a) scene 1; b) scene 2; c) scene 3 (Source: M. Rodrigues and A. Romanini).

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Positive justifications		Negative justifications	
%	Justification	%	Justification
15.0	Conservations status	15.0	Conservation
15.0	Colour of façade	15.0	Existence of modern and old buildings
10.0	Existence of modern and old buildings	10.0	Demolitions and alterations to the façades

Table 5. Justifications related to visual appearance of scene 2 – São José do Norte.

reasons justifying the positive and negative assessment of the scene are shown in Table 5.

It appears that the main positive justifications on the assessment of the scene is the 'conservation status' and the 'colours of the façades', which highlights how maintenance of buildings is an attribute valued by *Nortenses* (the appellation for the residents of Sao Jose do Norte). The existence of modern and new buildings was the third positive justification, as respondents believed that the buildings contribute to the renewal and upgrading of the urban scene. However, the mix of modern and old buildings was considered one of the main negative justifications, along with conservation. The demolitions and changes in the façades are the third justification presented. The scene presents such a situation due to the partial demolition of a two-story colonial terrace that dominates the centre of the scene (building 7) and adulteration of façades in varying degrees.

Scene 3 – The heterogeneous scene collects representative examples of Luso-Brazilian architecture from the colonial period (Figure 3c). The single storey row houses were adulterated. The colonial mansion located in the centre of the scene (6), which dominates by its volume, height and other formal and symbolic attributes, is in disrepair. Both building 7 (modern period) and building 8 were identified through mental maps as 'ugly' places. This scene was positively evaluated by 15% of respondents. Compared with the heterogeneous scenes of the other city, it achieved the highest negative rating (37.5%). The main reasons justifying the perceived visual appearance of the scene are shown in Table 6.

Although most of the justifications are negative with respect to the visual appearance of the scene, *Sobrado dos Imperadores* (building 6), despite its poor condition, was highlighted with the following statements: 'could be restored and would be beautiful; is poorly preserved; conservation is not good but it gives life to the scene; the unique beautiful building in the scene is not well maintained'. The state of preservation was the main negative justification (42.5%) and in this context, changes such as alteration in the façades, was more accurately perceived than in the previous scene, where five adulterated buildings were considered positive.

2.2.1. Analysis of aesthetic preference of the scenes in São José do Norte

The order of the scene 1s, 2, 3 was preferred by 42.5% of respondents, followed by the order of scene 2s, 1, 3 (32.5%). scene 1 was preferred by 47.5% of residents. For scene 1, the rating was slightly higher than the second scene, considered mixed. Comparing the two scenes, the second presents a greater number of adulterations, six in all, five of which were positively assessed. It transpires in the questionnaire responses that, due to the loss of much of the original structure of the city and state of ruination of the remaining historic buildings, preservation seems to be the key variable that affects preference. In contrast to Piratini, where there is a rigorous and critical assessment from the residents regarding the inclusion of new buildings and adulterations, in São José do Norte evaluation does not depend on whether the building is ancient, modern, contemporary, restored using good technique

Positive justifications		Negative justifications	
%	Justification	%	Justification
35.0	Outstanding building (*Sobrado dos Imperadores)*	42.5	Conservation
-	-	32.5	Alteration to façades
-	-	12.5	Outstanding building (*Sobrado dos Imperadores)*

Table 6. Justifications related to visual appearance of scene 3 ð S«o Jos® do Norte.

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or without its original character. For example, two respondents over the age of 60 expressed a preference for new and modern buildings, rather than the historic ones. Another aspect that respondents make clear is preference for buildings with more than one floor row houses, even when adulterated, are considered positive, suggesting some preference for this type of architecture. Findings about the aesthetic assessment of each scene shows the trend of positive assessments on the scene 1 and 2 and negative evaluations concentrated on the scene 3.

In the third scene, although chaotic, adulterations were perceived as negative. Analyzing the responses as 'adulteration of terrace house; modified façade; other buildings have been altered; because it is very uncharacteristic, nothing is as it should be' allows us to infer that the domain of the *Sobrado dos Imperadores* house, with its formal and symbolic weight, positively influenced the aesthetic response. Some respondents commented that the buildings should be restored to its original characteristics and almost all respondents pointed the *Sobrado dos Imperadores* house as a priority for restoration.

3. Relationships between visual appearance of the scenes and formal attributes

The relationship between the assessment of the visual appearance of the scenes and the composition of the buildings was obtained by evaluating the formal attributes 'volume', 'roofs' and 'façades' in each scene. In homogeneous scenes (scene 1, Figure 2 and Figure 3) the correlation between the 'assessment of the visual appearance of the scene' and 'perception of compatibility of façades' was confirmed (Spearman coef. = 0.244, sig. = 0.00), suggesting that recognition of the presence of order and typological patterns of the façades that constitute both scene 1s, play an important role in the positive evaluation of homogeneous scenes (69%). In the mixed scenes (the scene 2s) statistical support was found for asserting that the 'assessment of the visual appearance of the scene' is directly linked to the 'perception of compatibility of façades' (Spearman coef .= 0.283, sig. = 0.00); that is, perception of formal compatibility between the façades was a relevant attribute for the positive evaluation (51.3%) of mixed scenes. The research also identifies a correlation between the 'assessment of the visual appearance of the scene' and the 'perceptions of compatibility of roofs' (Spearman coef. = 0.235, sig. = 0.01). This relationship suggests that formal compatibility of roofs contributed to the positive assessment of the scene.

In heterogeneous scenes (scene 3s), where negative evaluation was higher (32.8% negative and 22.2% positive), correlation between 'assessment of the visual appearance of the scenes' and 'perception of compatibility of volume' was found (Spearman coef. = 0.222, sig. = 0.00), which suggests that the lack of formal compatibility between the volumes of the buildings that compose the scene contributes to negative evaluation of the heterogeneous scenes; the lack of adequate volume reduces the level of satisfaction with the visual appearance. Also identified were correlations between the 'assessment of visual appearance' and 'perception of compatibility in terms of façades' (Spearman coef. = 0.194, sig. = 0.03), revealing that the evaluation of the appearance of the scene is directly linked to compatibility between the façades of buildings. In the case of the heterogeneous scenes, the trend of appearance evaluation was negative, that is, lack of formal compatibility decreased the level of satisfaction. In assessing the visual appearance, only the formal attribute 'façades' presented statistic significance in the homogeneous, mixed and heterogeneous scenes, indicating the importance of this attribute in the urban setting. This result allows us to infer that the greater the compatibility between the façades, the higher the level of satisfaction with the visual appearance of the urban landscape.

4. Relationships between visual appearance of the scenes and formal compatibility

Analyses were conducted to verify how formal characteristics of pre-existing buildings (formal compatibility) were perceived in relation to new buildings inserted in the pre-existing scenario (Table 7, next page). In all the scenes (homogeneous, mixed and heterogeneous) in the two cities, respondents did not perceive the existence of formal compatibility with new insertions in the urban setting.

In the homogeneous scene in Piratini, where only one building of the contemporary period was inserted (with two floors and height similar to the next door house), there is the lowest percentage of formal incompatibility (44.4%). This shows the accuracy by which the new inserts were valued by the respondents, especially in a well-preserved ancient structure.

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		Piratini	S. J. Norte	P. Alegre
S.1	Compatible	36.1%	12.5%	8.1%
	Neutral	19.4%	12.5%	24.3%
	Not compatible	44.4%	75.0%	67.6%
S.2	Compatible	11.1%	12.5%	2.7%
	Neutral	13.9%	17.5%	16.2%
	Not compatible	75.0	70.0%	81.1%
S.3	Compatible	13.9%	10.0%	13.5%
	Neutral	16.7%	12.5%	10.8%
	Not compatible	69.4%	77.5%	75.7%

Table 7. Perception of formal compatibility.

Relationships between evaluation of visual appearance, perceived formal compatability, volume, roof and façade were further explored (Table 8).

Correlations were significant between 'assessment of visual appearance' and 'perception of formal compatibility with pre-existing buildings' only in the scene 2s (Spearman coef. = 0.271, sig. = 0.00). This trend makes sense because due to its characteristics – not as homogeneous as the first and not as heterogeneous as the third – it received the most intense negative assessments about the insertions of new buildings occurring primarily by *Piratinenses* (75%), which confirms perceived incompatibility of the new insertions with respect to pre-existing buildings.

A perceived lack of compatibility of volume was detected in all six scenes studied. In the scene 1s, statistical support was found for asserting that the new insertions are not compatible with the volume of pre-existing buildings, where the lack of compatibility of volume between the buildings indicates the importance of adequate volume in the aesthetic response to visual appearance of urban scenes, especially when the buildings tend to be more homogeneous. In scene 2s, correlation between 'formal compatibility of the new insertions' and 'compatibility of volume' was also identified (Spearman coef. = 0.342, sig. = 0.00). In the scene 3s, there is a repetition of the correlation between 'formal compatibility of the new insertions' and 'compatibility of volume' (Spearman coef. = 0.407, sig. = 0.00); indicating that the perceived lack of formal compatibility between pre-existing buildings and new insertions is influenced by the lack of compatibility of volume. When correlated with the presence of 'compatibility of roof' the influence of lack of compatibility of roof in the perception of formal compatibility of the scenes was also verified. Note that the negative ratings increase inversely with the degree of preservation of the scenes, so that the scene 3s (heterogeneous) were the most negatively evaluated regarding the compatibility of roof.

When evaluated separately, in the scene 1s correlation between 'formal compatibility between pre-existing buildings and new insertions" and "compatibility of roof' was identified (Spearman coef. = 0.354, sig. = 0.00), indicating once again that the lack of compatibility of roof negatively affects perception of formal compatibility of the scenes. In scene 2s, there is the same correlation (Spearman coef. = 0.486, sig. = 0.00) and in scene 3s, this correlation is even stronger (Spearman coef. = 0.496, sig. = 0 , 2000). Besides confirming that there was no concern for integrating roofs of the new insertions in relation to pre-existing buildings, it can be seen that the more heterogeneous the scene, the lower the perceived compatibility in terms of roof.

The compatibility of façades assumes a key role in the aesthetic preference of the scenes and on the perception of formal compatibility between the pre-existing buildings and new inserts. The perceived lack of compatibility in the three scenes indicates that most respondents considered that there was no such concern. The homogeneous scenes show correlation between 'perception of compatibility of

Visual Appearance	Scenes 1		Scenes 2		Scenes 3	
	*Cor.	Sig.	Cor.	Sig	Cor.	Sig.
Assessment of visual appearance	-	-	0.271	0.00	-	-
Compatability in terms of volume	0.545	0.00	0.342	0.00	0.407	0.00
Compatability in terms of roofs	0.354	0.00	0.486	0.00	0.435	0.00
Compatability in terms of façades	0.331	0.00	0.540	0.00	0.435	0.00

Table 8. Relationship between visual appearance and formal compatibility of new insertions. * Cor. = Correlation

Rodrigues, M. S. & M. C. D. Lay. 2012. Perception and evaluation of visual quality of the urban landscape in historic areas. *In* Zancheti, S. M. & K. Similä, eds. *Measuring heritage conservation performance*, pp. 90-101. Rome, ICCROM.

the new insertions' and 'perception of compatibility of façades' in the scene (Spearman coef. = 0.331, sig. = 0.00), indicating, according to the frequencies obtained (Table 8), that compatibility was negatively perceived, and that the façades of new buildings that were inserted into the urban landscape did not adequately consider the characteristic features of pre-existing façades. The mixed and heterogeneous scenes also show a significant correlation between 'perception of formal compatibility of the new insertions' and 'perceived compatibility of façades' (Spearman coef. = 0.540, sig. = 0.00), demonstrating the importance of reconciling the façades of the old and new buildings. In this respect, the results confirm results obtained by Groat (1988) on the suggestion to incorporate some degree of replication (repetition of certain elements, but with current design) in the design of façades, in addition to replication of the spatial pattern (contextual appropriateness) and mass (volume).

Conclusion

Results indicate the role of built heritage in the aesthetic evaluation of the urban landscape and emphasize the relevance of studies focused on urban aesthetics as a need to promote actions to qualify of public spaces. The importance of a particular order, established by formal consistency, is confirmed. For example, when still present in the urban scene in the form of sets, the old buildings tend to fit into a recognizable pattern, suggesting an idea of order, which justifies the preference of the more homogeneous scenes over the others. On the other hand, the perceived chaotic profile of the heterogeneous scenes highlights the lack of order, justifying the arguments of authors such as Lozano (1988), Weber (1995), Nasar (1998) and Reis (2002), who consider order as a human need, recognized as an important component that affects evaluation of visual appearance of the environmental. The valuation of the buildings of the early period is confirmed by both their particular formal and symbolic attributes when related to the urban context and especially for their contribution in qualifying visual aesthetics of the urban landscape. Also confirmed is that the symbolic attribute 'historical value' can positively affect aesthetic preference, corroborating studies by Coeterier (1996).

Results indicate that both the preservation of heritage buildings and the aesthetic quality of new buildings cannot be conceived without considering the set of pre-existing buildings. Even if belonging to different periods and different styles, the buildings form relationships with each other and can compose harmonic sets, an organic environment with a pleasant visual appearance which will be positively evaluated, or establish ruptures as a mixture of missing pieces, leading to chaotic appearance and negative evaluations. It was possible to identify relevant aspects in relation to matters of cultural built heritage and the importance of including issues of urban aesthetics in the process of city planning. It also underscores the importance of bringing the users of the historic core concerned with public policy issues relating to preservation of cultural heritage, urban aesthetic and urban planning. On one hand research results confirm the positive contribution of the buildings of the ancient period in visual quality of the urban landscape, while on the other it is evident the need to curb the actions of distortion, mutilation and even demolition of buildings of ancient period located in historic cores.

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The design of an assessment system for sustainable rehabilitation

Ana Teresa Vaz Ferreira Ramos[1] & José António Raimundo Mendes da Silva[2]

Abstract

Rethinking intervention in the built legacy can represent one of the paths to the achievement of sustainable development. To endorse processes, key factors to assess are methodologies, materials and solutions to change the approach of this intervention, in order to promote sustainable practices that lead to a rational use of resources, reduction of waste production, the encouragement of local activity, respect for the individual or the creation of new opportunities to reduce social disparities. This paper presents a sustainability assessment system for the built environment, specifically addressing urban centres with historic features and consisting of a built fabric with high cultural value but often marked by dereliction and constructive degradation. The system was designed based both on the analysis of other assessment systems worldwide and the analysis and characterization of the urban areas, mainly through a comprehensive survey work of the 'old town' of Coimbra (Coimbra's downtown). The results achieved by applying this methodology allow us to define a profile of intervention that clearly shows the performance in each area assessed. The main objective was to create a decision support tool that guides the activities of designers and engineers involved and to guide the user's attitude to building occupation and maintenance, specifically attending to the level of resource consumption and waste generation.

Keywords: sustainable rehabilitation, sustainable construction, urban sustainability, old city centres, traditional construction

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Introduction

The understanding, after the oil crisis in the 1970s, of natural resources characteristics, their limits and their scarcity, produced a new overview of the world. However, the changing needs of the world's life style are a great challenge: how can it be possible to change ways of life of societies with different cultural, traditional, economic, political and social organization? In reality there is no doubt that it is an obligation of the local governments to promote and to encourage this change. The impact of sustainable development has been introduced at several intervention levels: global, regional and local ones, from the city to the housing buildings. Intervention must be carefully planned, not only in terms of new buildings and urban space, but also for the built environment that urgently needs to be renewed and invigorated in order to promote less use of resources and less production waste.

Urban areas, consisting of centres of resource consumption and waste generation, must be rethought in order to optimize their needs and create rational and self-sufficient spaces that meet the needs of their inhabitants. Considering this framework; rather than encourage the expansion of urban areas, we need to rethink the built environment and induce its renewal, with a new organization that meets the requirements of today's society.

1. Inputs to the information analysis process

1.1. Methodology

The design of an assessment system for analysing the sustainability of rehabilitation interventions in old city centres began to be structured from the analysis of several sources of information to guide the work and organize the existing knowledge in this area. Initially we have carried out an analysis about the leading growth models that gave rise to the concept of sustainable development and, subsequently, their implications for sustainability in construction, identifying the fundamental principles of its implementation (after Edward, 2005; Graham, 2003):

- Resource consumption compatible with the natural ability to replace them: minimize resources consumption; maximize the use of renewable and recyclable resources; do more with less – efficient resources.

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- Create systems that allow consumption to take full advantage of the energy/quality ratio: make use of solar resources; use of energy with a large number of small steps rather than a few major stages; minimize waste.
- Creation of materials that result in nutrients or raw materials for the production of resources: elimination of pollution; use of biodegradable materials; reuse of components in buildings.
- Improving adaptability and functional and biological diversity: allow access to easily recyclable materials without destruction of materials which are difficult to recycle; protection and upgrading of biodiversity.

The approach to sustainability involves a building at all levels, related to its existence over time. This complexity of factors, briefly, arises from the interaction between the building and the environment with behaviour similar to an ecosystem (Kibert *et al*., 2003).

Then we proceeded to a comparative analysis of diverse systems for assessing sustainability, implemented in several countries, and the analysis of these systems' tools devoted to the assessment of new existing buildings in order to identify the most relevant differences that resulted from the phase of its life cycle. To compare some of the various systems (BREEAM, Building Research Establishment Environmental Assessment Method, United Kingdom; LEED, Leadership in Energy and Environmental Design, USA; SBTool - Sustainable Building Tool, global; and LiderA, Sustainability Assessment System, Portugal) a matrix with common areas was created, assigning the evaluation criteria with similar objectives and with the same object of assessment. Figure 1 presents a summary of the information gathered at different phases that allowed the grounding of the assessment system structure.

All data collected were then confronted with the strategies that have been defined by the Urban Rehabilitation Societies, firms with public-private partnership, created in 2004 and already implemented in major cities in Portugal. The following section

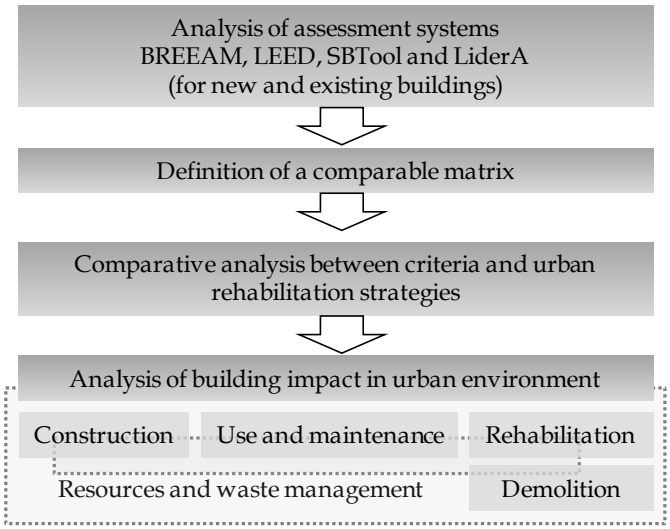

Figure 1. Sources and type of data analyzed.

will address in greater depth the characteristics and objectives of these urban management firms. Finally, some aspects of the impact of the building, at all phases of their life cycle, in urban environment were detailed. All these elements allowed defining the areas of assessment, as well as the assessment criteria required for their analysis. It is also important to note the call for transforming the current linear metabolism of cities into a circular metabolism (Figure 2), based on aspects such as the existence of a mixed nuclei, with capacity of producing energy, and with a transport system based on the use of sustainable energy sources (Gumuchdjian and Rogers, 1997).

1.2. The Urban Rehabilitation Societies and their strategies

In 2004 a Decree-Law (No. 104/2004 of 7 May) was published with the goal of reversing the tendency

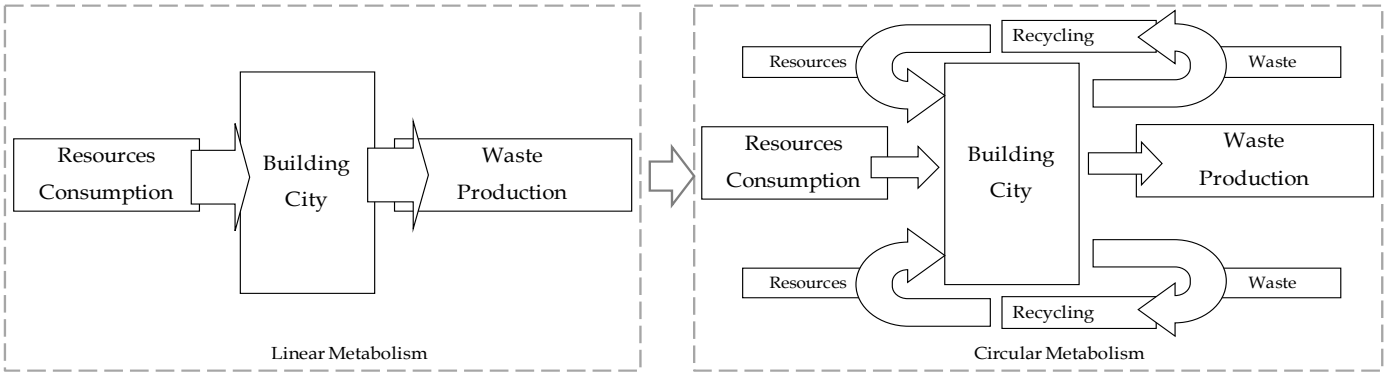

Figure 2. Linear and circular metabolism.

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towards degradation and abandonment of historic urban areas by emphasizing the responsibility of government at the municipality level for urban rehabilitation procedures. In this context, this Decree-Law allows municipalities to constitute Urban Rehabilitation Societies (URS), which are empowered in terms of, for example, expropriation and licensing. It is also a URS task to support owners in the preparation and implementation of rehabilitation actions, assuming the following responsibilities:

- License and authorize urban operations;
- Expropriate the property and the rights attached to them for urban regeneration, and provide easements for those purposes;
- Carry out operations for relocation;
- Supervise the work of urban rehabilitation.

SRU also have the power to draft a strategic report for each unit of intervention, which may match to a block, street or courtyard, and in cases of particular interest, a building. This report should hold the following information:

- The definition of buildings to rehabilitate, and extent of interventions scheduled for therein;
- An indication of the respective owners, other owners of real rights and lessees;
- A project-based intervention, which describes the strategic options in rehabilitation, namely with regard to housing, accessibility, equipment, infrastructure or public space, when the intervention should cover these areas, explaining briefly the reasons for the options undertaken to reflect the weighing scales between the different relevant public interests;
- The planning and budget of interventions to be carried out;
- The suggestion of possible individuals interested in joining forces with the owners for recovery of property purposes.

The strategic report should also comprise information that makes it possible to identify conservation status in terms of security, sanitation and aesthetic conditions through the survey of each building that is part of the same unit.

This study analyzed the strategies defined by the *URS Coimbra Viva, Porto Vivo* (Porto Vivo, 2008; 2008a) and Lisbon Occidental (CML, 2005; Lisbon Occidental, 2006) responsible for the rehabilitation of the older areas of the main Portuguese cities, respectively, Coimbra, Oporto and Lisbon. The strategies defined by the Urban Rehabilitation Societies were analysed, identifying common aspects or elements that may compromise sustainability and considering the positive and negative impacts of its implementation in urban sustainability. We have identified the following common strategies: rehabilitation and revitalization of buildings – interventions tailored to construction needs; public space interventions; habitability conditions improvement; mobility improvement; parking rearrangements; and economic activity reorganization. The modernization and adequacy of infrastructure are considered strategic in Lisbon and Oporto.

Lisbon is moreover adopting, as fundamental, the following actions: i) to encourage residential occupancy; ii) to remove or assimilate dissonant elements; iii) to vacate public areas and interior courtyards; iv) to consider demolition in case of public interest; v) to allow increases in building height; and vi) to renovate urban public equipment. In Oporto it is regarded as essential to educate the population about the importance of heritage, to promote social development, to enrich the area in terms of tourism and landscaping, and to ensure mobility between the two margins of the river. In Coimbra, the need to keep 20% of households under controlled pricing, to encourage land consolidation, to preserve archaeological evidence and to improve environmental quality are all emphasized.

It is also possible to say that the strategies that focus on the redevelopment of buildings allow an increased quality of indoor environment, as well as in improving mobility and promoting local economic activity. The boosting of local economy helps to improve the quality of life for residents and promotes the interest of the area, either as trade and service centre or as a central element of patrimonial and cultural tourism. Some strategies can provide barriers to sustainability in the processes of rehabilitation, namely demolition, the eviction of public areas or increasing building heights. These strategies should be properly organized and coordinated to minimize their impacts, particularly those involving construction waste generation, increased density in face of the value resulting from the occupation of existing buildings, the increased volume of new buildings, increase in paved surfaces and the

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resulting reduction of green areas that are already scarce.

2. Characterization of older areas: Coimbra's downtown

2.1. Assessment purpose

The creation of an assessment system should take into account the characteristics of the area or object assessed. The use of global systems can lead to the application of complex and ineffective models against the objectives of assessment. Some assessment systems adopt a comprehensible methodology for defining tools geared to what is intended to assess. These specific tools allow an objective and guided assessment of the action that is to be developed. This work focuses on designing an evaluation system geared specifically for old areas, which requires a thorough knowledge on the subject of assessment in order to consciously define the proper tools to use. The knowledge of the building in terms of their construction characteristics, interventions throughout their existence, and circumstances of use such as sanitation or housing allow also the definition of assessment levels that are compatible with three key features: i) what exists; ii) what it is possible to improve; and iii) the level of improvement to be aimed at.

The definition of this system is based, firstly, on the main characteristics of Portuguese construction, with a more general approach on techniques and materials, and, secondly, attending to the evidence of the historical centre of Coimbra, called the *Baixa* (downtown) of Coimbra. The characterization of the area was conducted using data collected by expert teams from the University of Coimbra in the scope of the process of Coimbra's Downtown Renewal, conducted under a protocol with the Municipality of Coimbra. In this protocol a variety of areas were integrated, including sociology, architecture and engineering. The study allowed the collection of data on 770 buildings in Coimbra's downtown.

2.2. Coimbra's downtown

For a better understanding of the area under study, in order to assemble the system, some general characteristics that influence the construction of the model are presented, particularly concerning the measurement indicators involved.

The road structure in this area is defined by the buildings themselves; their façades are bounding the narrow and shaded streets. The shape of the buildings ranges from one to seven storeys; however 588 buildings have three to five storeys. The streets have varying widths; 50 out of the 83 analysed are 2 to 3 meters wide. Most buildings have only two exterior façades and the side walls usually border neighbouring buildings. The existence of openings is thus limited to the main and rear façade (Ramos, 2010).

Figure 3 shows an example of the type of data collected at the work of survey, including the width of the roads (Figure 3a) and the number of storeys above ground (Figure 3b). We have used several sheets that allowed the analysis of: a) the construction characteristics; b) the existing anomalies; c) the state of conservation; d) ventilation, sanitation, lighting, thermal and acoustic conditions; e) the efficiency of existing infrastructure; f) the interventions performed previously; g) the commercial areas; h) buildings in poor condition; and i) warehouses and annexes.

Figure 4 shows some images of the study area, downtown Coimbra, and allows verification of the characteristics of streets: roads strictly delimited by buildings. The relationship between height and distance between buildings is minimal, leading to shading and preventing the incidence of solar radiation.

The shape of the buildings has changed over the years, a feature identified by the use of different materials between the lower floors and the higher ones. The exterior walls are constructed of stone masonry, with considerable thickness, and the walls between buildings consist of *frontais* (Figure 5a), wooden structures filled with rocks, clay and a sand and lime mortar. Interior dividers are *tabique* (Figure 5b), light wooden structures filled with sand and lime mortar (Teixeira and Belém, 1998).

Figure 5 presents some general characteristics of the built environment. In Figure 5c is possible to observe the types of windows, originally with wooden frame. Figure 5d shows the roof, which is characterized by a coating of ceramic tiles and a wooden structure (Figure 5e, Figure 5f). The characteristics of the building affect the living conditions of users, and its advanced state of degradation produces impacts on the indoor environmental quality and on human health. In the context of sustainability, attending to the many concepts widespread, we can verify the existence of a common factor: the safeguarding of human health. The shift to the sustainable development paradigm depends on the

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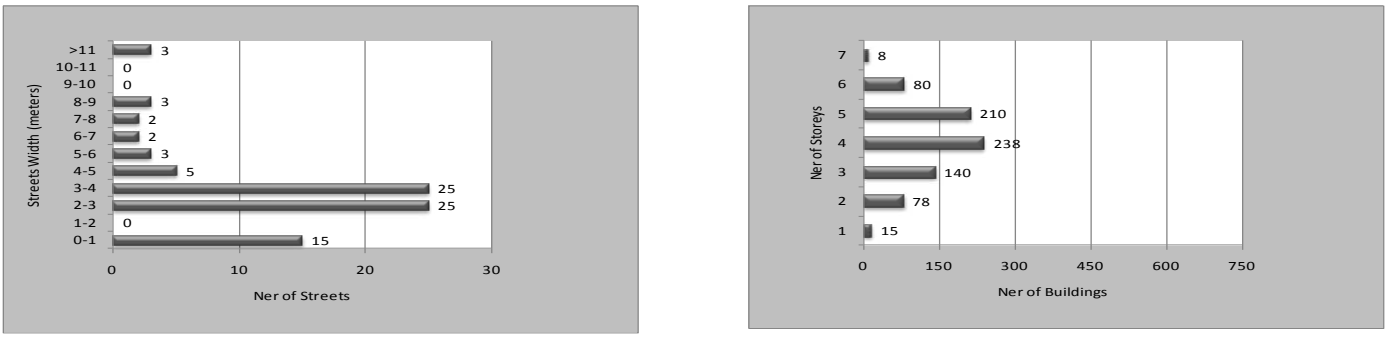

Figure 3. Examples of downtown data – a) width of the streets; b) floors above ground.

Figure 4. Narrow streets in downtown Coimbra.

ability to ensure healthy conditions, favourable to the development of healthy standards of living. In this sense, to arbitrate these built spaces turns out to be fundamental to the promotion of social welfare and improving the urban image.

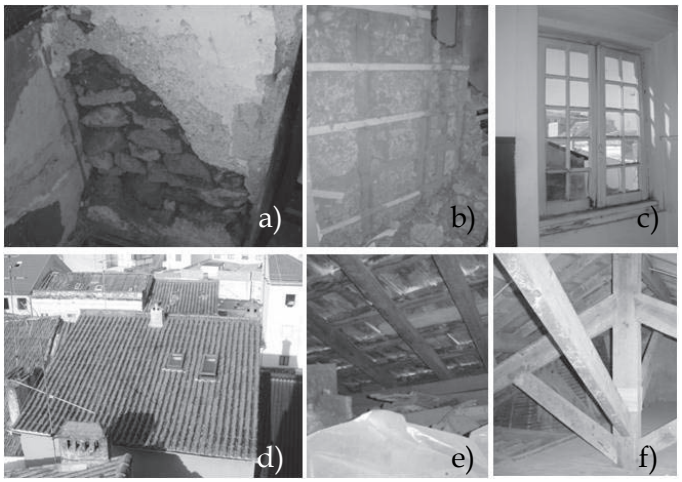

Figure 5. Building characteristics: a) interior wall, *frontais***; b) interior wall,** *tabique***; c) wooden window; d) roof with ceramic tiles; and e) and f) wooden roof structure.**

3. Sustainable Rehabilitation Assessment System

3.1. Constraints and objective

Urban sustainability involves several parameters related to the characteristics of its structure. These aspects are related, for example, to the width of the streets, the existence of green spaces, the volume of buildings or the types of occupation. Historic centres, in general, do not satisfy these aspects; they are spaces branded by narrow streets, which themselves affect traffic and circulation of people; they require specific security plans for buildings with different volumes, often inconsistent with the width of the streets; their indoor comfort is marked by lack of space; and several other features clash with what is expected of sustainability.

However, rehabilitation is an advantage to sustainability. Renewing built-up areas, reversing their state of degradation, preserving cultural and physical heritage, promoting new uses and new activities, providing better living conditions for residents and

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attracting new dwellers are key strategies for urban sustainability. It is necessary to define strategies that are intended to be implemented before the intervention, guiding all of those who operate in these urban areas: technicians, urban managers and users.

The possibility of rehabilitation is a sustainable attitude that reveals a series of favourable parameters in existing assessment systems for new construction, including land value, occupation, impact on biodiversity, landscape change, increase in construction, the possibility of recycling materials, components and structures, etc. These sets of factors, which are intrinsic to the activity of rehabilitation, are very positive aspects for sustainable development. A major objective which is hoped to be achieved in designing this system was to adapt the methodological assessment criteria to existing elements; to create a system that would be appropriate to the subject assessed and would be the starting point for improving the built and urban environment quality.

3.2. System structure

The system was designed with a hierarchical structure: Areas → Parameters → Criteria → Indicators → Assessment Levels. Each of these elements assumes the following meaning within the system scope:

- Area: the area consists of the subject under study and results from the analysis of several criteria involving the approach itself;
- Parameters: in some cases the area is divided into two parameters that characterize the input of resources or waste production;
- Criteria: these are the items addressed and are assessed according to measure indicators. The assessment of measure indicators will become the criterion assessment;
- Measure indicators: consist of the option chosen and which reverses to a given assessment.

The basis for assembling the system was the definition of nine key areas for assessment: i) local sustainability; ii) transportation sustainability; iii) sustainability in water resource management; iv) sustainability in energy resource management; v) sustainability in the management of material resources; vi) exterior environment sustainability; vii) interior environment sustainability; viii) use sustainability; and ix) cultural, economic and social sustainability. Table 1 shows an example of one of these areas, as well as criteria and indicators involved in the assessment.

The indicators are analyzed according to predefined levels. For example, the criterion SL1 has an indicator SL1.1 'inhabitants/square metres' which is assessed according to the following levels of measurement: a) increase, resulting from the volumetric change or parcelling; b) maintenance, same occupation without significant changes in size or space; and c) reduction, restructuring of spaces to allow for greater interior comfort and/or promotion of local development initiatives (new businesses) by maintaining the original occupation.

The system allows each indicator that contributes to the assessment criteria to score. The indicators are assessed on three levels: A (-3 points), which represents a poor performance; B (0 points), which represents a performance that does not harm the environment or is sufficient to comply with regulations; and C (3 points), representing sustainable performance. General indicators allow assigning 1 extra

Area	Local Sustainability							
Criteria	SL1	SL2		SL3	SL4	SL5	SL6	
	Density	Exterior spaces		Type if occupation	Exterior ventilation	Exterior thermal conditions	Impact on surrounding	Total grade
Indicators	SL.1.1(UM)	SL2.1(UM)	SL2.2 (UM)	SL3.1(UM)	SL4.1(UM)	SL5.1(UM)	SL6.1(UM)	
	Inhabitants/ m2	Green spaces/ building areas	Open spaces/ green spaces	Mix/housing/ comercial/ services	Frequency and orientation	Temperature and humidity	Control of landscape changes	
	3	3	3	3	3	3	3	21

Table 1. System Structure and Local Sustainability Area example.

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point arising from the use of new techniques, solutions and materials that reduce impact on environment. The score must be justified and consists of an assessment report that includes the final result. This result is presented in numerical, textual (report) and graphical form. The graphic allows performance in each area to be checked, showing the score achieved and highlighting their relationship against the minimum and maximum possible score.

Conclusion

Climate change produced by environmental degradation has become a reality that must be reversed in order to preserve population conditions and quality of life. Sustainable development is a goal that enables society to rethink the economic development and growth model, prioritizing issues such as social equity and resource management. In terms of the construction industry, the answer may be found in sustainable construction, a concept that brings to the building industry awareness of sustainable development objectives. Considering the impact of this industry, socially, economically or environmentally, we have noticed the emergence of several tools that aim to assess sustainability of a building at all stages of its life cycle. The rehabilitation of the built environment is, in fact, an asset for sustainability because it engages the decrease of requirements for new buildings. Promoting interventions in degraded urban areas is a key factor in renewing the urban environment and reduce its spreading.

By understanding the systems studied, it is possible to conclude that the existence of tools that are tailored to each context make the assessment task simpler and more targeted. Based on this principle an assessment system which is specific and adapted to the reality of old Portuguese city centres is suggested, a system that allows guiding the intervention of urban managers, planners, technicians and users, a dynamic system that allows assimilating changes resulting from shifting standards of living and human activity. Applying an assessment system also allows checking the performance of interventions and defining strategies for development that can meet the objectives proposed for an urban space. Taking into account the principles of environmental sustainability, strategies must also consider the three major subjects to address: environmental quality, promoting economic activity and social equity.

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Economic evaluation of the performance of cultural heritage conservation policies: some methodological and empirical issues

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Abstract

The paper offers an overview of the main theoretical issues underlying the measurement of cultural heritage conservation activities and the evaluation of the performance of the public actors involved. Moving from theory to practice, some examples of empirical investigation of the performance of cultural heritage authorities in Italy will be provided, both with respect to regulation and to public spending, to highlight how to handle some practical issues of measurement. The general conclusion stemming from the analysis is that limitations in the practice of performance indicators in the field of cultural heritage conservation are somehow affected by its specific features (the lack of well identified objectives as well as of clarity in the identification of the cultural heritage and the multidimensional nature of the conservation output) and that the performance indicators as such must be 'handled with care' and should not be considered the 'miraculous' solution for the accountability problems of the organizations involved in cultural heritage conservation.

Keywords: performance indicator, conservation, cultural heritage, efficiency, effectiveness

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Introduction

In economic and political debate it is increasingly recognized that cultural heritage (CH) can play a relevant role as a 'strategic' resource to foster sustainable local development. However, a necessary, though insufficient, condition for such a role is that CH is properly conserved; to be an *input* of economic development CH has to be the *output* of conservation policies and, therefore, the ways in which these policies are designed and implemented crucially affect the overall economic impact of CH.

Conservation policies rely on different public tools: direct and indirect public spending and regulation are identified as the most relevant ones. The awareness of the importance of these public tools and their shortcomings is related to the functioning of the public decision making process and calls for strengthening the efforts for measuring and evaluating CH conservation activities to reduce the asymmetrical information enjoyed by the CH authorities – the bureaucrats responsible for implementing conservation policies – and to make these authorities more accountable. Surprisingly, the literature on the economics of CH has paid little attention to the definition and measurement of the output of CH conservation activities and to the evaluation of the performance of the public actors involved in the implementation of these activities.

In this paper we try to fill this gap from a methodological as well as empirical point of view: in Section 2 the features of the decision making process underlying conservation policies will be recalled; in Section 3 an overview of the main theoretical issues related to the assessment of public spending will be offered; in Section 4 the concept of performance and its evaluation will be explored; and in Section 5 some examples of empirical investigation will be provided and the main operational issues will be outlined. Some concluding remarks will be offered in Section 6.

1. CH conservation and the public decision making process

Almost everywhere the public sector plays an important role in CH conservation, even if with different quantitative and qualitative characteristics, following various patterns and using a mix of different tools; e.g. direct and indirect public spending[1] as well as regulation.[2]

Elsewhere (Peacock and Rizzo, 2008) this topic has been dealt with in more detail; here, it is enough to stress that the conservation decision making process exhibits some peculiar features that are worth noting; the size of CH sector is not well defined, especially when minor heritage is involved, but it is determined at the discretion of the decision maker, who enjoys an informational advantage because of the specific knowledge involved in CH decisions. The identification of 'heritage' is a matter of discretion and is mainly based on the judgement of experts hired by the government who may have professional disagreements about priorities concerning the extent and the type of intervention as well as historical periods and artistic styles (Peacock, 1994). In these circumstances, the scholastic and academic

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training of experts involved in the decision making process (archaeologist, art historian, architect, urban planner and so on) crucially affects the stock of CH, both in quantitative and qualitative terms, the allocation of resources in the field[3] as well as the choice of the type of conservation to be carried out. In fact, CH conservation itself is a wide concept that:

> "[...] encompasses all aspects of protecting a site or remains so as to retain its cultural significance. It includes maintenance and may, depending on the importance of the cultural artefact and related circumstances, involve preservation, restoration, reconstruction or adaptation or any combination of these" (World Bank, 1994, p. 2).

The terms included in this definition can be variously interpreted, with the consequence that highly subjective judgment underlies conservation choices. Furthermore, conservation can be also considered in a wider perspective, implying a planning strategy aimed at preventing decay (Della Torre, 2010).

The above considerations would suggest that the features of the decision making process and the asymmetrical information enjoyed by the experts crucially affect the resource allocation as well as the scope and intensity of CH conservation; from this perspective, it is interesting to stress that in many countries there is a tendency to extend the concept of heritage and that heritage lists are large and keep growing (Rizzo, 2003).[4] In the economic literature it is widely agreed (Rizzo and Throsby, 2006) that the efficiency and effectiveness of CH conservation policies, i.e. their capability to meet citizens' demands and to score the expected results in terms of 'public interest', cannot be taken for granted but crucially depend on the institutional features of the decision making process[5] and on the role of the actors involved (type of experts, stakeholders).

The economic implications are worth noting. In fact, CH conservation cannot be considered only a technical or aesthetic matter; on the contrary, it affects property rights and the possibility of using CH for private and collective purposes. Moreover, the economic impact of heritage in promoting local development – urban regeneration and tourism being usually advocated as the most important factors – is affected by the strength of regulation. This includes extending the concept of heritage to artefacts of minor importance and the range of compatible uses allowed for archaeological sites or historical buildings.

The awareness of the relevance of conservation and of the shortcomings of the decision making process suggests that measurement and evaluation of CH conservation activities are needed to reduce the asymmetrical information enjoyed by the decision maker.

2. Public programs assessment: general issues

The investigation of CH conservation performance is closely related to the more general subject of performance evaluation of the public sector. In line with the principles of the 'New Public Management' approach, it is widely agreed that public sector organizations need to create value upstream for those who provide resources and downstream for the people who use their services, i.e. *value for money*. Being the output of public activities not sold in the market, the different stakeholders cannot rely on market signals, even if they are imperfect, to evaluate public production: therefore, the need for some empirical support for measuring and evaluating public action is widely advocated. As Peacock and Rizzo point out, until very recently:

> "[...] cultural organizations were mainly subject to the evaluation of other heritage professionals as it was considered that only peer review was appropriate for their activities. More recently, however, the scarcity of public funds coupled with a changing social attitude towards the 'value for money' principle have led to a greater awareness of the need for their accountability […] The use of some form of measurement of the activities carried on by cultural organizations is increasingly advocated, though not always adequately practiced." (Peacock and Rizzo 2008, p. 164).

The assessment of public action can occur at various levels, with respect both to the decisions regarding the allocation of resources and, once a decision is made, its implementation, e.g. regarding the production of the related goods and services.

At the first level, the rationale underlying the economic appraisal of public programs is that public intervention is justified only if maximizes social welfare, depending on individual preferences. Economic appraisal, therefore, would support public decisions to identify the most efficient proposal among several competing projects, at macro level, when funds have to be allocated to the various fields (for instance, culture, health, education, etc.) as well as, within each field (for instance, assessing

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which historical building, museum or archaeological site should be chosen for investment).[6] Economic appraisal is also advocated to assess the impact of regulatory policy options in terms of the costs, benefits and risks of a proposal: the appraisal usually applies at macro level (for instance assessing the impact of changes in legislation in the heritage protection system).

Though this macro-level of assessment is outside the scope of this paper, it is however useful to recall here that in some countries there is a long standing tradition of economic appraisal of major investment projects in preservation and restoration work of historic buildings. For instance, in the United Kingdom, the Department of Culture, Media and Sports (DCMS) supports the Treasury commitment in public spending appraisal;[7] the use of cost–benefit analysis (CBA) is recommended, coupled with evaluation procedures based on 'willingness to pay', notably the use of contingent valuation (CV) to evaluate the so-called 'non-use values'.[8] As Peacock (2000, p. 194) outlines, "the growing acceptance of sensible methods of appraisal is a notable development, although it is one thing to detect agreement amongst economic analysts on procedures and another to ensure their acceptance by those affected by the conclusions, upon whom access to information may depend." On the other hand, such an effort is crucial to ensure support to CH conservation: as Stephens *et al*. (2002) suggest with reference to natural heritage, if no credible methods are put in practice to measure conservation outcomes, doubts about the quality of conservation activities are likely to arise with the result that conservation might be penalized in trade-offs against other social outcomes (such as health, education, etc.).

Shifting attention from macro to micro level, some form of evaluation is needed also as far as the production of the goods and services is concerned. In fact, such a production is carried out by non profit organizations that are not exposed to the spontaneous evaluation of their activities through the competitive market. In this perspective, great attention is paid to the construction of performance indicators as management tools for making performance-based decisions. Of course, each specific field of public intervention generates specific measurement issues. In what follows our attention will be concentrated on the CH field.

3. Performance indicators: a methodological perspective

In general terms, in the last decade in the cultural field, mainly with respect to museums and performing arts, the methodological and operational issues related to performance indicators has been on the agenda of several international conferences and meetings and has attracted the attention of international organizations as well as that of academics. Moreover, a change of attitude has occurred in cultural organizations, especially in Anglo-Saxon countries; until recently they were mainly subject to the evaluation of other heritage professionals as it was considered that only peer review was appropriate for their activities.

Performance indicators belong to the 'big family' of indicators for arts and cultural policy that has been investigated in depth in the economic literature.[9] Various classifications are provided; following a hierarchical classification according to the level of detail at which indicators are applied, Madden (2005) distinguishes three types of indicators: *macro indicators* for sector-wide monitoring and evaluation, (for instance, cultural indicators of development); *meso indicators* for regional or cross-agency policy monitoring and evaluation (for example, indicators that measure outcomes of an arts council policy) and *micro indicators* for agency program monitoring and evaluation (for instance, indicators that measure outcomes of an arts event). Within such a classification, performance indicators might be used at both mid- and micro- level, referring to the evaluation of heritage institutions as well as to specific conservation intervention, being aware that the indicators would differ in the way they are constructed and used.

The literature on performance indicators in the cultural field is a very extensive one, suggesting several aspects worth considering. Following Schuster (2001, p. 15) it is important:

- to distinguish between measuring inputs, outputs, and outcomes and be sure that there is appropriate emphasis placed on outcomes;
- to avoid the use of total performance indicators as opposed to multiple indicators reflecting various aspects of policy management;
- to consider what conceptual variable one wishes to measure, what variable can

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actually be measured, and how it is to be measured;

- to distinguish between 'red flags' – effectiveness measures, integrity measures (e.g. how well do its activities match what the institution says it is doing?), and efficiency measures;
- to identify the different uses of performance indicators, e.g. to distinguish between performance indicators to affect behaviour, performance indicators to evaluate behaviour, performance indicators to monitor behaviour, and performance indicators to infer behaviour;
- to collect longitudinal data as well as cross-sectional data so that one can make both types of comparisons.

Not all of the above issues can be considered within the limited scope of this paper and, therefore, attention will be concentrated on those which appear to be more relevant for CH conservation such as those referring to the object of measurement, the choice of methodology, the interpretation of the indicators and the design of the information flow needed for the implementation of those measures and the related costs.

What is performance? Pignataro (2003, p. 371) provides a good answer: "There is no such thing as 'the performance' of cultural institutions, or of the whole sector. There are different aspects of performance that can be evaluated also with the help of numerical indicators, but none of these can provide an exhaustive representation of the functioning of arts organizations."

The various aspects of performance range from a mere quantitative description of the size of activity – the output – to more elaborate concepts such as efficiency or effectiveness. Even the concept of output, which is apparently clear, is not easy to measure: from an economic perspective, cultural institutions are multi-product firms that transform inputs into a mix of outputs to meet certain objectives, using technology and performance indicators to capture such a complex reality. In the economic literature, attention has been devoted to museums: several outputs are identified (e.g. visits, acquisition, conservation, research, temporary exhibitions, ancillary services) and several physical as well as monetary indicators of output are proposed (e.g. number of visitors, number of days open per year, number of publications, number of restored objects, etc.), pointing out that each indicator would need to be qualified with a quality dimension.[10] While the above indicators merely represent a quantitative partial 'description' of production and consumption activities, other types of indicators with different units of measurement can be constructed to evaluate different aspects of the performance of cultural organizations such as efficiency or effectiveness. Efficiency measures factors' productivity (for instance, costs per visitor, etc.). Effectiveness refers to the outcome, i.e. to the capability of cultural activities to meet the goals of cultural organizations or, at higher level, of cultural policies.[11] In such a case, evaluation is complex since objectives are usually stated rather vaguely, and there is a qualitative dimension that is not simply related to quantity of output but also to some subjective measure. However a 'caveat' is needed: since the refinement of output indicators is virtually endless, their costs have to be taken into account as well as their feasibility, which crucially depends on the availability of reliable data.[12]

Which methodology? As was pointed out before, performance indicators can be represented as numbers to measure a specific output (for instance, number of visits), or as ratios, e.g. relation between the volume of activity and the resources employed in producing it (for instance, cost per visitor). However, this type of indicator focuses on single aspects of cultural production and consumption and, therefore, it is not suitable to grasp the complexity of multidimensional output. As Pignataro (2003, p. 369) points out, "a general evaluation of the efficiency of production can, then, be obtained only through a multiplicity of indicators,[13] which does not allow a clear-cut evaluation of the efficiency of an organization". To take into account multidimensionality, more advanced techniques, such as the method of efficiency frontiers,[14] are needed. Such a method takes simultaneously into account all the relevant inputs and outputs of the production process (provided that data are available) and constructs one single measure of efficiency. As a consequence, it makes it possible to measure relative efficiency rather than just productivity and to make comparisons across institutions.

4. Performance evaluation: empirical analysis and evidence

Indeed, the above evaluation problems are enhanced in the CH conservation case: the output is multidimensional, has marked 'public goods' characteristics and is affected by the institutional

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features of the decision making process, therefore making international comparisons difficult.

To my knowledge only a few attempts have been made in the economic literature to address such an issue. Without entering into the methodological and technical details of the research in the field, here it may be interesting to sketch briefly what the main results reached so far have been, as far as the construction of performance indicators and the measurement of relative efficiency are concerned, to offer some hints on the potentialities of empirical investigation and of its shortcomings.

Rizzo (2002) using Sicily, an Italian region, as a case study, has attempted to construct conservation indicators, taking into account the variegated nature of the output of Heritage Authorities (the Sicilian Provincial Boards for Culture – *Soprintendenze*), e.g. the public authorities in charge of conservation activities. *Soprintendenze* are run by experts (e.g. archaeologists, art historians, architects, etc.) and enjoy considerable discretion because the choice of instruments and their intensity largely depends on their autonomous technical evaluation. In other words, from the institutional point of view, conservation activities are organized according to a bureaucratic model.[15] Rizzo (2002) proposes to distinguish conservation activities in 'passive conservation' (PC) and 'active conservation' (AC); the former pertaining to the regulatory output, i.e. the number of administrative acts provided by the regulator (such as listing, demolition orders, authorizations)[16] and the latter referring to direct spending for conservation (such as archaeological excavations, restoration interventions, etc.). In principle, the number of restored buildings might be used as a measure of this output but the differences existing between them (dimension, relevance of the restoration, technical difficulties involved, etc.) would need a very complex weighting; therefore, AC is measured using capital expenditure related to restoration or archaeological excavations as a indicator.[17]

The distinction between PC and AC activities might be questioned, given that these concepts are closely interconnected (for instance, the research and study activities underlying both AC and PC) or interdependent (for example, a discovery resulting from an archaeological excavation might call for imposing constraints). Although in some cases the distinction between AC and PC activities is questionable, it turns out to be a useful approach to the analysis of heritage conservation: in fact, it recalls the above mentioned distinction between public intervention tools (spending and regulation), helps to understand the complexity of conservation activities from an economic point of view and allows for empirical investigation by introducing the possibility of devising indicators for each activity.

These definitions of AC and PC are used by Finocchiaro Castro and Rizzo (2005) to calculate performance indicators in terms of each output of *Soprintendenze*; the analysis shows a certain degree of variability across the *Soprintendenze* and, more interestingly, for each *Soprintendenza* through time. The existence of these differences suggests that there is room for a closer investigation of the performance of *Soprintendenze* from an efficiency point of view. However, more advanced techniques are needed to take into account the multidimensional nature of the output and to allow for a meaningful comparison.

The same data are used by Finocchiaro Castro and Rizzo (2009) to measure the performance of the conservation activity of *Soprintendenze,* in terms of relative efficiency. The Data Envelopment Analysis (DEA) technique[18] was applied for the first time to heritage conservation to take into account the multidimensionality of conservation output and to calculate the efficiency frontier.[19] The results of the DEA analysis show that *Soprintendenze* differ as far as efficiency is concerned and that there is room for efficiency improvements by driving the dimension of the *Soprintendenze*, in terms of personnel, to an efficient level. Looking at the different outputs, the analysis shows that, as far as PC activity is concerned, *Soprintendenze* seem to be relatively more efficient when their output is mainly demand-induced (for instance if a permission is requested by the owner of heritage). Comparing AC and PC activity, the former being the more visible output,[20] achieves relatively higher levels of efficiency than the latter. In other words, the choice of the output mix (AC and PC) is mainly driven by specialists according to their own objectives.[21] Tentative policy implications stemming from the analysis would suggest that introducing incentives to improve the PC activity would increase the efficiency of the *Soprintendenze*'s output mix. Moreover, overall, the results show that the implementation of DEA technique in this field may play a crucial role in shaping a new and appealing methodological approach to study the efficiency of heritage conservation activity.

A further dimension of performance has been explored by Guccio *et al.* (2010), who investigate the efficiency of public spending for conservation in Italy. Performance is measured in terms of *cost*

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overrun [22]and *delays*[23] in such spending activity.[24] Results show that, *ceteris paribus*, the search for quality and the expertise characterizing the CH conservation field affect the performance of spending: *Soprintendenze* tend to maximize reputation among the peers and their efforts are mainly allocated toward completion of works, with less attention to the control of costs.

Overall, though from different perspectives and referring to a different data set, the above empirical analyses reach fairly similar conclusions pointing out that the efficiency in the performance of conservation activities, as carried out by *Soprintendenze,* is affected by institutional context, severe asymmetrical information, the lack of clearly stated objectives and, therefore, of incentives. Indeed, the results suggest looking for some form of benchmarking or best practice to orientate practitioners and professionals in the conservation field and to reduce the asymmetrical information enjoyed by *Soprintendenze*. A tentative suggestion coming from the analysis points towards the adoption of standards of conservation. Though the adoption of technical standards of conservation is not agreed by practitioners, on the assumption that each piece of heritage is unique and, therefore, conservation should be carried out on a case-by-case basis, it seems that they could help better control the final total cost of conservation interventions. The above studies also offer some hints on how to handle some practical issues of measurement of conservation outputs as well such as the usefulness of using methodologies based on frontiers to evaluate various aspects of conservation efficiency.

However, the above-mentioned efficiency analysis says nothing about the quality or the effectiveness of conservation activity, e.g. its outcome, but only whether resources are allocated efficiently (e.g. with minimum cost) between different outputs or how efficiently (in terms of cost overruns and delays) public spending for conservation is carried out. The lack of a qualitative dimension (such as, for instance, how has the state of CH changed as a consequence of conservation?) is a major shortcoming of the analysis because it prevents evaluation of the outcome of the conservation activity.

A satisfactory performance evaluation analysis should include both efficiency and effectiveness investigation. However, the measurement of effectiveness in CH conservation generates several problems: as it was pointed out before, conservation is not a well-defined concept, experts may have professional disagreement about priorities concerning the extent and the type of intervention as well as on preservation strategies and, as a consequence, most of the time objectives are not very clearly stated and the trade-offs between them are not clearly specified, with outcomes that are not easily measurable and may span on several years. As Peacock (2003, p. 3) points out "the indicator must take account of quality changes but arriving at a definition of quality capable of being used as a component of the relevant indicator is essentially a subjective matter."

The ambitious task of evaluating outcomes with a qualitative dimension therefore requires that stakeholders be involved in the identification and definition of the objectives of conservation policies as well as in the process of policy changes so that the discretion of the decision maker is reduced. Different types of data – financial, physical, quantitative as well as qualitative – have to be collected on a regular basis, with an homogeneous format, both on time series and cross sectional basis to carry out the evaluation *within* the same organization through time as well as *between* organizations, with the above mentioned benchmarking approach.

Elsewhere (Rizzo 2007) the difficulties of collecting meaningful, reliable and comparable data in the cultural sector have been investigated, stressing that data are not relevant *per se* but only if they produce useful *information.* In the case of conservation, the main point is that efforts to improve data should not simply be addressed to devise better quantitative methods but to a better understanding of conservation activities, to allow for a better design of conservation policies and for understanding the impacts that measurement can have on 'stakeholders' in the CH sector. Such information is relevant to counteract the above-mentioned tendencies toward 'supply-oriented' policies[25] and to meet the increasing demand for greater public accountability, to make clear the links between policy aspirations, the output and the outcome of chosen policies. Of course, the last step is very difficult and tricky: for instance, it is not sufficient to measure the number of registered buildings or the financial resource spent in restoration activities but whether they have generated social and cultural capital, in terms of a better state of heritage, as well as an increase in visitors (belonging to target groups) and an improvement of visitors' understanding and appreciation. Such a measurement requires different types of information deriving from qualitative rather than quantitative sources, such as interviews, questionnaires, etc.,

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and, rather than being considered an alternative, can be used as a useful complement to the first type of assessment. Consultation and review procedures[26] are also a useful means for reducing information asymmetries and improving the accountability of conservation policies.

A few caveats are in order. The 'contextualization' of indicators is needed when performance indicators are used for comparing different institutions as well as for outcome indicators, since the impact on the objectives is related not only to the outputs but also to several factors, for instance institutional ones, which are not under the control of heritage institutions. Moreover, the cost of collecting data and of calculating indicators should not be undervalued and the criterion of being proportionate should underlie the information requirement of the valuation process. Furthermore, the soundness of valuation relies on accurate, reliable and good quality data which are not necessarily spontaneously produced by heritage organizations: indeed, these organizations have to be aware of the relevance of information and to understand its usefulness, this aptitude requiring specific professional training.

In the field, however, there is some evidence of efforts in calculating performance indicators also with some attention to outcome. At national level, English Heritage offers a good example of such a practice, based on quantitative as well as qualitative indicators; at international level UNESCO provides a wide array of quantitative indicators in relation to its various programs.

Concluding remarks

Far from providing clear-cut conclusions, a few tentative considerations will be developed. The awareness of the relevance of CH conservation and of the shortcomings of the decision making process suggests that the measurement and the evaluation of CH conservation activities is needed to reduce the asymmetrical information enjoyed by the decision maker. In this perspective, great attention has to be paid to the construction of performance indicators as management tools for making performance-based decisions.

The various aspects of performance range from a mere quantitative description of the size of activity – the output – to more elaborate concepts such as efficiency and effectiveness. A satisfactory performance evaluation analysis should include both efficiency and effectiveness investigation.

Empirical analysis offers some hints on how to handle some practical issues of measurement of conservation outputs as well as on the usefulness of using methodologies based on frontiers to evaluate various aspects of conservation efficiency. At the same time, it would suggest the adoption of standards of conservation to address the asymmetrical information issue affecting the CH conservation decision–making process.

Notwithstanding the development of thinking on performance indicators, their use is still not very common in conservation policy and activities. The measurement of effectiveness in CH conservation generates several problems: conservation is not a well-defined concept, experts may have professional disagreement about priorities concerning the extent and the type of intervention as well as on preservation strategies and, as a consequence, most of the time objectives are not very clearly stated and the trade-offs between them are not clearly specified, with outcomes that are not easily measurable and may span several years.

The ambitious task of evaluating the various dimensions of performance requires a sound information basis as well as the involvement of stakeholders in the identification and definition of the objectives of conservation policies as well as in the process of policy changes so that the discretion of decision maker is reduced.

Summing up, performance indicators as such must be 'handled with care' and should not be considered a 'miraculous' solution for all the accountability problems of the organizations involved in CH conservation.

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Endnotes

[1] Direct public expenditure ranges from the purchasing of goods and services (for instance, the salaries for Government experts and staff involved in heritage conservation, etc.), to investment (for instance the purchasing of buildings of artistic interest or the restoration of historic buildings) or subsidies to private institutions as well to private owners of historic buildings. Indirect support is provided through tax expenditure, in the form of tax allowances, to incentivize private financing, such as, for instance, donations/sponsorships aimed at supporting heritage conservation and private actions that preserve buildings of historic/artistic value.

[2] Regulation consists of different types of action: listing, which is a major regulatory tool in the heritage field to identify buildings, sites or areas of historical importance (Schuster, 2004); the imposition of limitations on the use of land affecting heritage; and the definition, sometimes by both central and local government, of rules to discipline the various ways of conservation.

[3] Montemagno (2002) suggests that Sicily provides a significant example: the education disseminated from archaeological schools until recently has led to undervalue Middle Age relics when compared to relics of classical antiquity and, therefore, the supply of heritage, including that for tourist purposes, has been also affected, with the city of Syracuse being an interesting case study in this respect.

[4] The same phenomenon occurs at international level as it is showed by the growth of UNESCO World Heritage List (Frey and Pamini, 2010).

[5] Different incentives are generated by different institutional features. In state-driven systems, such as that in Italy, where policy decisions are implemented by bureaucracies, the decision making process is less 'demand oriented' than in arms' length systems, such as United Kingdom, where independent agencies operate (Peacock and Rizzo, 2008).

[6] In broad terms, the pros and cons of using economic valuation methods in the heritage field are explored by a report issued by the Getty Conservation Institute (1998), questioning the capability of these methods to take into account historical, aesthetic, symbolic and spiritual values of heritage.

[7] The HM Treasury Green Book (2007) provides the techniques and issues that should be considered when carrying out assessments; assessments is the general term used in the Green Book to refer to both appraisals before decisions are made, and evaluations of decisions once made. United Kingdom offers also a good operational example of the extension of a well-established procedure such as the Regulatory Impact Assessment (RIA) to the heritage field (DCMS, 2007).

[8] *Eftec* (2005) provides an extensive overview of the methodological and practical issues involved by evaluation, as well as a survey of the studies on this topic.

[9] An extensive survey of the literature is provided by IFACCA (2005).

[10] An example of the wide array of performance indicators for museums is offered by the 1999 report prepared by Deloitte and Touche for the United Kingdom Department of Culture, Media and Sports (DCMS).

[11] For instance, if museums are assigned educational goals, an indicator of effectiveness is given by the learning achievements of children visiting the museum.

[12] See below, section 5.

[13] The potential number of indicators measuring factors' productivity, for instance, is equal to the number of inputs multiplied by the number of outputs.

[14] See below section 5.

[15] See above note 5.

[16] In counting administrative acts a weighting is introduced to account for their heterogeneity, since different levels of difficulty and effort are involved in their production and implementation.

[17] It might be argued that such an indicator is questionable; in fact, there is no guarantee that resources are used efficiently, since greater expenditure is not necessarily representative of larger or more difficult restoration. However, such an argument is weaker whenever some form of ex ante evaluation of the investment is carried out, perhaps using the above mentioned CBA (see above, section 3).

18 DEA calculates the efficiency frontier for a set of Decision making Units (DMUs), as well as the distance to the frontier for each unit. This distance (efficiency score) between observed CH intervention and the most efficient CH intervention gives a measure of the radial reduction in inputs that could be achieved for a given measure of output. In other words, DEA identifies as productive benchmarks those DMUs that exhibit the lowest technical coefficients, i.e. lowest input amount to produce one unit of output. Once these reference frontiers have been defined, it is possible to assess what would be the potential efficiency improvements available to the inefficient DMUs if they were to produce according to the best practice technologies of their benchmark peers.

19 On the grounds of the available data, the analysis is carried out using expenditure and weighted administrative actions as outputs and personnel as input.

[20] Restoration or the archaeological excavation is a testimony to the expertise of the *Soprintendenza*'s experts. Moreover, these specialists have direct interest in any AC activity that offers scope for new discoveries and historical interpretation in their field of expertise and, therefore, allows them to gain professional prestige among their peers.

[21] Finocchiaro Castro *et al.* (2010) extend the above results and investigate the determinants of performance of *Soprintendenze*

and, among the other things, suggest reshaping the territorial design of *Soprintendenze* to reduce their costs of production.

[22] Costs overrun are the additional costs incurred by contracting authorities above those contractually expected.

[23] Delays refer to the time of completion of works exceeding the length contractually expected.

[24] The public spending for conservation is just a special case of public procurement. The analysis use data for the period 2000-05, referring to 4,997 public contracts amounting to about 3,545 million Euros; DEA technique (see above note 18) is adopted also in this case.

[25] See above, section 2.

[26] A good example is provided by *Conservation Principles, Policies and Guidance* launched by English Heritage in 2008 after extensive debate and consultation on-line.

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Spatial analysis in heritage economics

Christian Ost[1]

Abstract

Urban planners and architects consider heritage as built structures, organized in space and revealed by their own scale and perspective in the surrounding area. Preservation projects aim to improve the 'attractiveness' of the heritage, by creating new business, fostering tourism, and improving quality for inhabitants in historic cities. Spatial analysis, taken as an economic tool based on indicators, aims to identify the organization in space of heritage's economic use and non-use values. It provides a better understanding of heritage economics, and suggests strategic implications for urban management. The mapping process of economic indicators through spatial analysis provides additional insight into the understanding of a conservation project, and facilitates the implementation of site management.

Keywords: heritage values, heritage value maps, spatial analysis

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1. The Challenge of Globalization for Historic Conservation

In times of globalization and economic crisis, cultural built heritage faces the difficult challenge of conservation. The purpose of economics is to manage scarcity and nonrenewable resources. Cultural heritage is a limited resource because it cannot be replaced or substituted. Yet the need to enjoy its beauty or to use it for human activities is growing fast. According to such a definition, heritage conservation is also clearly an economic choice. 'Think global, act local' becomes the motto of market-related economics. As an immutable asset, cultural built heritage presents a perfect opportunity for local development and sustainable growth.

Most cities across the world also face the challenge of globalization, whether they are big, medium, or small sized. Part of the challenge is to attract investment and wealth. When industrial development emerged in the western countries, geographical factors were often keys to success: communication crossroads, means of transportation, access to rivers and seas, proximity of raw material and coal mines, labour resources, local skills, etc. Economic growth today does not rely as much on geographical conditions. Business can be successful in any part of the planet when high-tech, state-of-the-art communication networks exist. Compared with the industrial era, this era fortunately allows many countries in the world to participate in the major competition game, boosting economic opportunities, cultural resources and sustainable development all at once.

Historic cities are said to be blessed with the possession of heritage capital with both cultural and economic value, and potential for growth. Yet conservation expertise tended to cover objects, monuments or sites, with less emphasis on the economic and social impact of preservation projects on the city as a whole. UNESCO's initiative today is to put emphasis on historic urban landscape, as a new international instrument. Today's decision makers in historic cities are inevitably confronted with sustainable development priorities. They need information on the economic value of their heritage, and on the economic impacts of its conservation. In a competitive context of globalization, cultural goals and economic welfare must go hand in hand.

The cases of such World Heritage cities as Venice, Italy or Djenné, Mali, illustrate the intricacy and complexity of the challenges. Some World Heritage cities suffer from mass tourism, despite the huge potential for economic resources it represents; others fail to provide sound and balanced economic growth; yet others cannot afford to be on UNESCO's list, because central and local governments lack the ability and the means to cope simultaneously with historic preservation and economic development.

The opportunity of being listed as a World Heritage city is still considered by many as an economic panacea. But social and economic benefits of heritage are sometimes hard to achieve. Conflicting issues may arise between protection rules applied to heritage, and alternative economic opportunities emerging one or two decades after the nomination, in particular in times of economic crisis and increased competition between cities.

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2. Measuring economic values of heritage

Today, measuring economic values has become a common process in the economics of conservation, either for assessing the benefits of investing in cultural capital, or for evaluating and selecting projects through cost-benefit, multi-criteria, or alternative analysis.

Economic values are not necessarily apart from cultural values. They express different views of the same object. Different fields of economics have brought meaningful contribution to the definition of the economic value of heritage. Environmental and natural resource economics emerged in the 1960s as a distinct branch of economics, although many of the essential principles can be traced further back in time. To summarize, the field proposes a distinction between use and non-use values. Use and non-use values express the tangible and non-tangible aspects of built heritage. In economic terms, use and non-use values are distinguished by the marketable or non-marketable aspects of heritage. The peculiar definition of this heritage, as a commodity (a building, a monument), but with a value that goes clearly beyond the commodity itself, requires such a meaningful distinction. The measurement of use and non-use values aims to simultaneously develop quantitative and qualitative approaches to heritage preservation.

Use values are identifiable, often measurable with great accuracy and widely represented in historic cities. Use values also refer to the economic functions provided by the cultural heritage, and mostly to individual buildings or monuments. These functions are of three types:

- Functional use values existing within but independently from the heritage (housing, shops, offices, public services, etc.);
- Intrinsic use values, intrinsically related to the heritage itself (visits, museum of the monument);
- Indirect use values, generated as a result of cultural tourism (lodging, food, shops, services on site, and off site).
- Economists are also trained to measure induced use values, as a result of the macroeconomic multiplier, which create a range of benefits in the vicinity of the heritage, taken as a whole. The relevance of these values depends mainly on methodological factors, and the values are measured for larger areas only.

Non-use values are a prerequisite to use values. Because they are not marketable, non-use values are not directly measurable in monetary values. Non-use values can be identified in relation to individual monuments, objects, ensembles, public spaces, or in relation to the historic district taken as a whole. In the last decade economists have developed techniques to assess the economic value of non-market exchanges. These non-market valuation techniques are used to build indicators, and can be classified into two categories: revealed-preference methods draw and analyse data from existing market or past behaviour for heritage-related goods and services; stated-preference methods rely on the creation of hypothetical markets in which survey respondents are asked to make hypothetical choices. Most of these techniques are considered reliable today.

3. Mapping economic values

Mapping software (ArcGIS, Mapinfo, Maptitude) are useful and reliable tools for the purpose of drawing economic maps. The most common method of data creation is digitization. It provides a visual display of values or indicators. A geographic information system (GIS) captures, edits and analyses data, which are linked to specific locations. This technology of spatial data handling has developed with the growing use of information systems and personal computers.

Thematic maps emphasize the spatial distribution of economic values related to heritage. In general, a digitized map provides the base for a mapping system in which parcels, blocks, or neighbourhoods are attributed successive layers of data for individual components of economic values. They can be visualized separately or in combination. Functional, intrinsic, indirect, macro, and non-use values do not always show similar patterns, or a consistent spatial distribution. Adding them on a single map provides a comprehensive view of the economic values of the city heritage. This facilitates the identification of economic values that are distributed across the area.

The following table, Table 1, gives the relationship between types of values and mapping process.

Many heritage assessments do not require a monetary assessment. The mapping process does not need to achieve a total value of the heritage in monetary terms (as required in investment or

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Types of values	Example of values	Spatial identification	Mapping unit *
Functional Use Values	Heritage house rental	Heritage building	Parcel
Intrinsic Use Values	Admission fee to a monument	Heritage monument	Parcel, Ensemble
Indirect Use Values	Hotel income (related to visitor or tourist)	Non heritage building	Parcel
Macro Use Values	Growth of income to city residents	City as a whole	Area
Non Use Values	Option for non-residents to visit the city	Buildings, Historic district	Parcel, Ensemble, Area

Table 1. * A note on data availability: The precision of a geographic base map depends on data availability, which differs considerably among countries in the world. Digital base maps and extensive databases for economic values are often hard to find, since they depend largely on the quality and availability of national and regional or city statistics.

cost-benefit analysis). Indicators are consistently used these days as an integrated approach for measuring and monitoring cities. The use of indicators is not a substitute for the use of databases. But it is a very effective and pragmatic approach when direct surveying is costly and time intensive.

Table 2 gives examples of indicators for different types of values.

4. Spatial analysis and economic landscapes

Urban planners and architects consider heritage as built structures, organized in space and revealed by their own scale and perspective in the surrounding area. A convenient analogy would be the economic hinterland or zone coming under the economic and commercial influence of an urban, industrial or commercial centre. There is no absolute rule in tracing a hinterland: economic impacts do not necessarily propagate in concentric circles with decreasing intensity; they could disseminate further and in other directions than anticipated.

Spatial analysis aims to identify the organization in space of heritage's economic values, from the material provided by the mapping process. Spatial identification is conditioned by many factors: physical features (natural, artificial, or both), road and communication connections, urban density, etc. The analysis takes into consideration both the location of the economic values (buildings, monuments), and the impact of these values on the surrounding area (streets, public spaces, non-heritage buildings), thus arriving at the shape and boundary for each category of economic values.

The purpose is to draw areas of economic values on the base maps, and to identify the places with the highest values. Colour coded maps highlight relative values for each category. By adding up the different layers of values on a single map, the spatial analysis enhances the aggregate economic value of heritage, and visualizes an economic landscape of heritage.

Types of value s	Values in monetary terms	Example of indicators
Functional Use Values	Rental values, Property values	Vacancy rate, Housing affordability, Number of sales
Intrinsic Use Values	Admission fees, Income	Number of visitors, Monument carrying capacity, Visitor satisfaction, Number of guides
Indirect Use Values	Turnover, Expenditures, Income	Average time spent, Number of shops, Hotel carrying capacity, Tourism behavior
Macro Use Values	Income, Fiscal revenues	Jobs in cultural sector, Number of heritage-related events, Non heritage property values
Non Use Values	Willingness-to-pay, Hedonic prices	Resident's awareness of heritage significance, Status of the city heritage

Table 2. Examples of indicators for different types of values.

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Today most preservation projects include economic value assessment. Data are collected to help decision makers in site management, tourism, transportation, and local development. Estimates of use values and non-use values become available and are inserted into project evaluation model. A mapping process and a spatial analysis provide additional insight into the understanding of the project, and facilitate the implementation of site management, as in zoning or land use control.

The Djenné test case (Mali, World Heritage city since 1988) aimed to collect data to test the mapping technique, with the purpose of showing the distribution of the economic value of Djenné's heritage.[1] Survey questions were structured to roughly capture the use values of Djenné's heritage for the year 2008 (excluding the macroeconomic values). Non-use values were not specifically addressed in the survey, but are known to be significant to the city of Djenné as a whole. People all over the world care about the existence of the Old Town of Djenné, famous for its earthen architecture and pilgrimage places; many would be willing to pay something to preserve the option of visiting Djenné at some time; and it is considered as heritage to be transferred to future generations. With reference to use values, neighbourhoods (parcels data were not available for housing), historic buildings, and heritage-related business (hotels, restaurants, punt transportation, art and crafts, masons, guides) were identified on a base map.

Individual maps illustrate each category of economic values, drawn on a digitized base map (Figure 1). Spatial analysis areas were drawn on the original maps to identify places with the highest values (Figure 2, Figure 3, Figure 4 and Figure 5). An economic landscape map combines shapes of data displayed in the individual maps (Figure 6). This map reveals how overall economic values are distributed across the city, and areas of concentration.

Another mapping exercise in Djenné could reveal the economic impact of a particular project, for example the current Mosque restoration undertaken by the Aga Khan Trust for Culture. The project employs local masons, apprentice masons, wood suppliers, potters, water carriers, etc. Its teams are housed in long-term rentals or small hotels; eat at particular restaurants; hire cooks, guards, carriers and helpers. After completion, the attractiveness of the Mosque will be enhanced, at least for external enjoyment (non-Muslims are not allowed inside and this is likely to stay unchanged). If the Aga Khan network does what it did in Mopti, a community centre might be built in the city and neighbourhood of the Mosque to present and explain earthen architecture and the Mosque restoration project, thus increasing tourist traffic. Improved earthen coating developed for this project, and overall economic opportunities from this project may help masons further adapt earthen coatings for the houses.

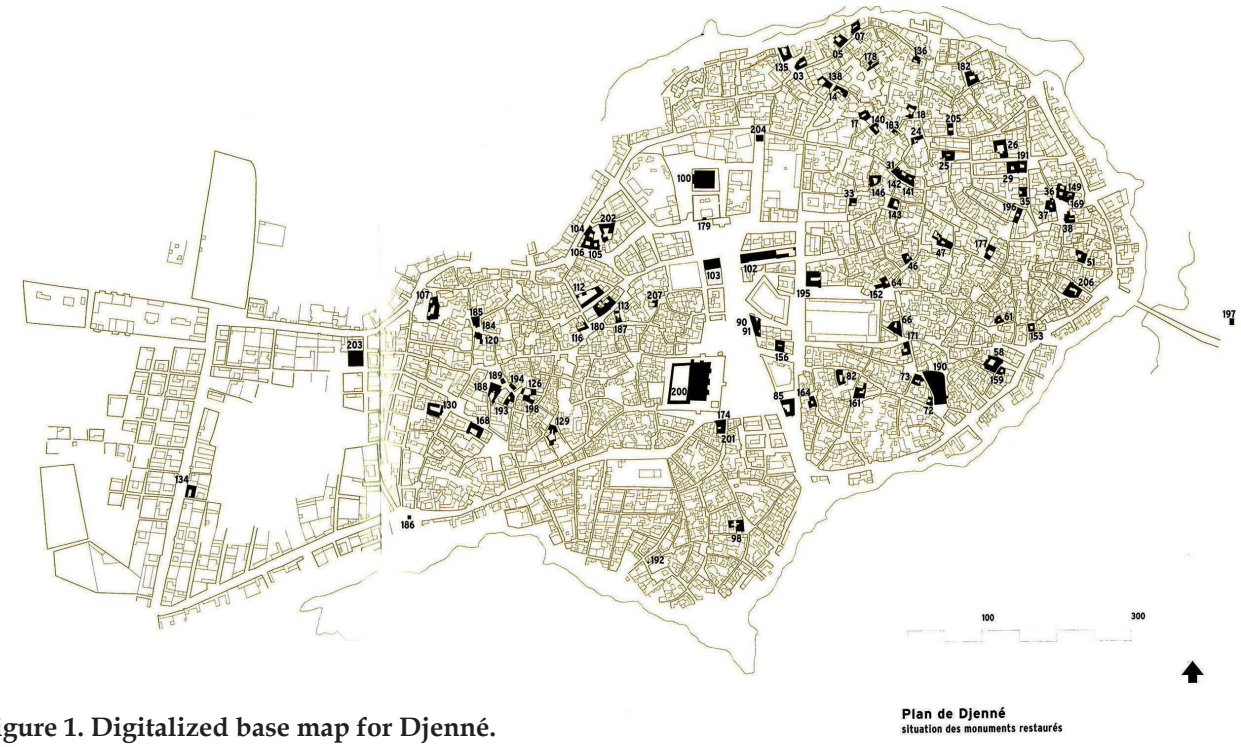

Figure 1. Digitalized base map for Djenné.

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Figure 2. Functional use values.

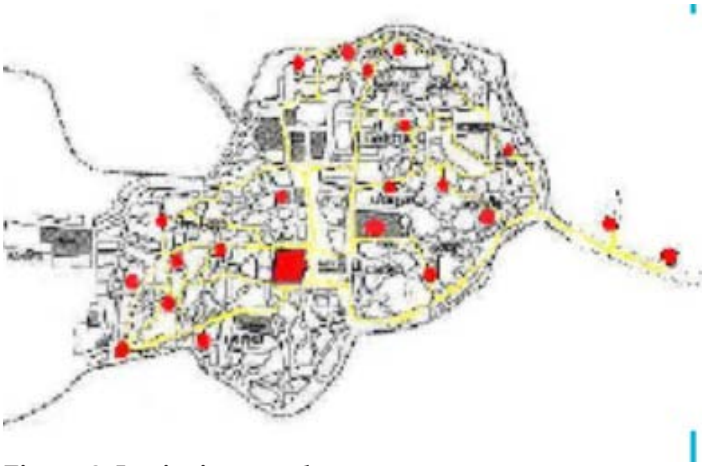


Figure 3. Intrinsic use values.

Figure 4. Indirect use values.

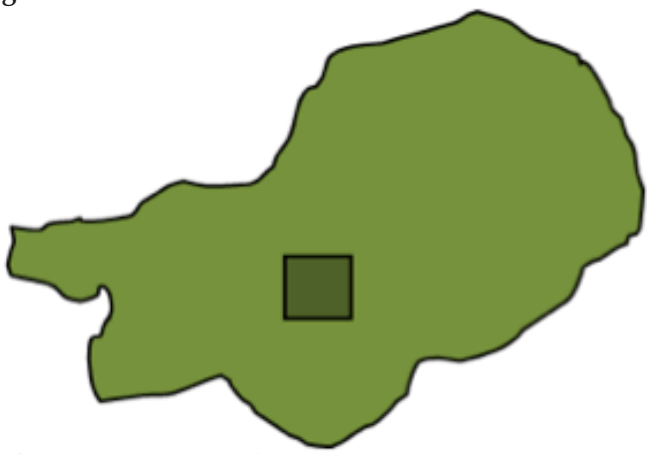
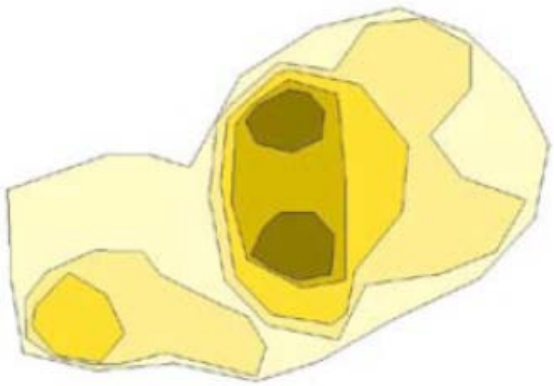


Figure 5. Non-use values.



Endnotes

[1]In 2009, a short survey was conducted by Kathleen Louw (Getty Conservation Institute, Los Angeles) in collaboration with Yamoussa Fané (Cultural Mission of Djenné).

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Revealing the level of tension between cultural heritage and development in World Heritage Cities

Molly Turner,[1] Ana Pereira Roders[2] & Marc Patry[3]

Abstract

World Heritage cities (i.e. all urban settlements with properties inscribed on the World Heritage List, located in or at the outskirts of their urban areas) contain cultural heritage that is not only of local importance, but is also of 'outstanding universal value'; that is, of global importance. Such heritage can enrich cultural diversity of urban settlements, but can also provide a source of tension for the comprehensive management of varied urban landscapes.

Three international organizations have been found periodically and systematically inventorying endangered cultural heritage properties throughout the world: UNESCO with the *List of World Heritage in Danger*, ICOMOS with *Heritage at Risk*, and the World Monuments Fund with the *World Monuments Watch*. Properties identified by these organizations are considered to be at risk as a result of varied threats, including development. However, the processes and criteria used by these organizations to determine such dangers were found to be very distinctive and inconsistent.

The goal of this paper is to propose systematic and comprehensive criteria with which to categorize the endangered level of World Heritage cities – specifically those threatened by development – and to present the resultant ranking of these cities by such criteria.

Keywords: level of tension, cultural heritage, development

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Introduction

Although the reporting process on the State of Conservation (SoC) of World Heritage properties has made some progress in recent decades, still no systematic and standardized assessment is being followed worldwide. In 1999, the World Heritage (WH) Committee did adopt the six-yearly 'periodic reporting' process, which focuses on one of 6 geographic regions annually (UNESCO, 1999). However, that process is "still being improved and information so gathered is highly variable in consistency and detail, and thus not readily interpreted for the purposes of comparative temporal or special analyses" (Patry *et al.*, 2005).

A similar pattern is to be found in the reports created during occasional site level 'reactive monitoring' missions, carried out by WH Centre and the Advisory Bodies staff, at the request of the WH Committee. These neither comply with a standard format nor are related in structure to the 'periodic reporting' process. These missions merely gather disparate information, which is no more than an "assembly of basic quantitative attributes of these sites as a group and qualitative summaries of conservation issues on a site by site basis" (Thorsell and Sigaty, 1997).

Some global initiatives, such as the 'Rapid Assessment and Prioritization of Protected Areas Management' (RAPPAM) methodology developed by WWF, the World Bank/WWF tracking tool (Ervin, 2003), have proposed the standardization of a set of criteria across World Heritage properties listed as natural heritage, allowing quantitative and comparative analyses. One other example of a similar Management Effectiveness Assessment methodology is the 'Enhancing Our Heritage' methodology developed by the WH Centre (UNESCO, 2008a). While useful, these methodologies "have been applied haphazardly to only a very few WH sites to date" (Patry *et al.*, 2005), resulting in very limited analytical uses across WH cities (i.e. all urban settlements with properties inscribed on the World Heritage List, located in or at the outskirts of their urban areas (Pereira Roders, 2010).

Despite these limitations, the WH Centre has easy access to existing information that can in fact permit the monitoring of objective indicators (quantitative and qualitative) of the State of Conservation (SoC) of WH Cities. These are respectively:

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- Indicator 1: Absolute number of WH properties including or included in WH cities on the List WH in Danger
- Indicator 2: Proportion of all WH properties including or included in WH cities on the *List of World Heritage in Danger* (number of WH cities on Danger List/total number of WH cities)
- Indicator 3: Threat intensity to which WH properties including or included in WH cities are subjected
- Indicator 4: Average threat intensity for entire WH properties including or included in WH cities network.

The first two indicators (Indicators 1 and 2) are based on WH cities' potential inscription on the *List of World Heritage in Danger*. The second two indicators (Indicators 3 and 4) are based on whether monitored conditions at individual WH cities reveal significant enough threats to be discussed by the WH Committee at their annual sessions.

The value of these indicators can be tracked over time, providing important information on trends, and allowing for a variety of practical analyses. All raw data used to generate the graphs illustrating this paper can be found available on the World Heritage Cities Programme website at: http: //whc.unesco.org/en/cities. Particularly, the methodology to determine indicators 3 and 4 can be found detailed in a piece entitled 'The State of Conservation of the World Heritage Forest Network' (Patry *et al.*, 2005). Basically, they are based on the frequency with which the WH Committee has discussed a WH property over the past 15 years (0 = minimum reports, 100 = maximum reports).

1. Results

For cultural heritage assets, and for a scale of property such as a WH city, it is a challenge to identify indicators that can provide tangible and comparable measures of the SoC of WH properties. However, much information is periodically gathered by the WH centre "through its reactive monitoring process and by way of third party information". The data so obtained is "rarely of a nature that allows for objective quantifiable analysis" (Patry *et al.*, 2005). The following data, proposed as indicators, is quantitative and available to every WH property.

When a property's OUV is threatened 'by serious and specific dangers' the WH Committee has the option of inscribing the property on the *List of World Heritage in Danger* (UNESCO, 2008b). This 'Danger Listing' serves not only to heighten concern about the property's integrity and stir up international support, but the list itself also serves as a record of the threatened state of the property.

THREAT	# Cities Facing Threat	% of all Threats
new development	11	16.42%
lack of, flawed or damaging maintenance, reconstruction and restoration work	11	16.42%
natural disaster	8	11.94%
general degradation	7	10.45%
infrastructure construction and development	7	10.45%
tourism pressures and associated development	5	7.46%
informal/illegal settlements or construction	5	7.46%
illegal or inappropriate dismantling and demolition	3	4.48%
archaeological excavations	2	2.99%
natural causes	2	2.99%
motor traffic	2	2.99%
land privatization and ownership issues	2	2.99%
lack of or insufficient infrastructure	1	1.49%
neglect	1	1.49%

Table 1. Threats affecting WH properties including or included in WH Cities on the Danger List.

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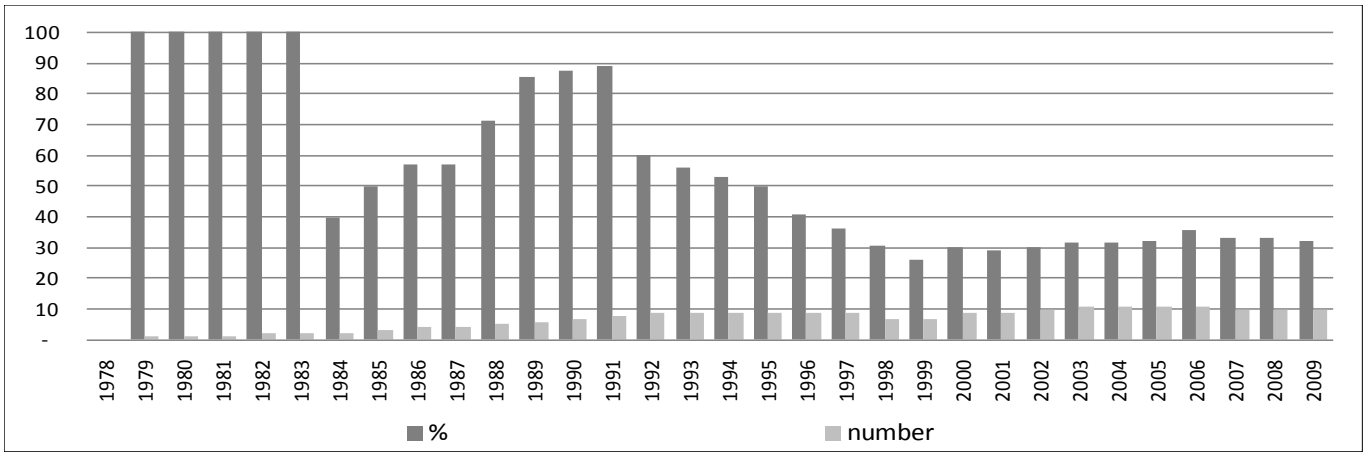

Figure 1. Number and Proportion of WH properties including or included in WH cities on the Danger List.

By 2010, 21 WH properties found including or included in WH Cities (Indicator 1) had made an appearance on the Danger List (see Table 1). An exceptional case is the WH property Dresden Elbe Valley (Germany), inscribed on the Danger List in 2006 and delisted from the WH List in 2009. As it was no longer a WH property at the time this research was conducted, Dresden Elbe Valley was excluded from this survey.

Since 1979, when the first WH properties that include or are included in WH Cities were inscribed in the *List of World Heritage in Danger*, the proportion (Indicator 2) of these WH properties on the Danger List has ranged from as high as 100% (1979-1983) to as low as 26% (1993). Ten of these WH properties still remain inscribed today on the Danger List. An additional ten properties have been delisted and still remain on the WH List. No WH property returned after delisting.

Both Indicator 1 (number) and 2 (%) can be used as a measure of the degree to which these particular WH properties were under threat worldwide (Figure 1). Although indicator 1 reveals a small sample of properties when compared with the whole population (4.4% of all 459 WH properties including or included in WH Cities), it reflects the whole *List of World Heritage in Danger*, which includes no more than 31 WH properties (3.5% of all 890 WH properties inscribed on the WH List).

Similarly, Indicator 2 (with an average of 53% along the last 32 years) lightly surpasses the proportion of WH properties including or included in WH Cities on the WH List (51.6% of all 890 WH properties). In fact, until 1997 all cultural heritage inscribed in the Danger List were WH properties including or included in WH Cities.

The list of all WH properties including or included in WH Cities having been inscribed on the *List of World Heritage in Danger* is provided in Table 2, on the following pages. Similar to the WH Forests (Patry *et al.*, 2005), a future indicator of the state of these WH properties overall might focus on the urban area of WH properties in danger as a proportion of total WH properties cover. This indicator could increase the accuracy of the assumptions reached when surveying Indicators 1 and 2. However, urban area cover values of the protection zones (core and buffer zones) of WH properties including or included in WH Cities are unreliable, making it premature to consider this indicator.

Nevertheless, it is telling to review which of the WH Cities have appeared on the Danger List, as well as the threats for which they were included. After reviewing the threats all WH properties including or included in WH cities face, it will be interesting to compare which threats have resulted in Danger Listing and which have not. A review of the nature of threats that affect those on the Danger List shows the principle threats have been 'new development' and 'flawed restoration work'. These threats affect more than half of the WH properties including or included in WH cities on the Danger List (see Table 1).

The average time spent on the Danger List for WH Cities is 10.7 years. Seven cities have remained on the Danger List for more than the average tenure. For those properties, 'new development' has been the most prevalent threat. However, for the thirteen cities with less than average tenure on the List, the prevalent threat has been 'lack of, flawed or damaging maintenance, reconstruction and restoration work'. One might therefore conclude that new development poses a more serious and longer-term danger to these properties, therefore resulting in longer tenures on the Danger List.

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WH Property	Threats*	On (Year)	Off (Year)	# Years
Old City of Jerusalem and its Walls	archaeological excavation; new development; tourism pressures and associated development; lack of, flawed or damaging maintenance, reconstruction and restoration work; neglect	1982	still on	28
Natural and Culturo-Historical Region of Kotor	new development; tourism pressures and associated development; natural disaster; infrastructure construction and development	1979	2003	24
Chan Chan Archaeological Zone	archaeological excavations; new development; tourism pressures and associated development; informal/illegal settlements or construction; natural disaster; general degradation; lack of or insufficient infrastructure; natural causes; lack of, flawed or damaging maintenance, reconstruction and restoration work; looting/theft	1986	still on	24
Royal Palaces of Abomey	natural disaster; general degradation; lack of, flawed or damaging maintenance, reconstruction and restoration work	1985	2007	22
Bahla Fort	new development; lack of, flawed or damaging maintenance, reconstruction and restoration work	1988	2004	16
Timbuktu	new development; natural disaster; general degradation; natural causes	1990	2005	15
Angkor	new development; tourism pressures and associated development; informal/illegal settlements or construction; infrastructure construction and development; political unrest/violence; looting/theft	1992	2004	12
Fort and Shalamar Gardens in Lahore	new development; general degradation; infrastructure construction and development; motor traffic; illegal or inappropriate dismantling and demolition; land privatization and ownership issues	2000	still on	10
Historic Town of Zabid	new development; informal/illegal settlements or construction; general degradation; infrastructure construction and development; lack of, flawed or damaging maintenance, reconstruction and restoration work	2000	still on	10
Wieliczka Salt Mine	unidentified threats	1989	1998	9
Old City of Dubrovnik	natural disaster; lack of, flawed or damaging maintenance, reconstruction and restoration work; political unrest/violence	1991	1998	7
Walled City of Baku with the Shirvanshah's Palace and Maiden Tower	new development; tourism pressures and associated development; natural disaster; illegal or inappropriate dismantling and demolition	2003	2010	7
Bam and its Cultural Landscape	security	2004	still on	6

Table 2. WH properties including or included in WH cities previously and currently on the Danger List. Taken from Official Reports of the Sessions of the WH Committee from 1977-2009 *Indicator 1: threat intensity to which WH properties including or included in WH Cities are subjected. Indicator 2: average threat intensity for entire WH properties including or included in WH Cities network. Continued on next page.

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WH Property	Threats*	On (Year)	Off (Year)	# Years
Coro and its Port	natural disaster; general degradation; lack of, flawed or damaging maintenance, reconstruction and restoration work	2005	still on	5
Tipasa	new development; informal/illegal settlements or construction; natural disaster; infrastructure construction and development; lack of, flawed or damaging maintenance, reconstruction and restoration work	2002	2006	4
Kathmandu Valley	new development; informal/illegal settlements or construction; general degradation; infrastructure construction and development; illegal or inappropriate dismantling and demolition; lack of, flawed or damaging maintenance, reconstruction and restoration work; political unrest/violence	2003	2007	4
Medieval Monuments in Kosovo	political unrest/violence	2006	still on	4
Samarra Archaeological City	motor traffic; security; political unrest/violence	2007	still on	3
Cologne Cathedral		2004	2006	2
Historical Monuments of Mtskheta	land privatization and ownership issues; lack of, flawed or damaging maintenance, reconstruction and restoration work	2009	still on	1

Table 2 (Cont'd). WH properties including or included in WH cities previously and currently on the Danger List. Taken from Official Reports of the Sessions of the WH Committee from 1977-2009. *Indicator 1: threat intensity to which WH properties including or included in WH Cities are subjected. Indicator 2: average threat intensity for entire WH properties including or included in WH Cities network. Continued from previous page.

As seen in Figure 1, the number of WH properties including or included in WH cities on the Danger List does not grow in proportion to the number of WH cities being added to the WH List. Again, if the Danger List were used more comprehensively it might better reflect the growing proportion of WH Cities that are endangered.

Throughout the year the WH Centre and Advisory Bodies (ICOMOS and IUCN) receive information (unsolicited and solicited) related to emerging and ongoing conservation issues in WH properties from a variety of sources. Once a year, in preparation for the World Heritage Committee meeting, the WH Centre and Advisory Bodies meets to review and discuss information gathered during the previous months and jointly decide whether conditions warrant that a particular WH property and its conservation issues be discussed by the WH Committee.

When affirmative, the WH Centre and Advisory Bodies prepare a 'State of Conservation Report' or SoC Report, which includes a brief analysis of the conservation threats for the selected properties, along with a draft decision for the WH Committee's consideration. Typically, a SoC report will be requested when the values for which a property was inscribed on the WH List appear to be significantly threatened by either existing processes (e.g. change of uses), or by potential processes with a high likelihood of taking place (e.g. plans for development).

During its annual meeting in June/July, the WH Committee, which insures the WH Convention is being properly implemented by the State Parties, discusses the SoC reports and makes decisions on specific courses of action. Generally, they request that a State Party implement particular measures to mitigate threats. Usually, the WH Committee requests that a SoC report be produced for the following year's WH Committee meeting to determine if the threats have been properly mitigated. If confirmed by a subsequent SoC report, the WH Committee usually ceases to request any further SoC reports for that particular property. Otherwise, a SoC report will be requested again for the following year's meeting.

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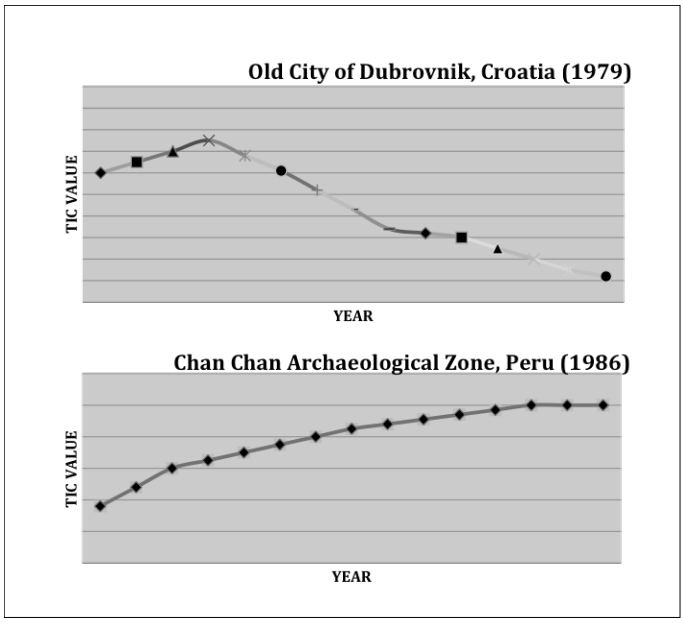

Figure 2. Sample Threat Intensity Coefficients for two WH properties including or included in WH Cities, over time.

Figure 2 illustrates the Threat Intensity Coefficients (TIC) when applied for 2 WH properties including or included in WH Cities over the last 15 years. While the Old City of Dubrovnik, Croatia (which in the past has been inscribed on the *List of World Heritage in Danger*) is decreasing its TIC year after year; Chan Chan Archaeological Zone, Peru keeps on rising, despite the many years in the Danger List.

Figure 3 illustrates the average annual values of the TIC from 1995 to 2009. The average TIC values during the last 15-year intervals are 6.7 (1995) and 16.9 (2009). These values are affected by a combination of the actual TIC values of WH properties including or included in WH Cities and the total number of WH properties.

As SoC reports for newly inscribed WH sites are rarely requested, the year of nomination has not been included in the sum. This methodological decision creates a downward pressure on the average TIC value. Another factor that also likely influences the average TIC value in earlier years is the difference in the Operational Guidelines and the requested information and focus during the Sessions of the WH Committee.

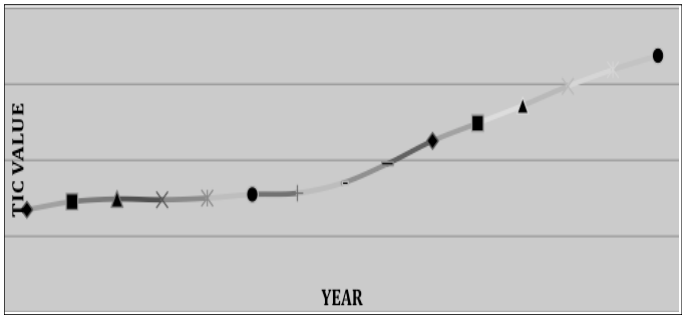

Figure 3. Average TIC Value for entire WH properties including or included in WH Cities network.

The Official Reports of the Sessions of the WH Committee mention threats facing 193 of the 476 WH properties including or included in WH Cities. Each discussed property faced anywhere from one to eleven unique threats. Therefore, all together, hundreds of unique threats emerge from the reports. For the purposes of this research we have grouped the referenced threats into 23 distinct categories. Among these, a handful emerged as most common.

The most-referenced threat represents a notable limitation of the data source: 'unidentified threats'. The reports do not detail the specificities of all threats, particularly in earlier years when reports were less comprehensive. Thirty-two percent of WH properties including or included in WH Cities face unidentified threats, which represent 27 percent of all threats. The remaining threats referenced in the reports are indeed more specific and demonstrate the prevalence of one specific class of threat: 'the development threat'.

'New development' and 'infrastructure construction' are referenced as threats to twenty-six and twelve percent of WH properties including or included in WH Cities respectively. Threats that are mentioned in reference to five to ten percent of WH properties including or included in WH Cities are 'insufficient maintenance' and 'restoration', 'tourism pressures' and 'natural disasters' (n.b. 'tourism pressures' include new development, but also no development related threats such as motor traffic and foot traffic).

In addition to 'new development', other categories of threats represent development (defined for the purposes of this research as all activities of urban planning/renewal promoting changes on the built environment**)**. Therefore, categories representing development threats are: 'new development'; 'infrastructure construction and development'; 'tourism pressures and associated development'; 'informal/illegal settlements or construction'; 'temporary events (and associated structures)'; 'oil and gas exploration and mining'; 'land privatization and ownership issues'; 'industrial construction and development'; and 'military facilities development' (see Table 3, next page). All together, these development threats represent 45 percent of the threats facing WH properties including or included in WH Cities and are referenced as threats to 54 percent of WH properties including or included in WH Cities. In comparison, 'inappropriate excavation and

Threat Category	# Properties Facing Threat	% of all Threats	% of all Properties Facing Threat*
unidentified threat(s)	152	26.67%	31.93%
new development	124	21.75%	26.05%
infrastructure construction and development (roads, airports, ports, sewers, etc.)	57	10.00%	11.97%
lack of, flawed or damaging maintenance, reconstruction and restoration work	46	8.07%	9.66%
tourism pressures and associated development	44	7.72%	9.24%
natural disaster	32	5.61%	6.72%
general degradation	16	2.81%	3.36%
illegal or inappropriate dismantling and demolition	14	2.46%	2.94%
informal/illegal settlements or construction	13	2.28%	2.73%
natural causes	12	2.11%	2.52%
lack of or insufficient infrastructure	10	1.75%	2.10%
motor traffic	8	1.40%	1.68%
political unrest/violence	8	1.40%	1.68%
temporary events (and associated structures)	7	1.23%	1.47%
neglect	5	0.88%	1.05%
oil and gas exploration and mining	4	0.70%	0.84%
land privatization and ownership issues	4	0.70%	0.84%
looting/theft	4	0.70%	0.84%
industrial construction and development	3	0.53%	0.63%
archaeological excavations	2	0.35%	0.42%
security	2	0.35%	0.42%
military facilities development	2	0.35%	0.42%
noise and visual pollution	1	0.18%	0.21%
TOTAL DEVELOPMENT THREATS	**258**	**45.26%**	

Table 3. Development-related threats referenced for WH properties including or included in WH cities. *Properties often face more than one threat, therefore, this column adds up to more than 100%.

restoration' is mentioned as a threat to only 13 percent of WH properties including or included in WH Cities; 'natural threats' are referenced for only nine percent; 'security-related threats' referenced for only seven percent and 'general neglect and degradation' referenced for only four percent. This data clearly shows development-related threats as the greatest perceived threats to WH properties including or included in WH Cities.

For the purposes of this research we have also grouped the referenced causes of threats into 19 distinct categories. As mentioned previously, not all referenced threats were discussed in detail in the reports; consequently the causes of such threats were not always given. However, those causes that were given show a majority of development-related causes (defined for the purposes of this research as the causes that led development to become a threat to these WH properties). Among all causes

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referenced, the most common categories are 'insufficient regulatory frameworks', 'insufficient buffer zones' and 'insufficient enforcement of regulatory frameworks', representing 23 percent, 17 percent and 15 percent of causes respectively. These three cause categories are all mentioned in reference to development threats. Other categories mentioned in relation to development threats are: 'insufficient coordination of stakeholders', 'insufficient tourism plan', 'insufficient impact analyses', 'insufficient understanding of heritage's value', 'insufficient involvement of local population', 'insufficient design guidelines', 'insufficient political agreement' and 'population growth and economic pressures' (see Table 4, further below). All together, these development-related causes represent 83 percent of all causes and were mentioned in reference to 98 percent of all WH properties including or included in WH Cities. This data shows development related causes as the principal threats to WH properties including or included in WH Cities is development.

Conclusion

Given the absence of any framework under which a homogeneous set of indicators on the state of conservation (SoC) of WH properties including or included in WH cities worldwide can be constructed for the time being, it will remain extremely difficult to develop a highly reliable measure of how well these WH properties are being conserved over time.

Under these difficult conditions, the WH Centre must rely on indirect measures of the SoC, using the Periodic/Reactive Monitoring, the Danger Listing or the Threat Intensity Coefficient. However, based on the information so gathered, positive and negative aspects can be ascertained on the state of conservation of WH properties including or included in WH cities.

The average TIC values for all WH properties including or included in WH cities network over the past 5 years is relatively low (ranging between 12.4 and 16.9), as the proportion of these WH properties including or included in WH cities on the Danger List (ranging between 35.5 and 32.3). However, both indicators show steady growth along the years. Considering that the WH Committee only meets once a year and for a limited amount of time, the number of cases discussed cannot grow that much. Still, there is a high probability that more WH properties including or included in WH cities shall join the Danger List and/or become discussed by the WH Committee in the following years.

When comparing the results of the four indicators it was possible to conclude that the level of tension between cultural heritage and development in World Heritage cities has been rising over the last years and is varied in nature. It was also evident that the *List of World Heritage in Danger* cannot alone act as an indicator, as it does not accurately include all cases of WH properties including or included in WH cities facing development-related threats, nor their level of threat.

The root of this problem may be grounded in the politicization of the Danger List. If its use – extension of damage for a property to be listed, duration of a property to stay listed, degrees of danger and respective mitigation strategies, etc. – were to become more comprehensive and/or to be complemented by other indicators (e.g. decisions from the Annual Sessions of the WH Committee) it could become an even more useful indicator.

The changing composition of the Danger List over time is a dynamic record of the SoC of the most threatened WH properties in the world. The composition of the Danger List, both the categories of properties included and categories of threat they are included for, indicated which categories were most threatened and which threats were most prevalent worldwide. Therefore, the Danger List provides rather objective indicators for the monitoring of the category that concerns us in this research, WH Cities.

Moreover, the Threat Intensity Coefficient (TIC) was a first attempt at providing a quantitative value on the State of Conservation (SoC) of WH forests that is applicable to all WH properties, natural or cultural, though the actual utility of this indicator remains to be seen over time. Further research on rationalizing the nature of the identified threats and causes could help raise the understanding of the SoC of these and other WH properties.

This initial use of the four indicators has revealed the high degree of tension between heritage preservation and development in WH Cities. WH Cities are dynamic organisms within which pressures for modernization are not likely to subside. Therefore, it is essential to collect more detailed information about the particular characteristics of new development that threaten a property's OUV. In this regard, our analysis only scratches the surface, as it is limited by the depth of available data. Therefore, we hope this can serve as an impetus for more systematic and comprehensive monitoring of the evolving threats to WH cities.

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Cause Category	# Properties Facing Cause	% of all Causes	% of all Properties Facing Cause
lack of or insufficient regulatory framework (including management plan, conservation plan, zoning laws, urban plan, etc.)	127	22.48%	26.68%
lack of or insufficient buffer zone	98	17.35%	20.59%
insufficient implementation or enforcement of regulatory framework (including management plan, conservation plan, zoning laws, urban plan, etc.)	85	15.04%	17.86%
insufficient coordination of stakeholders or integration of respective initiatives	43	7.61%	9.03%
lack of or insufficient tourism plan	33	5.84%	6.93%
lack of or insufficient impact analyses	31	5.49%	6.51%
lack of corrective measures and their timely implementation	23	4.07%	4.83%
lack of or insufficient human, financial and technical resources	20	3.54%	4.20%
lack of or insufficient emergency, risk and disaster preparedness plan	19	3.36%	3.99%
lack of or insufficient monitoring and indicators	18	3.19%	3.78%
insufficient understanding of heritage's value and conditions of integrity	16	2.83%	3.36%
insufficient involvement of local population	14	2.48%	2.94%
lack of or insufficient funding	13	2.30%	2.73%
lack of design guidelines	9	1.59%	1.89%
lack of political agreement or support	6	1.06%	1.26%
population growth	4	0.71%	0.84%
insufficient socio-economic conditions	3	0.53%	0.63%
economic pressures	2	0.35%	0.42%
lack of or insufficient infrastructure	1	0.18%	0.21%
TOTAL DEVELOPMENT-RELATED CAUSES	**468**	**82.83%**	**98.32%**

Table 4. The causes for development-related threats affecting all WH properties including or included in WH cities.

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Outstanding Universal Value vs. zoning regulations: Willemstad as a case study

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Abstract

Even though World Heritage cities are of global importance, the management of World Heritage is often the responsibility of local authorities. The Operational Guidelines of UNESCO cover a great part of the management process for these properties of Outstanding Universal Value, but leave out how they should be managed on national and local levels.

This article aims to contribute to the enhancement of the currently implemented management practices for the World Heritage city of Willemstad, Curaçao. The documents produced during and after the process of nomination of Willemstad have been surveyed in search for the justifications on its Outstanding Universal Value. This paper aims to demonstrate that the management of a World Heritage City can be fostered by making use of the information compiled in the official documents prepared for the nomination and, if applicable, during the protection process.

Keywords: World Heritage cities, Willemstad, Curaçao, Outstanding Universal Value, zoning regulations

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Introduction

On December 4th, 1997, the World Heritage (WH) Committee decided to inscribe the historic inner city of Willemstad on the World Heritage List. They considered "that the Historic Area of Willemstad is a European colonial ensemble in the Caribbean of outstanding value and integrity, which illustrates the organic growth of a multicultural community over three centuries and preserves to a high degree significant elements of the many strands that came together to create it" (UNESCO, 1997a).

The concern of the government of Curaçao for dynamics that can negatively impact on the Outstanding Universal Value (OUV) of the historic inner city of Willemstad is not recent. The periodic report of 2006 (ICOMOS, 2006) references several threats that were affecting its state of conservation. Accordingly, even though 100 of 760 listed buildings have so far been restored, still, 8 have been lost and 90 remain in very poor state of conservation. Salt water and the humid climate is contributing to their deterioration and increased the risk for collapse. Moreover, the present state of conservation was considered 'patchy' and threatening the integrity of the urban fabric (ICOMOS, 2006).

Development projects would be a welcome complement to the fragmented state of conservation of Willemstad. However, development pressure is also a named threat to the site (ICOMOS, 2006). According to Gill (1999) the dominating historic character complicates new developments that balance on the thin line between historicization and contrasting with the site. The difficulty is to find the right translation from the historic to the respectful contemporary.

The quality of development projects is left to the skills of the 'architect'. Since the title of 'architect' is not protected on the island of Curaçao (Environmental Department, 2010), the person applying for a building permit may not necessarily hold a degree in architecture, nor be aware of Willemstad's OUV. The local authorities are charged with the assessment of whether the proposed development is successful in terms of respecting the OUV of Willemstad. This assessment was undertaken by one responsible official, supported by zoning regulations (Speckens, 2011).

The local government of Curaçao has indicated a struggle with the zoning regulations laid down in the 'Island Development Plan' (Executive Council, 1995a), which should guarantee the quality of new developments (Speckens, 2011). Despite these regulations, development pressure is threatening the OUV of the site was found. Therefore adjustments can be made to these zoning regulations to improve the protection of the OUV of Willemstad.

Speckens, A.; Veldpaus, L.; Colenbrander, B. & A. Pereira Roders. 2012. Outstanding universal value vs. Zoning regulations: willemstad as a case study. *In* Zancheti, S. M. & K. Similä, eds. *Measuring heritage conservation performance*, pp. 134-141. Rome, ICCROM.

By surveying the OUV along the official documents, sufficient information about the attributes and cultural values of the enlisted property are expected to be found to help the local authorities sustain the formulation of the Retrospective Statement of Outstanding Universal Value and respective management practices.

1. Research Aim

This paper focuses on the nomination of Willemstad as basis for its zoning regulations. For this purpose the significant attributes and cultural values found referenced in the official documents produced during the nomination and protection stages shall be identified. The purpose was to sustain enhancements to the zoning regulations, concerning the protection of the discovered cultural values and attributes found justifying the OUV.

The survey presented in this paper is part of a case study entitled 'Revising World Heritage Willemstad: Enhancing Outstanding Universal Value Assessment Practices' which aims to assist the government of Curaçao to facilitate contemporary developments in the historic inner city of Willemstad. The case study is part of a larger international research entitled 'OUV, WH cities and Sustainability: Surveying the relationship between the Outstanding Universal Value assessment practices and the sustainable development of World Heritage cities' lead by Eindhoven University of Technology, the Netherlands; and UNESCO World Heritage Centre, France. Therefore, we foresee that these results will also help other local governments around the world, struggling with similar issues.

2. Methodology: Significance Survey

In order to enable the acknowledgement of the OUV of Willemstad to facilitate management practices, the identified cultural values and attributes should be reflected in the zoning regulations. To understand these attributes and cultural values, data was collected from the official documents produced during both nomination and protection stages (Pereira Roders and Van Oers, 2010). These documents, produced by the Government of Curaçao, the advisory body ICOMOS (International Committee on Monuments and Sites) and the World Heritage Committee, included: the Tentative List Submission Form (1995), the Nomination File (1996), the Advisory Body Evaluation (1997) and the Nomination Decision (1997). The documents of the protection stage include the Island Development Plan (1995), the Periodic Report (2006) and the Retrospective Statement of OUV (2010).

In Section 3 the attributes of the historic inner city of Willemstad (Figure 1) have been correlated with the cultural values, which have been underlined. The cultural values, elaborated in Section 4, have been retrieved by methods of coding, using the eight main values (social, economic, political, historic, aesthetic, scientific, age and ecological value) to categorize and distinguish the nature of the justifications defined to guide Cultural Significance Surveys (Pereira Roders, 2007). In this article, the results of the significance survey shall be illustrated with a few examples of the process of coding the information retrieved from the official documents

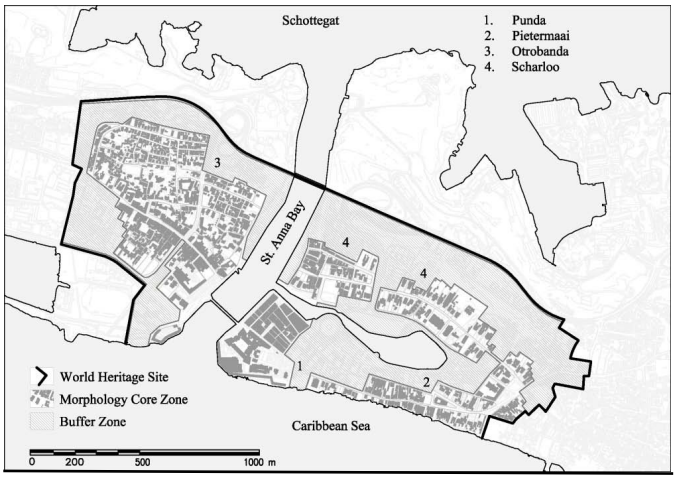

Figure 1. The listed area: the historic inner city divided in the Core area and the Buffer zone.

3. Nomination and protection stage

3.1. Tentative List Submission Form

The first step to nomination was taken on August 1st, 1994, when the government of the island of Curaçao composed the Tentative List Submission form for 'Willemstad, Inner City and Harbour'. By then, they describe that Willemstad has Dutch[1] colonial[2] architecture and town planning[3] from the period of the European expansion.[4] The residential[5] districts Punda, Pietermaai, Scharloo and Otrobanda developed in different centuries with their own urban structures and are bound to the north by a natural ridge[6] as shown in Figure 1 and Figure 2 (Kingdom of the Netherlands, 1995).

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Figure 2. The urban districts of Punda (1), Pietermaai (2), Otrobanda (3) and Scharloo (4) (Source: author).

3.2. Nomination File

In June 1996 the Kingdom of the Netherlands submitted the Nomination File entitled the 'Historic Area of Willemstad, Inner city and Harbour'. Accordingly, Willemstad is characterized as a Dutch colonial settlement founded during the period of the European expansion in the 15th and 16th century. Both St Anna Bay and Schottegat, the natural deep-water harbour, triggered the creation and further growth of Willemstad as a settlement thriving on trade and commerce, including slave trade. Willemstad has a history of immigration including Sephardic Jews from Portugal and Spain. Therefore Curaçao has been shaped by the exchange of cultural elements between the Dutch, Iberians and Africans.

The urban districts were on different flat and sloping sites separated by the natural waters of St Anna Bay and Waaigat. These natural waters link the urban districts and integrate them into an exciting townscape of colourful façades along stretches of lively quays.

The urban districts were developed subsequently, starting with Fort Amsterdam in 1634 to defend the natural deep-water harbour. It was built according to Dutch customs, just like the walled city of Willemstad emerging to the North. The houses were tightly laid out in building blocks marked by a distinct building line alongside narrow streets in a grid structure. They featured two to three storey buildings covered by a steep pitched roof.

Due to the absence of restricting ramparts, Otrobanda developed a rather unplanned spatial structure. It features an open compound layout, the yards of Otrobanda called *Kura*, and a dense alley structure. Otrobanda is characterized as a working-class neighbourhood.

The construction of the urban district Pietermaai started to the east of Punda. It features a linear urban development of stately and colourful mansions since the elite of the shipmasters and high-ranking administrators settled there.

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Scharloo enjoyed the relative freedom of space resulting in an open layout of streets lined by detached and quite often luxurious dwellings. It was a residential district of great prominence, for the greater part inhabited by Jewish merchants who owned shops in Punda.

The initial architecture of Willemstad was Dutch architecture of the 16th and 17th centuries. From the 17th century on, the architecture gradually acquired local traits as a result of the climate, the use of local materials[7] and the introduction of new architectural elements. A government act of 1817 ordered the colouring of the white lime façades, which characterizes the architecture of Willemstad (Kingdom of the Netherlands, 1996).

3.3. Advisory Body Evaluation

The evaluation of the nomination file made by ICOMOS in 1997 largely adopted the justification and description of the property. In conclusion, they deduced that the Historic Area of Willemstad is an example of a Dutch colonial trading and administrative centre during the 16th, 17th and 18th centuries that was both walled (Punda) and undefended (Otrobanda). Its urban fabric and townscape has been created by the blending of European town-planning and architectural traditions and local Caribbean influences (ICOMOS, 1997).

3.4. Decision

Subsequently, the recommendation to the WH committee was made to inscribe this property on the World Heritage List. The exact wording of the recommendation has been adopted in the decision: "the World Heritage Committee decided to inscribe Willemstad on the basis of cultural criteria (ii), (iv) and (v), considering that the Historic Area of Willemstad is a European colonial ensemble in the Caribbean of outstanding value and integrity, which illustrates the organic growth of a multicultural community over three centuries and preserves to a high degree significant elements of the many strands that came together to create it." (UNESCO, 1997a).

By 1997, the Operational Guidelines defined criteria (ii), (iv) and (v) as (UNESCO, 1997b):

> (ii) "[Nominated properties shall] exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design";
>
> (iv) "Nominated properties shall "be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
>
> (v) "Be an outstanding example of a traditional human settlement or land-use which is representative of a culture (or cultures), especially when it has become vulnerable under the impact of irreversible change."

3.5. Periodic Reporting

In 2006, the State Parties have submitted their first periodic report, to provide an assessment as to whether the OUV of the property has been maintained over time (UNESCO, 2008). Concerning the OUV, it repeated most of the justifications used by ICOMOS on the Advisory Body Evaluation. It starts, however, with a new brief description:

> "the people of the Netherlands established a trading settlement at a fine natural harbour on the Caribbean island of Curaçao in 1634. The town developed continuously over the following centuries. The modern town consists of several distinct historic districts whose architecture reflects not only European urban-planning concepts but also styles from the Netherlands and from the Spanish and Portuguese colonial towns with which Willemstad engaged in trade" (ICOMOS, 2006).

3.6. Retrospective Statement of OUV

Since 2005, the nominations of new World Heritage properties are required to include a Statement of Outstanding Universal Value (UNESCO, 2005). Therefore, all State Parties with previous nominations have been requested to submit a Retrospective Statement of OUV on their subsequent period reports (UNESCO, 2007) The Retrospective Statement of OUV concerning the historic inner city of Willemstad has been recently submitted and waits for adoption by the World Heritage Committee (Kingdom of the Netherlands, 2010). The historic inner city of Willemstad is found described as a Dutch colonial trading settlement with colonial town planning and architecture of the period of Dutch expansion with Afro-American, Iberian and Caribbean influences.

Moreover, the historic inner city of Willemstad stands out for the diversity in the historical morphology of its four urban districts, which are separated by the open waters of the harbour. They

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demonstrate the subsequent stages of historical development over the course of centuries by the gradual influence of the tropical climate and the social and cultural differences of their inhabitants on their layout and architecture. In more detail, Punda is mentioned as the only part of the city with a defence system consisting of walls and ramparts (Kingdom of the Netherlands, 2010).

In the most recent Operational Guidelines (2008) Criterion (ii) and (iv) have remained unchanged. Criterion (v), however, has changed: "nominated properties shall be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change" (UNESCO, 2008).

4. Attributes and Values

The historic inner city of Willemstad has been enlisted under criteria (ii), (iv) and (v), which, in accordance with the Operational Guidelines of 2008, reflect respectively social value, historic value and a link between social and ecological values (Pereira Roders & van Oers, 2011). These three cultural values are therefore required to justify the OUV of Willemstad. Still, additional values have been identified in the studied documents.

In the description of the Tentative List Submission Form of the urban areas of Punda, Pietermaai, Scharloo and Otrobanda, together with the harbour of St Anna Bay, are the identified attributes seen in Figure 1 and 2. Although the harbour has been mentioned as an attribute as well, only the urban areas have been substantiated with values. In total, the ensemble is ascribed seven of the eight values, excluding the aesthetic value. The social (Dutch), historic (Dutch colonial architecture and town planning) and ecological values (bound to the north by a natural ridge) required for the criteria have also been found referenced (Speckens, 2011).

The nomination file clarifies that the attributes are both the urban fabric and architecture of the four urban districts of Punda, Pietermaai, Otrobanda and Scharloo together with the harbour St Anna Bay (Figure 1 and Figure 2). Punda is divided into Fort Amsterdam and Old Willemstad. All eight values have been identified. Supplementary to the Tentative List Submission Form, the dissimilarities of the urban fabric and architecture of the four urban districts is found emphasized; all of them have different social (e.g. Dutch, Portuguese, elite and working-class) and historic values (e.g. grid, *Kura*, alley and linear structure) (Speckens, 2011).

No new attributes and values have been identified in the advisory body evaluation by ICOMOS. It was mainly found to paraphrase parts of the nomination file. However, in the paraphrased information, the attributes are reduced to 'the historic inner city of Willemstad'. While the social (Dutch, European, local, Caribbean) and historical values (European town-planning and architectural traditions) are clearly mentioned, the ecological value has disappeared (Speckens, 2011).

The decision adopted by the World Heritage Committee defines the ensemble of the Historic inner city of Willemstad as the attribute. With the information from the previous documents it is clear that ensemble means both urban fabric and architecture. However within this short text, which is currently the official justification of the criteria, 'ensemble' means 'entity'. Thus, again, the social (European, multicultural community) and historical values (European colonial ensemble, illustrates) are mentioned, while the ecological value is absent (Speckens, 2011).

The brief description included in the periodic report identified the urban structure and the architecture as attributes. The districts cannot be identified as attributes since no values have been ascribed. The architecture is ascribed to the social (European, Netherlands, Spanish, Portuguese) and historic values (European urban-planning concepts, styles from the Netherlands); the ecological value is still found missing (Speckens, 2011).

The Retrospective Statement of OUV identifies the urban structure and architecture of the different districts. Unfortunately, the districts have not been identified individually; only Punda has been mentioned. However, morphology and architecture are ascribed to the social (Dutch, Afro-American, Iberian, Caribbean), historic (colonial town planning and architecture) and ecological values (separated by the open waters of the harbour, the gradual influence of the tropical climate) (Speckens, 2011).

5. Zoning regulations

For a property to qualify for the inscription on the WH list, the State Parties have to provide measures to protect and manage the property (UNESCO, 2008). In 1995, during the nomination stage, the government of Curaçao provided zoning regulations concerning the conservation area. They are

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defined in the Island Development Plan (EOP) and enclose rules for restoration, renovation and new developments in the historic inner city of Willemstad. Applications for building permits are subject to provisions regarding allotment, construction height, façade width and layout, roof shape and building materials (Executive Council, 1995a).

Paragraph 4 of the zoning regulations specifies the provisions in more detail. The façade has to have evenly distributed vertical windows, plus both horizontal and vertical façade articulation. In the case of a façade wider than 15 meters, it must have a dominating vertical articulation. If the building has several floors, the façade must have dominating horizontal articulation. The building materials are limited to stone and plaster; in areas dominated by timber, wood is also accepted. All façades must be painted. The roof has to be made of tiles, painted roof sheets or other high-quality materials (Executive Council, 1995a).

However, the demands regarding the allotment, construction height, façade width and roof shape are limited to be "consistent with the existing urban fabric and architecture" (Executive Council, 1995a).

These zoning regulations are accompanied by a preceding appendix: the Island Development Plan (EOP), Part 1. Chapter 4 describes the historic, current and future development of the historic-inner city (Executive Council, 1995b). It describes four urban districts (see Figure 1) with their (former) functions (economic value), the traditions of the infilling of water (ecological value), the urban structures (historic value), important political decisions (political value) and the social identities (social value), similarly to the documents discussed in Section 3 (Speckens, 2011). However no direct link has been made between the actual zoning regulations and the appendix. Therefore the translation from the cultural values to the zoning regulations is still found lacking.

Conclusions

The historic inner city of Willemstad OUV was acknowledged by the World Heritage Committee when it was inscribed on the World Heritage List. It has been enlisted under criteria (ii), (iv) and (v), which reflect respectively social value, historic value and a link between social and ecological values. These cultural values are important to consider while developing in the historic inner city of Willemstad and should therefore be integrated in the zoning regulations.

The attributes and cultural values have been accurately defined in the nomination file. They are the urban fabric and architecture of Punda, Pietermaai, Otrobanda and Scharloo, the four districts of the historic inner city of Willemstad. These districts are linked by natural bodies of water. Punda is characterized by a Dutch urban structure and Dutch architecture, while Otrobanda is typified as a working-class area with both a *Kura* (open compound) and a dense alley structure. Pietermaai is described as a linear urban development for the social elite and Scharloo is characterized by an open street layout with luxurious dwellings owned by Jewish merchants. The initial architecture was Dutch architecture of the 16th and 17th centuries, which gradually changed as a result of the climate and the introduction of new architectural elements by the Portuguese, Spaniards and Africans.

However, the zoning regulations only mention the historic inner city of Willemstad. No distinction has been made between the districts of Punda, Pietermaai, Otrobanda and Scharloo, though the social and historic differences between them have been found emphasized in the varied justifications of its OUV.

The regulations regarding the allotment, construction height and façade width and roof shape are limited to the guidance of being 'consistent with the existing urban fabric and architecture'. Even though they do not interfere with the characteristics of the districts, they barely help in their clarification. Instead, the regulations regarding façade layout and building materials are more specific. They cannot, however, support the varied nature of the four districts since they are equal throughout the entire historic inner city. Nothing in the zoning regulations indicates that the social, historic and ecologic values that evidence the OUV of the historic inner city of Willemstad are being protected. Therefore, this leads us to the final conclusion that the current zoning regulations do not guarantee that new urban and architectural developments respect the OUV of the historic inner city of Willemstad.

Enhancements to the zoning regulations

First and foremost, the districts Punda, Pietermaai, Otrobanda and Scharloo should have their own zoning regulations. These zoning regulations could enter at length into the social, historic and ecologic values of a district without constraining

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another district. However, further research needs to be undertaken to determine the physical attributes of these distinct districts, in order to translate them into guides or rules.

What characterizes the architecture and morphology of Punda as 'Dutch'? How has the climate changed the architecture and morphology in Willemstad? What is a *Kura* structure, exactly? How dense is the alley structure? How is the elite status of Pietermaai readable in its architecture? What makes the architecture of Scharloo luxurious? To succeed on its protection, questions like these have to be answered to enable the translation between the words describing the OUV and the physical attributes of the historic inner city of Willemstad.

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Endnotes

[1] 'Dutch' is a social value; as it expresses cultural identity.

[2] 'Colonial' is a political value; as it refers to strategies and policies.

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[3] Dutch colonial architecture and town planning' are both historic values; as they are stylistic movements.

[4] 'From the period of the European expansion' is an age value; as it reflects the period of development.

[5] 'Residential' is a economic value; as it explains the (former) use.

[6] 'Bound by a natural ridge' is an ecological value; as it defines interaction between the natural and artificial.

[7] 'Local materials' is a scientific value; as it indicates skilfulness within techniques and materials.

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Designing an active monitoring system: the planned conservation project and Monza and Brianza province

Stefano Della Torre[1] & Rossella Moioli[2]

Abstract

The paper presents a theoretical discussion illustrated by a case study concerning an ongoing project. There is some research about the condition of survey and assessment, and a lot of literature about the performances of sites as assets for cultural tourism. The need is for research concerning direct and indirect impacts of investments made in built heritage. It is necessary to investigate which are the expected impacts in order to understand how to measure them. There is a trend in Europe, especially in Italy, to fund restorations under the condition that they have been arranged inside wide-area projects; the aim being to set up sustainable management plans. In any preservation program and/or development project, relevant preconditions to social and economic sustainability are the quality of conservation activities and the 'true involvement' of stakeholders. Then two points emerge: the dynamic nature of significance, understood in the frame of cultural relativism; and the strategic importance of a shift in procedures towards preventive conservation, as the old paradigm centred on restoration proves to no longer be satisfactory. A control of the full process is needed, involving local communities as well as scientific networks in prevention and maintenance in a continuous caring investigation. The case study is a development project in Northern Italy, which identifies culture as a catalyst for innovation, and encompasses a set of different actions, including the setting of a 'front office' for planned maintenance and monitoring of buildings and sites, implementing a multi-level and multi-user information system. The project involved from the very beginning architects, restorers and builders. Implementing the experience developed by *Monumentenwacht Vlaanderen*, an information system is adopted to monitor the state of conservation of built heritage, as well as identification of a set to monitor the stakeholders' involvement and the dissemination of new paradigms.

Keywords: local development, significance, preventive conservation

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Identifying what has to be measured and monitored

There is a trend in Europe, especially in Italy, towards funding restorations under the condition that they have been arranged inside wide-area projects, the aim being to set up sustainable management plans, taking into account the economic performances of restored sites seen as belonging to territorial systems. This tendency is generally proposed because of increasing scarcity of resources, calling for scale economies producing more efficiency in keeping the benefits given by expensive restoration works. The trend has been reinforced also by the diffusion of management plans for sites inscribed in World Heritage List (Feilden and Jokilehto, 1998). This may be an important step towards the dissemination of integrated conservation paradigms, as well as towards a long-term vision in conservation. Moreover, in this way managerial culture enters into preservation practice, as a management plan requires a monitoring plan; that is, a clear set of targets, indicators and timetables.

This paper is focused on the theoretical premises to be clarified before measuring the performance of regional development projects that include actions of conservation of built cultural heritage. The first problem is to identify the expected impacts, as currently these wide-area projects are designed with different visions and aims. It is necessary to discuss in depth those that are targets and their nature, in order to understand how to make them measurable.

The most obvious impacts could be expected in terms of enhancing the state of conservation of heritage buildings, and there exist experiences and scholarly debate about condition survey and assessment, so that there is a background for the evaluation of the performance in terms of material conservation. Condition assessment is meant as the first step to diagnosis: the use of a medical language reveals the way of thinking. Medicine is a popular metaphor for restoration (Schueremans *et al.*, 2007;

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Treccani, 1996). For example, a staging system has been proposed based on analogy between the approach to condition assessment and conservation of stone structures and the classification and treatment determination of cancer patients (Warke *et al.* 2003).

It is worthwhile to notice that, from an economic point of view, pure conservation is no longer deemed to be a good reason to spend public money; many arguments show the high cost of restoration, the always increasing demand for funding, the often arbitrary definition of values and priorities and the uncertainty of having sufficient revenue to cover costs of maintenance and property management (Benahoumou, 1996). Nevertheless a general acknowledgement can be observed, in economic literature as well as in public policies, that built heritage assets, environmental assets and cultural activities produce social benefits: identity, cohesion, inclusion, openness to innovation, etc. Grant programs are still justified by a set of arguments, focusing on increased economic value (income creation, job creation, regional economic growth, forces for innovation) and referring to non-market values (aesthetic, cultural, and social value through to existence value), sometimes recalling the notion of monuments as merit goods, sometimes appreciating wide-area projects as experiments of devolution and subsidization in which minor or ethnical heritage is valorized along with local economic resources.

There is already a lot of literature about the performance of sites as assets for cultural tourism. Nevertheless, scholars suggest that there is a need for further research (Mäntysalo and Schmidt-Thomé, 2009) concerning direct and indirect impacts on the local and regional economy and of investments made on built heritage. Impacts go far beyond tourism, and strategies need to be complex and to implement a set of tools (Schuster, 1997).

Nevertheless in many cases development projects have proved to have poor vision, targeting (highly uncertain) direct income, and incapable of taking into account the quality of conservation activities and the 'true involvement' of stakeholders. Underscoring 'true involvement' we mean that it ought to entail a change in attitude and in mind, and this change is one of the most relevant preconditions to social and economic sustainability of any preservation program and/or development project.

The 'learning region' model has been implemented to understand this kind of intangible impact of projects focused on tangible heritage. In *Regional Economy:*

> "the complexity and systemic nature of innovation […] entails that learning is an interactive process. Put otherwise, learning springs from cooperation and interaction between firms and the local scientific system, between different functions within the firm, between producer and customers, and between firms and the social and institutional structure" (Capello, 2007, p. 201).

In *Economy of Culture* the shift is from projects exploiting only tourism as a way of boosting heritage potential as value generator, to the implementation of models in which culture gets a new role as a catalyst of innovation. Although projects of this nature require a very long time to be developed, some experiences and lessons learned can already be cited (Putignano, 2009). Two points seem to emerge: a) the dynamic nature of significance, and b) the strategic importance of a shift in procedures towards preventive conservation.

In our experience, a conservation project implies a free and deep revision of knowledge of the significance of a property, an urban sector or a site. The task of restoration is not to confirm established values, but to discover new meanings, and it often gives the floor to different and relative interpretations. Conservation itself is tasked with lending to future generations the integrity of cultural heritage in order to make possible different understandings. The fact that significance may be understood in the frame of cultural relativism is powerful in driving preservation out of old schemes and putting it in the forefront of activities that work for change. It may sound paradoxical, but people in conservation know very well how much openness and creativity is required to solve technical problems.

Furthermore, continuous investigation entails methodical doubt regarding the presentation of sites; in other words it requires, as a necessary consequence, a rich production of new studies calling the attention of different kinds of people. This flexibility in presentation is required to get people involved, thus creating social inclusion through heritage, and this deserves to be underlined as well. Therefore research is needed to design functional indicators of these dynamics, seldom acknowledged as the key impact of preservation actions.

Given these theoretical premises, the old paradigm centred on restoration (that is, identifying conservation with just repair and works which, in the case of architecture, include adaptive reuse) proves to

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no longer be satisfactory. Control of the full process is needed, including prevention, maintenance and a continuous caring investigation, or curious care. The shift from restoration to preventive (or planned) conservation is the answer to this need.

The point is that measurement of conservation performances is not to be considered complete after one measurement activity, as what matters is the trend achieved by changing policies. That is why it is not enough to collect data through an external measuring agency, and the necessary monitoring system has to involve players (local communities as well as scientific networks) and to create the conditions for continuous care. That is, the monitoring system must be 'active'.

The best-known examples of such 'active systems' have been set up by *Monumentenwacht* organizations in some European countries (Cebron Lipovec and Van Balen, 2010). These experiences have a relevant output in terms of condition assessment practices and information management, but what is more relevant here is the strategy of getting people involved. The Netherlands as well as Flemish Provinces show impressive figures, demonstrating an increasing number of private owners who join the program, increasing networking at national and international level, increasing research, and even the setting of the UNESCO Chair of preventive conservation, monitoring and maintenance of architectural heritage at the Catholic University in Leuven.

Among the issues heralded by this movement in the scientific community, we want to underscore the dissemination of an attitude to risk management, and in general to a long term and integrated vision. In the past, up until recent times, restoration was addressed to the past, not to the future; condition assessment was not carried out thinking in terms of processes, but of 'state'; namely the 'state of conservation'. Behind the priority now given to prevention, monitoring and maintenance there is a deep change of philosophical references 'from being to becoming' (Della Torre, 1999).

The shift from restoration to 'planned conservation' has relevant economic outputs, as the new paradigm entails scale economies and cost reduction, and, above all, it moves investments to more qualified activities (survey, monitoring, diagnostics, data filing, information management, research, communication, etc.). A discussion concentrating on the reduction of preservation costs would be very complex and perhaps misleading, because it would put aside many relevant dimensions of heritage preservation. The objective is rather to focus on using given resources in a way that yields the maximum of positive outputs in a local development process: that is, economic impact and local growth, but also externalities oriented to catalyze innovation attitudes. Planned conservation entails process management, which contributes to harvesting these positive externalities and strengthening the attitude to innovation of the regional system (Della Torre, 2010).

As a provisional conclusion we can say that cultural heritage conservation activities give performances on a double level: there is the direct output, to be measured in terms of significance and of preparedness to risk, and an outcome, including positive externalities, to be measured in terms of preconditions to innovation. The bulk of our thesis is that 'monitoring conservation performance' (i.e. saying attention should be paid at any time and by everybody to the quality of conservation activities), produces the best contribution heritage sector can give to endogenous development.

1. The case study

In the case study we deal with a development project in Northern Italy, namely in the new 'Monza and Brianza' province: a part of Milan province that has ultimately assumed administrative autonomy because of its size and particularity. To avoid making mistakes, it is worthwhile to explain the meaning of 'development' in this case. It is less a problem of job creation and income recovery, and more an issue of improving the quality of the local system and building new attitudes. Monza and Brianza is an already quite rich province whose current development model risks forgetting or misusing a rich and meaningful territorial heritage. Monza, well known worldwide for car racing more than for the Imperial Villa and its historic park, is located in the centre of a territory whose economy produces wealth by means of a network of small industries, while the beautiful landscape is threatened by uncontrolled sprawl. The greatest strength of the territory was deemed to be innovation in design, but in few years rapid changes in the global scenario came to threaten the very extent of the local system. The need is felt for new tools to strengthen local identity and to make the development model more stable and sustainable.

The Monza and Brianza Cultural District project, developed following the system-wide model proposed by Pier Luigi Sacco (Sacco *et al.*, 2008)[1], is one

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of the 11 projects funded by the Cariplo Foundation within the matching-grant program 'Cultural districts, economic wheels for the territory'. The call asserted that:

> "the enhancement process, which is based on restorations of buildings at risk, or of buildings which need a functional adjustment, will be conditional on the way those restorations will be realized and presented […] Therefore, it is important that the districts choose course of action suitable to guarantee a continuous impulse towards choices of high profile, in order to maximize the interventions on built cultural heritage so as to the growth of human capital, to the production and dissemination of knowledge, to the update and the strengthening of individual and collective sensibility, to the implementation of more up-to-date methodologies for the protection of Built Cultural Heritage (Planned Conservation)".

A dialogue with stakeholders has been started, aiming at involving them in the matching grants process: the particularity of the proposed strategy was to set up practices making the conservation sector able to give a performance as a catalyst for innovation.

Four buildings have been selected to have their restoration and reuse financed: Palazzo Borromeo Arese, Cesano Maderno; Ca' dei Bossi, Biassono; Castello Da Corte, Bellusco (Figure 1); and ex-Filanda, Sulbiate. They have been chosen according to a set of specific criteria. Some of these criteria are almost obvious: location and accessibility, typological variety, economic feasibility, quality of management plan, or functions profitable to designed territorial system. Not so obvious is the idea of privileging the quality of the restoration process (the program, the project, survey, the diagnostics, the procurement, etc.), the direct commitment of public officers, an innovative maintenance plan or an educational plan to be developed together with the restoration work.

Figure 1. Bellusco (MB. Italy), Castello da Corte (Source: photo Rossella Moioli).

The project has an original approach as it valorizes not only the benefits offered by reused properties, but the externalities produced by restoration works as they are being carried on. The important matter is to acknowledge and to manage positive externalities, like new capabilities disseminated among players and officers, or the exemplarity of best practices in restoration techniques and soft solutions for energy efficiency in existing buildings. Perhaps the most relevant issue will be the attitude to networking between the administrative system, entrepreneurs, cultural associations, research institutes, and the educational system (Canziani and Moioli, 2010).

Among the designed actions, very prominent is the proposal of setting up a business unit named 'Front Office for Planned Conservation', offering to the territory services for planned maintenance and monitoring of buildings and sites and implementing a multi-level and multi-user information system in which information relevant to heritage building conservation can be stored and shared. This 'Front Office' has to play an active role in promoting a change in the attitude of stakeholders. In order to achieve this target, the project was born not as a top-down initiative, but involved from the very beginning architects, restorers and builders, and the organization of educational programs, programming meetings and guided tours.

The core business of the 'Front Office' is the maintenance of historic buildings, starting from the ones restored within the project, and offering consultancy and services for maintenance to public and private owners, according to a logic of voluntary enrolment stimulated by scale economies and emulation. Inside the 'Front Office' structure, the Building Entrepreneurs Association (*Assimpredil-ANCE*) will organize educational programs for workers, and will also make available its own legal office to prevent procurement problems as this can be very hard in Italy especially in work concerning heritage buildings (Guccio and Rizzo, 2010). The *Istituto per la Storia dell'Arte Lombarda*, a highly influential institution at international level, recently transferred from Milan to the small village of Cesano Maderno, and will feed the catalogue of heritage items and educational activities offered to the public. Therefore different stakeholders such as contractors, art historians, public administrators are forced to come

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closer and work together. This may lead to forms of mutual cultivation and cross fertilization which up until today have scarcely been practiced, giving culture the role envisaged by the project, that is to promote exchange and innovation.

Implementing the *Monumentenwacht Vlaanderen* practices (Stulens and Meul, 2010; Verpoest and Stulens, 2006), the 'Front Office' adopts an information system to monitor the state of conservation of built heritage, but it also identifies a set of indicators to monitor the involvement of stakeholders and the diffusion of new paradigms, as the project vision has recognized which are the real drivers for an improvement of preservation practices in the direction of sustainability.

The indicators have been chosen referring to a list of seven targets: 1) growth of human capital; 2) development of innovative skills in the conservation sector; 3) dissemination of a culture of preventive and planned conservation; 4) creation of a new sector in the market; 5) increase of the quality in restoration and maintenance works on built cultural heritage; 6) implementation of advanced techniques (diagnostics, monitoring, ICT, skilled workers, project organization, etc.); and 7) networking between municipalities – research institutes – enterprises. The main functions carried out by the 'Front Office' are related to one or more targets.

Mentoring municipalities, architects and contractors on restoration projects and maintenance plans, for example, can be linked to targets 1 and 2 (with quantitative indexes given by the number of customers and the amount of investment for conservation-related activities), as well as to targets 3 and 7 (with qualitative indexes expressed by means of questionnaires).

Cataloguing built cultural heritage contributes to target 6; these activities can be monitored both by quantitative indexes (number of forms filled) as well as by qualitative evaluations (quality of information management, public availability of data).

Educational activities will be very important in the strategy, working towards all targets. Quantitative indexes (number of people involved in the activities, number of people who implemented acquired competencies on their jobs) should measure the impacts relevant to targets 1 and 2; it should be possible to monitor the more qualitative effects related to the other targets by means of questionnaires.

By monitoring the number of events, attendance, the number of related news items (in the press, media and internet) and the number of publications issued, it will be possible to evaluate the contribution given by the 'Front Office' towards achieving targets 1 and 3; target 5, expressly devoted to 'quality', needs a more qualitative approach, evaluating contents and inquiring how efficiently they are communicated to stakeholders.

Behind this monitoring system, the information system created and managed by the business unit will work as a tool for measuring social impacts as well as for working directly to update condition assessments. Additionally, the information system is relevant to targets 3 as a tool for dissemination (so that the number of contacts and the amount of data will be significant indices), and to target 6 as it contributes to make people in conservation more accustomed to advanced techniques: this qualitative impact should be measured as a kind of 'customer satisfaction'.

As at the time of writing the project has just had its kick-off; we cannot yet speak of lessons learned in the monitoring phase. Nevertheless, it is worthwhile to remark that already in the early stages of developing the project it has proved to be definitely useful to express targets. Furthermore, all involved stakeholders have reached a better understanding of the process thanks to the set of indicators, and developed their own awareness knowing that the project will be monitored along with its impacts.

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Endnotes

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Methodology for monitoring the surrounding area of historic gardens

Inês El-Jaick Andrade[1]

Abstract

In the face of growing environmental problems it has become important to debate and seek out new perspectives for the planning and management of urban vegetation in cities. Through the analysis of the concepts of visibility and ambience, the article studies the impact that surrounding areas play in historic gardens and proposes an investigation methodology. The proposed methodology advocates the incorporation of diagnosis, forecasts and monitoring of impacts.

Keywords: historic environment, historic sites, preservation

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Monitoring and preventive conservation: applied principles in urban conservation

Throughout the development of the preservation discipline for historical and artistic monuments, the surrounding vicinity of the protected property already played a distinct importance and took different names. Recognition of the relevance of the vicinity of the heritage property is still very recent in Brazil, with regard to the comprehension of its influence and its respective management. Initially this has been due to the cultural context of implementation of our 1937 cultural legislation. The first federal listing by the *Instituto do Patrimônio Histórico e Artístico Nacional* (IPHAN) was not introduced with a definition of polygonal delimitation of the surrounding area, but there has prevailed the distinct expression, attributed to Lúcio Costa, that the surrounding area would be 'as far as the eye can see'.

There are few good examples that exist which incorporate this disposition, except for in the case of historic cities, but in practice, their delimitation by polygonal fields is based simply on visual fields and height measurement templates that have proven to be inefficient. It must be recognized that spatial and social contexts contribute to shape a particular urban and architectural identity for each site, that is, its unique ambience.

In order to not jeopardize the preservation of heritage value, it is necessary to establish clear guidelines for the management tools for the surrounding area, to be applied daily by the competent agencies for historic heritage. Thus, we propose a methodology for identifying and performing actions in the area surrounding the historic garden, that considers the impacts on the environmental dimension of the heritage property, their legibility and their historic ambiance. To assist in the impact investigation research methodology, this study supports the importance of the role of scientific inventory.

Inventory is a research method that – because it is based on systematic, comparative analysis and levels of distinct detail – is not restricted to a simple registration function or classification. It is a useful tool to analyze the property in terms of historical, aesthetic, artistic, formal and technical aspects. When done accurately, it allows a more detailed reading of the property and its transformations. It is argued that this documentation provides the ability to construct a general framework of the state of conservation and preservation of the property, and therefore it should be performed as a routine practice that precedes and follows any intervention on historic heritage.

1. Role of the surrounding area and the paths taken for its normalization

In Brazil, until the mid-twentieth century, the term 'neighbourhood' was used to refer to the surrounding area of federal landmark properties. The application of the term was officially incorporated in the 18th article of the *Decreto-lei* nº25/1937, which was to ensure visibility for the property landmarks in the area of its neighbourhood.[1]

Thus, the concept of neighbourhood, then confined to the views from the protected site and the bordering roads and neighbouring blocks, closely following the concept of 'immediate environment' covered under the principles of scientific restoration, as stated in the 1931 *Athens Charter*, and that influenced specific European legislation for the protection of specific assets of artistic and historical

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interest. The maintenance of good visibility of the property is a chosen attribute considered essential to safeguarding its historical and artistic value.

Over time, the concept of neighbourhood has been replaced by the use of the term 'surrounding area'. In Brazil this was coined by the technicians of *Instituto do Patrimônio Histórico e Artístico Nacional* (IPHAN) around the 1970s and consolidated in the 1980s. It was officially adopted by the Federal Government in *Portaria* nº5/1981.[2] Together with the technical term change there was included, in addition to visibility, another attribute: the preservation of the historic ambiance of declared historic sites. The international normative documents[3] were essential in this construction of the identity of the surrounding areas. Currently, the cultural institutions of the different spheres of influence use the new term and its attributes; however, few use standardized instruments for delimitation of polygons of surrounding areas of heritage property. Overall, the cultural legislation focuses on punishment rather than defining and delimiting the role of the surrounding areas in the preservation of heritage property.

1.1. Importance of the surrounding areas for historic sites

The choice of subject matter, historic gardens, was made because it stands out among the categories of urban environmental heritage. It presents aspects including natural heritage and its close ties with the quality of life in the city. Thus, the degradation of urban green spaces represents not only losses to environmental quality and urban environmental quality (micro-climate), but also gaps in our historical past and commitment to our patrimonial heritage.

Within the history of the ideology of preservation, the definition of separate guidelines for conservation and restoration of historic gardens date back to the end of the 1970s. The *Florence Charter* (1981, Art.3) identifies that the historic garden is one 'living monument', composed of both perishable and renewable materials. It is well known that, when designing with vegetation, it works in "direct complicity with living beings that grow and develop through the passage of time, creating and recreating spaces for each new season" (Macedo, 1982, p. 17). Thus, the site is essentially moving harmoniously, as much in relation to its time as to its space (changes in its surrounding areas). Even the most constant elements, such as its soil (and subsoil) and hydrography, undergo gradual changes related to the evolution cycle.

The conservation of the aesthetic and physical integrity of the garden is essential for the correct reading of history, that is, recognition of the historic site as provided by cultural significance. Visual intrusions outside of the garden reduce the enjoyment of the historic site; however, the greater commitment is to the scenic view from inside to the outside of the garden. Degradation is not, therefore, only the loss of area or the substance of the historic garden but also its decontextualization – an occasion when its relation to the historic environment is ignored. The hollowing out of context directly affects the quality of legibility and of ambiance. Thus, the environment must ensure the physical protection (ambiance) and the significance (legibility) of the monument.

1.2. Visibility and Ambiance

The method for studying impact and its causes restricts itself to historical surveys, morphology, and sensory perception (soil and topography, winds and climate, vegetation and wildlife, light, sound and water) combined with the identification of pathologies that compromise the identity and integrity of the site of historic interest. Measurement and utilization of quantitative indicators were discarded because there are still no studies focused on the investigation of impact indicators with reference to their preexistence (Romero, 2005); so it is necessary to produce them.[4]

The study of cognition and the perception of space have a long tradition in psychology, having been introduced in studies of urban architectural environment by Kevin Lynch (1999) and by Gordon Cullen (1983) in the 1960s. Cullen's theory about the 'art of relationship' of the urban environment argues that each fragment in the built environment can intrinsically present visual characteristics that play a fundamental role toward the construction of the identity of the 'local' (or mental image) of the urban site. The factors that contribute to the creation of an environment will range "from the buildings to the announcements and the traffic, passing through the trees, through the water, throughout all of nature and, ultimately intertwining those elements in such a way to arouse emotion or interest" (Cullen, 1983, p. 10). Without a thorough examination of those visual characteristics, these potentially might be overlooked and destroyed by urban interventions. This investigation of the relationship between environmental elements contributes to the definition of the current ambiance and of maintenance actions or intervention for the construction of the ambiance that should be perpetuated.

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The concept of legibility, proposed as a substitute to the usual concept of 'visibility', is the attribute of visual quality, that is to say, the ease with which the components can be recognized and organized into a coherent pattern (Lynch, 1999). This attribute can be easily interpreted as the concept of preservation of integrity of the heritage property in its context of urban setting. From a favourable visual framework (visibility) and contextualization (signalling and accessibility) of the heritage property it can be possible to have a spatial reading of the site, that is, to put forth an assessment of the state of preservation of the historic site inside its respective urban environment.

The replacement proposal for the term is grounded in the usual application of 'visibility'. This tends to be simplified and does not accomplish its ultimate goal – access to the monument testimony. The content of the 'visibility' has already been discussed in *Decreto* nº25/1937, and it was closely linked to the visual pollution caused by signs, banners, billboards, and bright or vibrant colours incompatible with the neighbourhood context. In the past, to ensure the integrity of the heritage property, the monuments were 'released' on the urban environment through open spaces. Currently, the visual relationship between the monument and the immediate vicinity is itself based in the identification of significant heritage values to therefore define visibility requirements and enjoyment of the monument reading. For this reason, it is proposed to change the terminology to encompass not only the question of visual intrusion, but also the integrity parameters of the declared heritage in its site.

2. Proposed methodology for monitoring of the surrounding areas of historic sites

2.1. Identification and characterization of the environmental dimension

The objective of this first step of the proposed study is to analyze the attributes of the site of historic interest. This corresponds to a general analysis of historic development of the zone area where the property is located, its cultural significance (historic mark on the city and local memory) and the importance of urban planning that relates to both the integration of heritage property with the landscape, as well as to aesthetic perspectives (landmarks and skylines). For this it is necessary to investigate the basic components of the environmental dimension of the site of the historic garden.

It is understood that the basic components of the environmental dimension are legibility and ambiance. To identify them it is necessary to conduct architectural and historic surveys; including the collection of iconographic and cartographic material (registration of the garden materials, aerial photographs and maps), surveys of legislation in the area (land use and restrictions), identification of civil society groups that operate in the area (to understand the cultural significance of the historic garden and also identify for partners to its preservation) and study of current photographic documentation. Additionally, it is advocated to prepare inventories that use urban environment visual analysis from the site of the monument as a conceptual tool from the surveys and study of the surrounding areas of the sites of historic interest.

2.2. Criteria for the delimitation of the surrounding area

In the second step of the study, there should be a survey of the physical environment of the site of historic interest, based on three variables: biotic, landscaping, and socioeconomic. The biotic variants are the climate, the geology, geomorphology, soil and subsoil, the water cycle, vegetation, wildlife, scenic resources, and noise. Socioeconomic variables are the use and the exploitation of the territory, as well as service infrastructure, accessibility, sanitation, air quality and the transport system. Already, the landscape variables are linked to the qualitative aspect of the place, that is, the recognition of the heritage value of the designated cultural property.

The methodology presented for the impact on the surrounding area proposes to create a file, similar to studies already conducted by IPHAN (2007), that seeks to identify the boundaries of the surrounding area and establish preventive measures and control of alterations that interfere with the environmental dimension of the declared historic site. The structure of this assessment method proposal is based on an integrative approach to landscape planning, in which the surroundings form part of the ecosystem of the declared historic site.

As a starting point, theoretically, is the proposal to use the conventional distance of 500 metres to define the close surrounding area, not as an area of tutelage, but as an area for study. For the delimitation of the surrounding area it is essential that the positive and negative charges imposed on the declared

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historic site are studied using the urban pathology inventory identified in the sites of historic interest. The importance of demarcating a polygon of the vicinity in the declaration, at the time of registration of heritage property, is stressed so that, in the short term, the correct perimeter based on these studies proposed by the methodology is ratified. Combined with this, one should choose to review this at the time of a new intervention in the surrounding area.

To inventory the conditions of the area surrounding the heritage property it is necessary to conduct direct observations, preferably supported by impact indicators, seeking to collect data on the state of conservation and preservation of the historic site. The existence of negative impacts is evidenced by the alteration of the typological traits of the heritage property, either by alteration of its structure or its components. Generally, the impacts are the results of project implementations in the historic site vicinity that overtax current conditions in three variables: (1) biotic, through the impact of excessive sealing of the land (soil and subsoil), height measurement templates (projected shadow), the increase of temperature and humidity (climate), the change in ground water (water), increased atmospheric pollution (air), the increase of resonance pollution (noise), the reduction of illumination (vegetation) and the migration of local wildlife; (2) the landscape, by physical, aesthetic, and sensory impacts on the ordination of the urban landscape; (3) economic and social variables, through the overload or under-utilization of public facilities.

It is not sufficient just to identify the impacts, but it is important to identify the causative agents of degradation and contamination. Along with these we should perform an assessment of its magnitude, for it is this that will indicate if the impact is very significant or if it can be ignored due to its minor significance. What characterizes the impact is not any change in the environment properties, but the changes that could inhibit equilibrium of the fundamental relationships of the environment, and that exceed the environment absorption capacity.

For the analysis of biotic variables, the urban landscape can be divided into six components: wind and climate; vegetation; water; topology and subsoil; sound; and light. Among the pathologies directly related to wind and climate that indicate changes in urban spatial thermal structure, there are: temperature changes, directional and intensity changes in the winds, and increased local precipitation. Some of the most usual pathologies of impact on the landscape and subsoil of the sites are an increase in soil acidity altering its fertility, and a change in drainage capacity of ground water.

These changes may be caused by land reshaping (land cutting and landfill), soil erosion on hills, pollution and contamination of soil by toxic waste, the reduction of permeable areas in the immediate vicinity area and by the mass movement caused by excessive vibration due to vehicles on traffic routes in the immediate vicinity, as well as air routes and by excessive vertical load exerted by the building foundations in the surrounding area of the historic garden. Among the water-related pathologies are increase in flooding, silting of lakes and rotting of individual plant roots. These can be the consequence of urban infrastructure projects for correction and channelling of water courses, underground construction in the immediate area that degrades and pollutes the groundwater or, in the same manner, by the pollution of waterways, groundwater for sewers, and untreated water used in production.

Among the biotic variables, the study of noise level – inside and outside of the garden – is very important, although its application is not usual. The reduction of background noise propagation depends on the capacity of sound absorption material, the quantity and the arrangement of vegetation and topography. The vegetal mass serves as an acoustic barrier, diminishing its intensity as a result of sound absorption by the leaves. The vegetation reduces the intensity of sound when it is in its path, but although a good absorber it is a bad insulator. It is necessary, therefore, to have a great mass of trees for isolation. Monitoring the impact of urban noise caused by vehicle traffic, along with studies of airborne (suspended) pollutants, can contribute to the implementation of a policy of sustainable urban mobility, that is, in the restructuring of the local road system.[5]

The amount of light is not as important in public spaces as quality. Light – whether natural or artificial – plays an important role in the formation of sensory data of the landscape. The plant height and plant age, time of year, type of foliage of the tree species, and disposition of vegetation coverage, as well as the area of visible celestial dome, are the variables that modify the illumination above the urban district (Mascaró, 1996; Romero, 2001). Shadow has a decisive role in the perception of urban districts;:those that give rhythm (shadows that differ in sizes), or emphasis (shadows highlighting elements) or contrast (shadows with multiple tonality).

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In the city of Rio de Janeiro, the *Decreto* nº 20.504 of 13/09/2001 regulates the Law 47 of 01/12/2000 regarding the criteria for analysis and maximum permitted limits for shading of buildings on the municipal beaches.[6] Although this law is restricted to the beaches, the simulation of shaded areas is important also to identify the level of solar illumination blocking in the historic garden. In this study of shadows, the decree in its 3rd article establishes that the documentation submitted must contain graphic projection of the building in the strip of beach sand on the spring equinox (September 23) and the summer solstice (December 22) at the following hourly intervals: 6, 7, 8, 9, 10, 15, 16, 17, 18 and 19 hours. The decree also notes that the shading of buildings when they are included in the shadowed areas of any topographical accidents or of buildings regulated by the municipality will not be taken into account. This study of shadows can be used to identify the causes of pathologies in the historic site, but also to assess the introduction of changes to the area height limit template and its impact on the garden.

The process of urbanization also causes violations in the landscape – the landscape variables – in two categories: visual and functional violations. In the visual landscape variants there are intrusive visual elements at the heritage property like commercial signs, walls and trees that jeopardize their own fruition. At an advanced stage, the impact of visual intrusion can be perceived in the skyline. Therefore, it is necessary to preserve the panoramic views of the historic garden.

However, it is not always easy to predict visual intrusion, because beyond being restricted to few cases, the study of visual axes is based only on studies of measurement templates (elevations) and serial visions. The studies of recent visual axes, of historic ones such as Ouro Preto (located in the state of Minas Gerais, Brazil), have used the resources of geoprocessing for the management of urban and architectural heritage (Moura, 2002). Those studies, which follow principles of the theory of perception and spatial cognition, use topographical and digital resources to generate a digital model of the study area. On the basis of the choice of significant points of the urban configuration and of the greatest visual reach that contextualizes the protected property, axes are mapped out, analyzed and summarized with scenic values. The resource permits information to be obtained in two natural forms: for the urban planning and for the management of historical, architectural and landscape heritage.

Still influencing the landscape variables, the functional violations are related to urban ordination and signalling (visual programming) in the surrounding area of the site of historic interest. Disorientation through inefficient signalling or through little perceptive content – obscure or disintegrating links with the surrounding area and the site – can reflect negatively on morphological identity and the allocation of importance to the urban image of the protected property.

It must be observed in these violations the requirements of the historic garden derived from the relations of the historic reading or user-population culture: the green space qualification. The application of illumination also echoes in this variable, since it can serve to encourage appreciation and stimulate heritage perception by means of nighttime lighting, prioritizing the distinction of shapes, colours, volumes, and textures of the historic site, or, in excess, cause damage to the development of wildlife and vegetation of the garden.

Finally, among the socioeconomic variables, there are common cases where the surroundings present problems like social and urban degradation. Some of the dangers that jeopardize the preservation of the site are related to inappropriate use of buildings in the vicinity, which can cause explosions and fires (properties used for mechanical, chemical or industrial activity) or atmospheric contaminants. The proximity of roads that have intense traffic flows compromises the site because mechanical shocks and air pollution at the border of the (historic) site could occur. Also, with the growing requirements of the city space, the area designated for vehicle parking is an issue that is difficult to solve.

It should be noted that for the study of the components of the site of historic interest, the land should be divided into blocks in accordance with both the dimension of the site and its visually perceptible characteristics. The separation into quadrants will facilitate taking measurements. Another precaution to be observed is proximity to the 'frontier edges' (Romero, 2001), understood as buffer zones of the site. The larger the site area, the more the measurements at the frontier edges will differ from the interior of the site.

In the identification of the causative agents of degradation and contamination in the surrounding areas of the historic garden the general prohibition of activities in a particular space does not resolve or ensure the preservation of the historic site, because it is not possible to rapidly quantify the interferences

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of the atmosphere and the underground (subsoil). For this reason it is necessary to monitor the changes experienced in the surrounding area to seek to anticipate (as a preventive measure) consequential damages to the property (remedial measure). The principle of periodic review and adjustment, present in the methodology of the *Instituto Brasileiro de Meio Ambiente* (IBAMA, 2002), is incorporated in the proposed methodology as a very important preventive measure.

2.3. Instruments for the mitigation of impact: monitoring and interventions

The third step, the criteria to operate in the surroundings, should be based on the analysis of the site inventory – diagnosis of the causes of identified pathologies – and will be able to indicate the degree of integrity compromised at the site (vulnerability), including potential, eminent, or immediate danger. In accordance with the impact intensity, there should also be an assessment of the necessity to act – forecasting – through landscape and urban instruments, in accordance with the municipal governments and environmental agencies. The preventive operation should be performed, even if significant impairment of the historic garden is not identified, through monitoring of the surrounding area. The actions defined in this step do not start just from assumptions of restriction but also from provisions designed to adequately protect the environmental situation and improve the urban environment.

After having identified the high vulnerability of the site of historic interest it is necessary to seek appropriate solutions to avoid increasing its impacts. The legal instrument of the surrounding area as applied in cultural legislation is not sufficient to protect the necessary references for the comprehension of declared monuments and properties. It is essential that these studies are incorporated into municipal master plans, in such a way that allows control of the elements that can interrupt the protected property's perspective, and establishes normalization of the volumetric conditions, materials, or new building types in the immediate area of the property. In accordance with the tutelary condition specific to the historic garden, studies must be performed for urban or landscape interventions.

Fulfilling a psychological and landscape role, the introduction of new green spaces in the vicinity of the declared property – buffer zones – constitutes an important component in the preservation of historic sites: absorbing impacts of biotic and socioeconomic variants. This zone cushioning should, preferably, be forested, since the tree mass contributes to reducing the negative effects of urbanized environments.

Also actions should be studied to increase the legibility of the protected site, through the establishment of information and visual integration of the historic garden into the surrounding landscape. However, the goal of the visual axes in the surrounding area are not to create new views, but to maintain respect for 'visual participation' (Ruiz, 1997) of the protected site in its surroundings, or in its surrounding landscape. For this it is important to choose the historically consolidated visual points to prohibit the placement of any element that can interfere with the direct view of the site, substitute aerial cabling with subterranean cabling, select furniture linked to the site and develop the information support necessary for the appropriate indication for visiting and understanding the protected site.

Conclusion

It is the understanding of environmental variables (ambient and legibility) of the historic garden, combined with the physical demarcation of the surrounding area or vicinity, and the monitoring of changes in the vicinity, that plays a crucial role in the preservation of urban public green heritage. The monitoring, interventions and actions in the vicinity have the objective to anticipate or reduce the negative impact of urbanization on sites of historic interest.

The immediate surroundings built in urban environments significantly influence the historic reading of the property as in the climatic performance and development of plant and wildlife of the urban enclosure. Once the substrate is moulded and composed mainly of live material, it is clearly sensitive to disfiguring and destructive actions. The identification and delimitation of buffer areas is essential to contribute to absorption and lessen the impact of ownership. Nevertheless, these actions still occur randomly, and this conservation tool is not part of preventive measures for conservation planners and heritage specialists.

Thus, other institutions with diverse technical staff (surveyors, geophysicists, archaeologists, traffic engineers, biologists, among other specialties) related to urban and environmental management must contribute to the construction of indicators for

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assessing impact variables and monitoring sites of historic interest.

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Endnotes

[1] **[trans.]** Without prior authorization of the *Serviço do Patrimônio Histórico e Artístico Nacional*, it will not be allowed, in close proximity to the declared item, to do construction that prevents or reduces visibility, nor to place announcements or large posters, under penalty of being ordered to destroy the work or withdraw the object, imposing in this case fine of fifty percent of the value of the same object' (Decreto-Lei nº25, Art.18, 1937).

[2] This gatehouse is in the Imperial City of Petrópolis.

[3] *Venice Charter* (1964), *Amsterdam Manifesto* (1975), *Recommendations of Nairobi* (1976), *Burra Charter* (1980) and *Xi-an Declaration* (2005).

[4] It should be noted that although the proposed method indicates the need for impact indicators to measure for the variable biotic, these indicators of bio-climatic urbanism are still few and are not specific to the heritage property.

[5] Although trees along the streets do not reduce the noise level, they reduce the residence duration time of noise in the street.

[6] With the decree, approval became conditional for the project study analysis of shadows for the *Secretaria Municipal de Meio Ambiente* (SMAC).

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Conservation of urban heritage and monitoring tourist impact: an integrated approach

Heleni Porfyriou[1] & Marichela Sepe[2]

Abstract

The negative impact of mass tourism on the conservation of urban heritage and the depletion of traditional civic values in historic centres is evident and has already been noted in European and international reports. However, planning and conservation policies in many European historic cities continue to be fragmented and short sighted as they are mainly interested in the short term economic advantages of tourism.

The aim of this paper is to propose an integrated methodology able to study the impact of mass tourism on historic centres, by introducing two complementary approaches. One is a survey consisting of a systematic collection and planimetric representation of data relative to uses of the buildings, the occupation of public space and the state of conservation of building façades. The other is a dynamic urban analysis and design approach that identifies the cultural resources and the identity of places and consequently projects interventions for their conservation.

More specifically the paper's aim is threefold: 1) to monitor tangible and intangible transformations related to increased tourist presence; 2) to evaluate the effects of increased tourist flow on the monuments' material and historical connotations; and 3) to develop techniques for mitigation and control of tourist impact and risks, having as a final aim the development of recommendations for a sustainable fruition. The case study of the Trevi-Pantheon itinerary situated in the historic centre of Rome will exemplify this methodological approach and its results.

Keywords: monitoring tourist impact, place making, historic centres, urban conservation, intangible heritage

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Premise

The negative impact of mass tourism on the conservation of urban heritage and the impoverishment of central places from their traditional civic values is evident and has already been noted in European and international reports (Council of Europe, 2000; Drdácky and Drdácky, 2006; ICCROM, 2005; ICOMOS, 2002). However, planning and conservation policies in many European historic cities continue to be fragmented and short sighted as they result mainly from interest in the short term economic advantages of tourism. Similarly, the enhancement of cultural heritage has direct consequences on the conservation of artefacts, in so much as it increases fruition, which implies a greater risk of decay due to the greater numbers of visitors and their interaction with the artefacts and the environment in which they are located. The so called 'human risk' is still not comprehensively studied and one can observe a lack of methodological approaches able to monitor the state of conservation of urban historic sites. In the meantime the increased mass tourist pressure in these sites alters their characteristics and inherent values (Boissevain, 1996; Frers and Meier, 2007; Gunn 2002; Haldrup *et al.*, 2004; Urry 1995).

Starting from these premises, the aim of this paper is to propose an integrated methodology still missing from relevant literature and to approach the issue from a complex point of view. The methodology elaborated and experimented uses two complementary approaches. One is a survey consisting of a systematic collection and planimetric representation of data relative to uses of buildings, occupation of public space and the state of conservation of building façades. The other is a dynamic urban analysis and design approach, which identifies the cultural resources and the identity of places – also introducing visitors' participation through questionnaires – and consequently project interventions for their conservation (Appleyard, 1981; Hague and Jenkins, 2005; Lynch, 1960; Massey and Jess, 1995; Sepe, 2009).

The case study of the Trevi-Pantheon itinerary situated in the historic centre of Rome will exemplify this methodological approach and its results.

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1. The Trevi-Pantheon area and its history

The case study area has a very long history going back to the Roman Empire when the Pantheon was built by Marcus Agrippa as a temple in the first century BC; later in the 7th century it was consecrated as a church. Also included is Hadrian's temple, situated along the itinerary, which was built by a Roman emperor in 145 AD and later transformed in the 17th century by the famous architect Carlo Fontana into the *Dogana di Terra*. Only the Trevi fountain is of a more recent origin. In fact it was completed in 1762, and gives the small square in front of it a fascinating and uniquely scenic image.

Both Pantheon square and the one in front of Hadrian's temple have been used through the centuries as market and civic spaces where commercial and public manifestations were held. The urban form of this old part of the city has not been changed as the Nolli map of 1748 shows when compared with the Pio-Gregorian urban cadastre of Rome in the 1820s.

In these squares community life has taken place, through the centuries, consecrating them as places of cultural, artistic and historical importance and as places of collective identity and civic pride, where a sense of belonging grows and takes root.

In 1991 the municipality of Rome announced a competition for the 're-qualification' of this central part of the city. The aim was to close it to vehicular traffic and create a pedestrian itinerary (Figure 1) connecting Pantheon square with the Trevi Fountain – two of the most famous and visited monumental sites of the eternal city.

Furthermore, another experimental project was proposed for the same area: the pedestrian itinerary had to be specially equipped for blind people (with pavement, infrastructure, and appropriate signs). The project was supported with special funds from the 2000 Jubilee and had finished on time.

Since then, in the last 10 years, the numbers of tourist in Rome (and in Italy more in general) has grown at an exponential rate. More than 30 million people per year are calculated to visit Rome (on the basis of hotel statistics), which means that on a daily basis 100,000 tourists are present in the historic centre. The Pantheon square and Trevi fountain, together with the Colosseum and the Vatican area, are probably the major attractions of the city. Connecting Trevi to Pantheon with a pedestrian street (initially specially designed for blind people) implied creating a privileged itinerary especially attractive to tourist groups and flows; who in fact immediately adopted it as the only real, direct connection between these two monumental spots of the city. It is amazing that nobody in the municipality offices (where this project was conceived) seems to have thought of it and no one considered monitoring its effects, which, as our research shows, have been devastating for the area.

2. Research and outcomes

2.1. The method

At this point our aim was to study the impact of mass tourism on historic centres, namely on their conservation in physical and functional terms as well as regarding their inherent intangible values. More specifically our aim was threefold:

1) to monitor the tangible and intangible transformations, along the itinerary, related to the increased tourist presence;

2) to evaluate the effects of increased tourist flow on the monuments' material and historical connotations;

3) to develop techniques for mitigation and control of tourist impact and risks, having as a final aim the development of recommendations for a sustainable fruition.

The method elaborated for monitoring the Pantheon – Trevi area utilized two complementary approaches: one static, the other dynamic. The first approach consisted of three interrelated surveys mapping changes and transformations with respect to: the uses and functions of the buildings along the itinerary, the state of conservation of their façades,

Figure 1. The Pantheon — Trevi itinerary in the historic centre of Rome, Italy.

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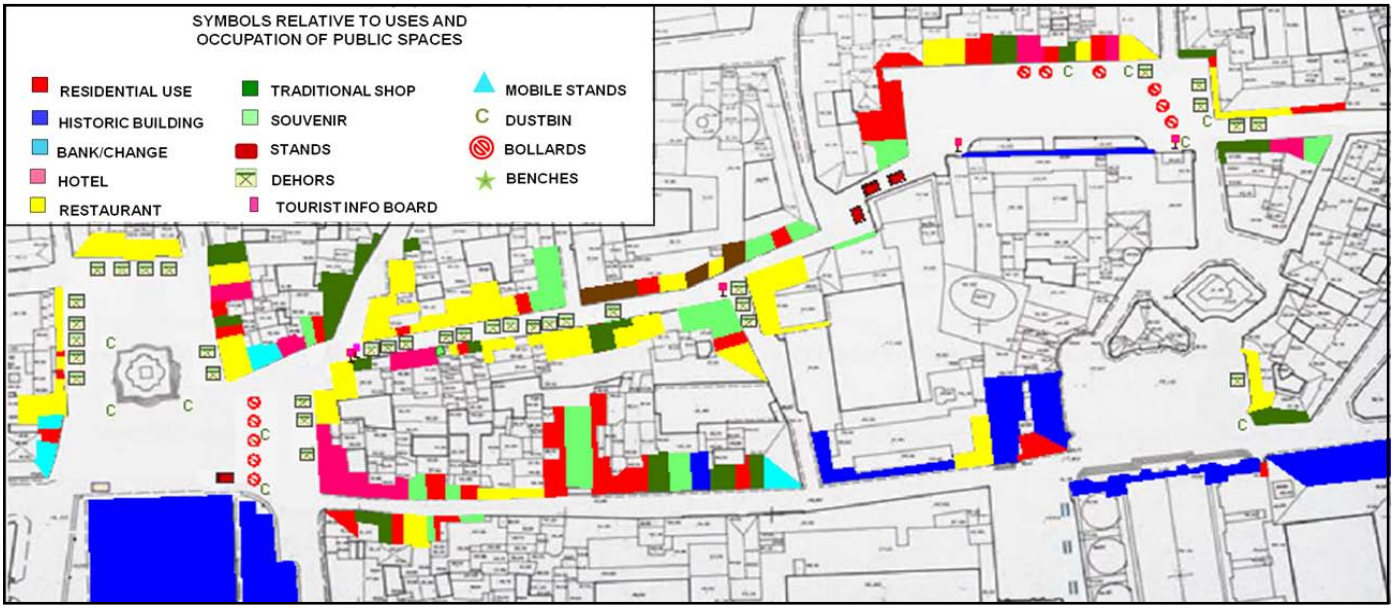

Figure 2. Planimentric representation of uses and occupation of public space, along part of the Pantheon – Trevi itinerary.

and the urban quality of the places (Porfyriou, 2010a).

In other words a systematic collection of data along the itinerary was undertaken for each building using two forms created for this purpose. The first one documented the uses and the occupation of public space directly related to the building's pertinence. The second one documented the state of conservation of the building's street façade, particularly in relation to the various changes of uses the ground floors were undergoing.

This documentation was then utilized in order to create three thematic maps representing: i) the uses and functions of all buildings along the itinerary; ii) the occupation of public space, both legal and illegal along the street (Figure 2); and iii) the state of conservation of the façades of the buildings along the itinerary. Finally a contextual representation of the buildings' state of conservation in relation to their functions and to the use of public space of their pertinence summarizes all three thematic maps (Figure 3, next page).

The second approach of the integrated methodology presented here, the dynamic urban analysis and design, consists of the application of PlaceMaker. PlaceMaker is a method of urban analysis and design that gathers processes and reconstructs the data deriving from nominal, perceptual, graphic, photographic and video surveys, and compares these data with those provided by an analysis of expectations, an analysis of traditional cartography and a questionnaire administered to local inhabitants.

PlaceMaker comprises eight phases; five of analysis and three of design (Sepe, 2007). The first phase of PlaceMaker is devoted to anticipatory analysis aimed at a primary investigation of places. After the preliminary choice of the city and of the part(s) to be analyzed, ideas about that particular area can be described using any type of instrument or tool of expression, using the information known prior to the first inspection. The second phase is that of the five surveys. The first survey, the denominative one, consists in collecting data regarding constructed elements, natural elements, transportation mode and people. The second survey is perceptive, carried out on smell, sound, taste, touch and visual sensations, and of the global perception, focusing on the localization, type, amount and quality. The third survey is graphic and consists of sketching the places according to a visual-perceptive standpoint. Then photographic and video surveys of the whole study area are carried out, taking care to record facts rather than an interpretation of the places. The third phase involves the analysis of traditional cartography of the selected sites in the city at the urban and territorial scale. The fourth phase is that of the questionnaire administered to visitors to the area in order to gain an idea of the place as perceived by those who are not involved in the study and are not specialists in related fields, but only perceive the site as users, at various levels: the inhabitant, the passer-by, the tourist. Then we have the last phase of analysis, that of assembling the collected information. In this phase, we test the maps produced and the congruence of the various collected data,

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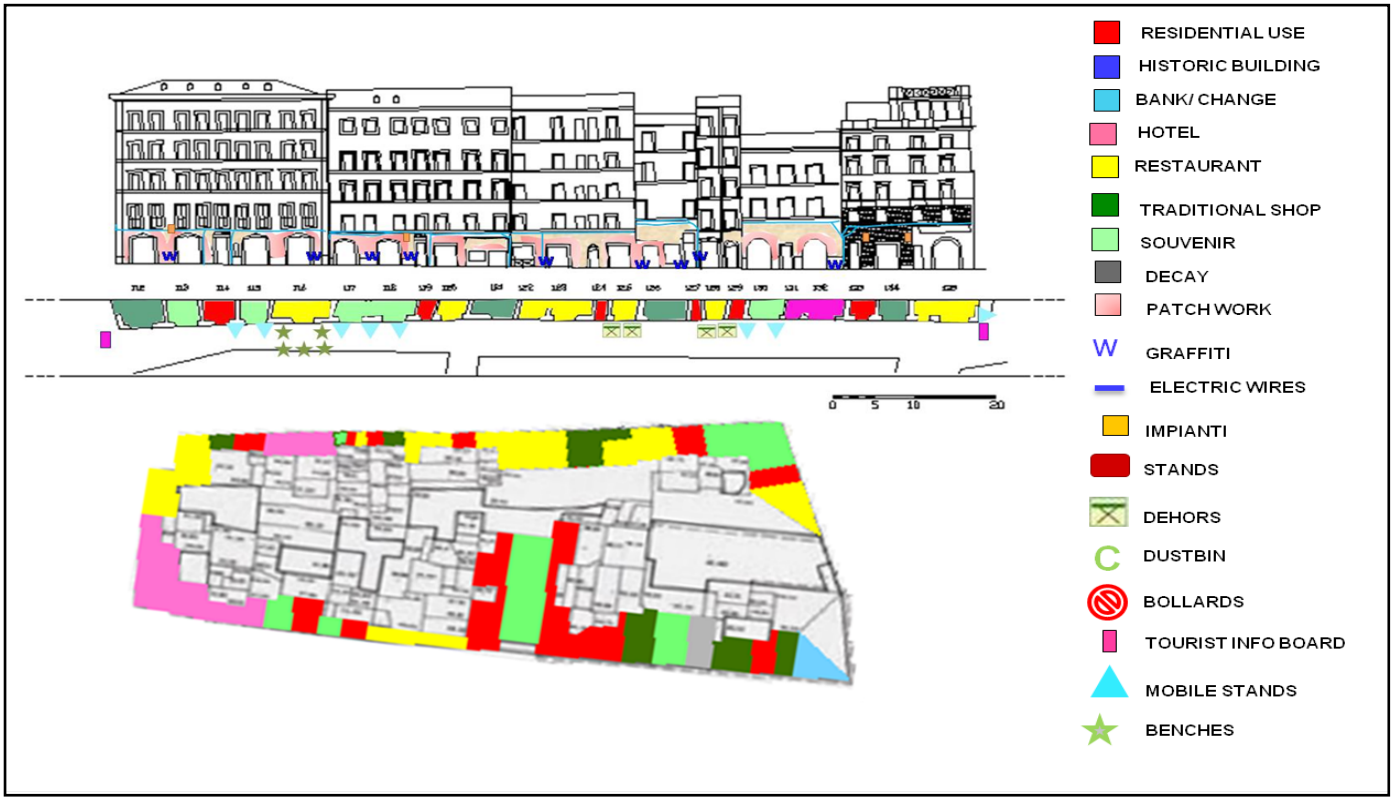

Figure 3. Contextual representation of buildings' state of conservation in relation to their functions and to the use of public space of their pertinence.

choosing the useful elements to construct the final map of analysis.

We thus have three design phases. The sixth phase is devoted to surveying identity resources in the study area. The sixth phase is realized through three measures: the identification of the identity potential, the identity problems and the identity quality. In this phase the identity resources available for the project are represented: a sort of map of intents, the first step for the construction of the complex map for the identity project in question.

The seventh phase is the survey of the identity resources by users of places, locals, passers-by and tourists, in which a questionnaire designed to elicit information emerging from the previous phase will be administered. The last phase consists of an overlay of data collected during the previous phases and identification of the project proposals, represented in a complex project map. This map is the last step in the design process, where the information contained in the complex map of analysis, after being filtered and transformed into resources, gives rise to proposals for the construction and enhancement of a sustainable place identity.

2.2. The results

The first aim was to confront and analyze the different maps with the original situation of the area before the realization of the re-qualification intervention by the Municipality (by monitoring the tangible and intangible transformations).

With respect to 'tangible' elements, the outcome of this comparison shows that: commercial activities, specially restaurants and bars, have been greatly increased, often substituting for previous commercial activities related to residential needs, such as shops for fruit and vegetables, bakeries etc., or other neighbourhood services. Most souvenir or commercial shops no longer sell local products but instead products of a global market, often made in China.

Furthermore the commercial activities related to restaurants, bars, gift shops, souvenirs etc., gradually increased their occupation of public space (both in legal and illegal terms), with tables, umbrellas, stands, benches, dustbins, fences, flower vases, etc. (see Figure 2). The increased presence of tourists also attracted other itinerary activities, such as street actors and street sellers, taxi and carriage parking, gladiators, police cars, etc., all of them occupying the public space in a savage way.

We also observed that tourist masses increased in an exponential way along this street, destroying the new pavement put in by the municipality when it re-qualified the area. The urban decay of all spaces along the itinerary is quite evident, both in material terms (graffiti, occupation of public space, bad

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Figure 4. Place Maker, complex map of analysis and legend.

pavement, congestion), social (expulsion of residents and related functions) and civic terms (civic activities have less space to be expressed as they have to share with mass tourist presence). The street has in fact changed from a residential to a tourist one with overcrowding, filth, unqualified occupation of public space, and disproportionate increase of commercial activities.

As regards the observation of the 'intangible' elements of the place – as noticed in the complex map of analysis (Figure 4) – the route links two major monuments located in two piazzas, Piazza della Rotonda and Piazza Trevi, and we might characterize it as a (musical) piece of the city that leads from the sacred (point) to the profane (counterpoint). The most significant break along the route comes in Piazza di Pietra, which in historical terms is no less important, but which has to some extent escaped having the magnetism of a tourist, cultural and commercial attraction. In spite of its impressive appearance, the Hadrianeum is less of a tourist draw, so that passers-by may pause here briefly but then go on to visit other monuments. By contrast, the break represented by Via del Corso is merely an interruption rather than a change in pace on the route. The streets linking the piazzas constitute a sort of recurrent motif with similar characteristics. Via di Pietra, Via dei Pastini, Via delle Muratte are primarily thoroughfares with several possibilities for eating and souvenir shopping. Along the sides the paving is in porphyry and down the centre special paving has been laid for the blind.

There are also some modern stelae made of burnished metal which recount the history of this route of Hadrian in Italian, English and Braille, with a plan of the itinerary (see the complex map symbols indicating the stelae and special paving for the blind). In some points there is graffiti on the façades. The most striking perception of the whole area is the noise of the water cascading in the Trevi fountain (see the complex map symbols indicating sound perception). Even before you reach Piazza di Trevi, you catch sight of the scenic Trevi fountain in white marble with ramps and the statue of Oceanus as its centrepiece. The fountain is built against one side of a building. There are flights of ramps both inside and outside, giving different perspectives and encouraging people to linger. Walking into the piazza you feel you are taking part in a scene or an event rather than merely arriving somewhere. The scene is made up of the spectacular fountain but also the enormous quantity of people (see the map symbols indicating high concentrations of people) who throng the piazza observing, admiring, listening, taking photographs, throwing coins into the water, eating ice cream or a sandwich, sketching, taking it easy, dangling their feet in the water, or buying souvenirs. There are hawkers selling souvenirs and other goods, a water seller, men dressed up as gladiators who tourists can be photographed next to, living statues, cripples begging (see the map symbols indicating hawkers and living statues).

The paving is in porphyry cubes, the urban décor street lamps and litter bins in decorated metal, and

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there are angular iron benches around the fountain. The tactile perceptions involve: the paving material and slight differences in slope, probably due to the constant tramping; the materials and sculptures of the fountain; the water in the fountain, which people often use to cool down. The visual perceptions include the churches of San Vincenzo e Anastasio and Santa Maria a Trivio, and the aedicule at one corner of a building. The acoustic perceptions include the predominant noise of running water, and the voices of the people who throng the piazza. The perceptions of taste and smell concern the products of the cafés, ice cream parlours and fast-food outlets, which hang in the air without being oppressive (see the map symbols indicating perceptions). The pace is slow.

Although it has different elements, Piazza della Rotonda appears comparable to the Trevi fountain. It is a typical location for traditional socialization; its conformation, the extraordinary beauty of its monuments, and the pleasant atmosphere ensure a constant throughput of people. The first element that catches the eye is the Pantheon, an ancient religious edifice, circular in shape, which dominates the scene and somehow embraces it. The voices of visitors and the noise of the constant tramping of feet constitute a strong acoustic perception (see the map symbols indicating transient sound perceptions). Not only those who come to visit the monument but also passers-by often pause for a while outside the monument, sitting at the foot of the columns or on the perimeter walls, chatting or having a snack, creating a scene which gets rather chaotic, as some respondents remarked.

A large nondescript throughput of people ebbs and flows in front of the Pantheon, which invariably includes hawkers, perhaps selling concert tickets dressed in historic costume, or souvenirs or miscellaneous goods. In front of the Pantheon a fountain with an obelisk and dolphins forms a focal point that not only characterizes the piazza and adds to the overall scenario but becomes a place of socialization for many visitors and tourists. The steps around the fountain encourage many visitors to pause or stop for lunch, photograph the fountain and the Pantheon, read a guidebook or feed the pigeons. The ground floor of the buildings is occupied by bars and restaurants with outdoor tables that are always thronged with people. From one of the restaurants emanates the unmistakable smell of fast food, while smells of food and coffee colour the atmosphere. A grocer selling local products on one side of the piazza attracts many tourists. In spite of the large throughput, the overall pace here is moderate and tranquil (see the map symbols indicating pace). The urban décor comprises old-style street lighting, litter bins and round metal bollards marking off the concourse; the paving, in small porphyry cubes, slopes at different angles and makes for a pleasant tactile perception.

Regarding our second aim to evaluate the effects of increased tourists' flows on the monuments' material and historical connotations, we identified two major approaches.

Through the analysis of the state of conservation of the façades of the buildings along the street (see Figure 3) one observes numerous interventions of maintenance and of external improvement of the façades, often realized by commercial activities occupying the ground flour of historic buildings of minor architectural prestige, which give a fresh colour to the façade of the new activity they open; a plaster, often of slightly different colour with regard to the original building colour, thus resulting in a patchwork which contributes negatively (instead of improving) the appearance of the whole area.

In parallel, important historic buildings are restored. These interventions are often related to buildings bought by tertiary or commercial activities, such as hotels or banks, which want to add prestige to their investment, and at times look exaggerated in their restoration or pose questions regarding the colour plan or conservation regulations of the city (as for example in the case of the building in Piazza del Pantheon which turned from ochre to light blue after its recent restoration).

Finally, as regards the third aim, development of recommendations for a sustainable fruition, at least five kinds of interventions – explained in the complex map of project (next page, Figure 5) – were identified.

These interventions, which supported the project hypothesis, were also proposed to visitors (all tourists aged between 28 and 65 years from Australia, U.K., Belgium, the Netherlands, Luxembourg, Czech Republic and Italy) through a double questionnaire. The first aimed to understand whether the visitors had seen only the elements of outstanding interest of this place or also the problems. In the second, we asked questions concerning possible interventions aimed at improving both the usability of the route, decongesting it, and the perception of its identity.

The first proposed intervention is differentiating and restoring traditional activities. This intervention

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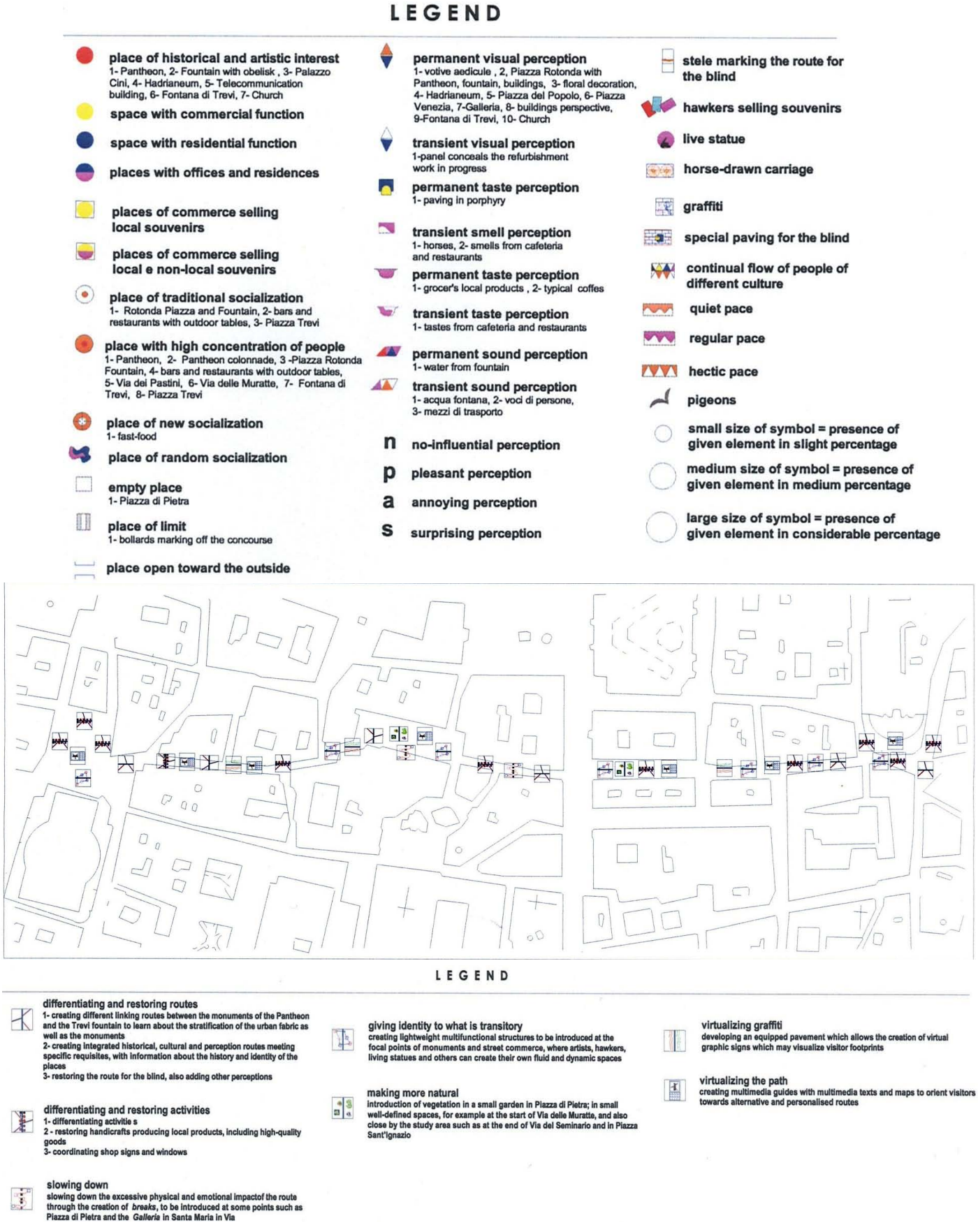

Figure 5. Place Maker, complex project map and legend.

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might include restoring handicrafts producing local products, including high-quality goods, so as to reduce the commercial confusion in these streets and rescue vanishing skills. Furthermore, we suggest the design of a coordinated project for shop signs and windows, above all as regards the streets that connect the squares, and eliminating graffiti on the façades. In this way, redesigning the critical points would ensure greater balance in the setup of spaces and organization of the various activities, act to discourage additional fast food outlets and pressure those already in place to conform.

The second is the differentiation of routes. This might involve creating different linking routes between the monuments of the Pantheon and the Trevi fountain: a short route (Hadrianeum), and a longer one featuring the stratification of the urban fabric as well as the monuments; creating alternative routes focusing on the elements of perception – this solution may well prove both educational and sustainable as it would show visitors how pleasing perceptions can be easily blotted out by unpleasant ones. The route for the blind should be restored – perhaps adding other perceptions. Integrated historical-cultural-perception routes meeting specific requisites should be created by introducing routes featuring the sound of water playing in the fountains, the ancient materials found along the route, admiring religious icons, buildings, churches, architectural features which pass unobserved in a hasty visit, sampling local produce, and breathing in the scents of Rome.

A third intervention designed to reduce the excessive physical and emotional load is the creation of breaks, to be introduced in several locations. Piazza di Pietra is currently the only true moment of relaxation, where one might build, for example, a little conceptual garden, also serving an educational function, where people can pause and indulge their perceptions and then proceed into the central space of the Hadrianeum. The Galleria in Santa Maria in Via, currently under-used and not strictly on the route but close by, could serve as a break with the inclusion of exhibitions, featuring the route of Hadrian for example, and other functions.

A fourth intervention consists in giving identity to what is transitory by creating lightweight multifunctional structures to be introduced at the focal points of monuments and street commerce, variable in extension and dimension, opening and closing;,where artists, hawkers, living statues and others can create their own fluid spaces within a dynamic, light grid which nonetheless constitutes a framework. This form of urban décor can be equipped for various functions including multimedia.

A fifth intervention involves virtualizing the graffiti and the path. In the first case, at some points, where there are more graffiti and the historical pavement has been replaced by a recent one, a special pavement could be inserted which allows the creation of virtual graphic signs which may visualize the steps of visitors. In the second case it involves going online with the creation of multimedia guides. The various routes can be presented and made more user friendly by means of multimedia guides via satellites accessible for example from cell phones. In this way visitors can be oriented towards alternative personalized routes that they can follow with the help of multimedia texts and maps (Sepe, 2010).

Conclusions

Reassessing, we recognized a twofold anthropic load on this route: a physical and an emotive one. The problem is not the mere concentration of mass tourism that affects many areas of cultural interest. Here visitors find themselves emotionally involved, and this must be a fundamental consideration in any operation promoting sustainable enhancement and fruition. Two other fundamental issues underlay the project phases and the entire experiment: the complexity of analysing sites with a deep-rooted historical identity, and the massive presence of tourism, currently on the increase in all heritage sites, creating overcrowding, chaos and gradual degradation not only for the works of art but also for the image of these sites.

In particular, from the results of our monitoring we can say that human risk and the impact of mass tourism on the state of conservation of buildings is relatively low, while the impact on urban morphology is totally absent, as revealed by a comparison between historic cartography and today's urban form. The urban form of this antique part of the city has not in fact changed at all, as one can see when comparing the Nolli map of 1748 or the Pio-Gregorian cadastral map of 1820 with a contemporary Google map. On the contrary, what is significant is the impact of mass tourism on the quality of life in the area and on the quality of these places, considered as symbols of collective identity.

Porfyriou, H. & M. Sepe. 2012. Conservation of urban heritage and monitoring tourist impact: an integrated approach. *In* Zancheti, S. M. & K. Similä, eds. *Measuring heritage conservation performance*, pp. 155-164. Rome, ICCROM.

The outcome of our investigation therefore sounds an alarm, and highlights the following:

1. Conservation policies should not only regard the restoration of a building or a fountain, but also the historic centre in its complexity, comprising both tangible and intangible heritage.

2. Enhancement policies (or re-qualification ones) devoid of a comprehensive vision and lacking impact monitoring may produce negative results and be counterproductive, as the case of Trevi – Pantheon has shown.

3. Human risk has more influence and a negative impact on the vitality of a place, on its quality of life and on the identity of places stratified through centuries – in other words it conditions the 'city of people' more than the 'city of stones'.

The case of Rome is not unique, as we all know Venice (Montanari and Muscarà, 1995; Van Den Borg and Costa, 2004) and many other European historic cities (Porfyriou, 2010) are besieged by the constant increase of mass tourism and are being depleted (of their traditional civic values) and degraded (growing occupation of public property, disproportionate increase of trading activities, filth, bad smells, overcrowding). The situation in many other countries, for example in China, however, is similar (Anderson, 2005; Cina, 2005).

Therefore, if we wish to safeguard the places of collective memory, we must immediately commit ourselves to finding ways to reconcile the needs of the tourist industry with those of life in historic centres and the conservation of their monumental cores. In this respect the final recommendations resulting from this research are: the need to introduce coordinated urban policies instead of fragmented ones, to diversify tourist offerings instead of simply increasing the incentives of demand, and to promote monitoring of enhancement policies and tourist impact instead of repeating an urban policy without testing its results.

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Using sequential mixed social science methods to define and measure heritage conservation performance

Jeremy C. Wells[1]

Abstract

There is no agreed-upon definition for heritage conservation performance, but it is possible to borrow ideas from the natural resource conservation field to inform this concept. Dimensions of performance can include economic, technical, and sociocultural and experiential indices. Because heritage conservation ostensibly benefits people as its primary goal the values of most stakeholders ought to play a role in defin ing performance. Most of these values are subjective and represent sociocultural and personal meanings and tend to differ dramatically from the positivistic, fabric-centred value system of conservation experts. Measurement implies quantification, yet many sociocultural values are based on qualitative meanings that defy direct attempts at quantification. One solution for this predicament is to employ a sequential mixed-method approach where qualitative meanings are gathered from stakeholders and then these meanings are used to inform the development of a quantitative method, such as a survey instrument. In this way, while the qualitative meanings are not being directly 'measured' as such, aspects of the phenomenon behind these meanings can be measured, quantified, and subjected to statistical techniques. A brief representative case study is presented as an example of how social science methodologies can help define and measure performance.

Keywords: heritage conservation performance, mixed-method social sciences

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Introduction

As we move into the twenty-first century, the practice of heritage conservation has become increasingly multidisciplinary as it subsumes responsibilities for sustainability, economic growth, and quality of life. While it is easy to recognize the need to increase the relevance of heritage conservation in everyday people's lives, it is increasingly difficult to determine the degree to which its practitioners are achieving success in their endeavours. This situation has led to a growing interest in determining how conservation performs over the long-term as a way to identify best practices and modify techniques that are not effective. There are, however, a number of important questions that need to be asked for which are no clear answers, such as: what is the nature of 'performance' as applied to the acts of heritage conservation? How does one define various conservation acts as 'beneficial' versus 'detrimental' to the heritage object, site, and region as a whole that consider contemporary social, cultural, and personal values as well as traditional objective criteria? Who gets to create these definitions? The answers to these questions are important in trying to understand what should be measured in order to define the nature of heritage conservation performance.

If we make the assumption that heritage conservation must, at some level, benefit people, then it is essential to understand people's values in relation to heritage to a greater extent than is now commonly practiced. The focus on the fabric of buildings and places without consideration of the values of most stakeholders is a commonly accepted practice due to limitations imposed by epistemological traditions within the discipline of heritage conservation. If part of the goal of defining performance is to include a fuller range of stakeholder's values, then social science research methodologies will become an essential tool for the heritage practitioner. This paper will therefore explore the nature of heritage values and how they are related to potential performance characteristics, such as authenticity, followed by an assessment of mixed-method social science research approaches that can be used to define and measure heritage conservation performance. Lastly, a case study will be presented as an example of how this mixed-method approach could be applied to assessing conservation performance.

1. What is conservation performance?

The concept of conservation performance (or conservation indicators) is relatively well known in the area of natural resource conservation, but is a fairly new idea to heritage conservation. Even in natural resource conservation fields, however, there is a

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lack of a consensus on which indicators are more effective than others in measuring performance (McDonald-Madden *et al.,* 2009). Such measures have typically included economic indicators, reduction and/or sustainable utilization of resources, biodiversity, and, in some cases, social and cultural measures. Conservation performance can also include measures of the technical performance of a system, such as the ability of an intervention to conserve water, or in the case of heritage, the ability of a grouting system to stabilize a masonry wall. Another approach is to base measures on the overall 'health' of ecosystems and the ability of performance measures to direct ways to 'heal' deficiencies (Salafsky *et al.,* 2002). Implicit in conservation performance measures, is that they should go beyond simple description and provide ways "to systematically examine interventions [with] the ultimate goal of adaptive management […] to learn to improve an ongoing project or intervention" (Stem *et al.,* 2005, p. 297). In these assessments, the assumed beneficiary of the measures is the environment (or building) itself, which leads to easier quantification of items such as number of acres of land conserved, number of species protected, etc. The 'soft' aspect of subjective social and cultural values – in other words, the benefits offered to people via conservation – are usually not part of the picture due to the difficulty in quantifying these aspects of 'performance'.

While few formal heritage conservation measures appear to exist, there are a couple of examples from the United Kingdom and the United States. The 'Conservation Performance Indicator' (CPI) developed by the National Trust in the United Kingdom is an objective measure of the performance of specific features present in heritage buildings and their environment (Cassar, 2009, p. 9). The criteria are contextually developed on a case-by-case basis and prioritize the significance of the property, what happens if conservation of the site is neglected, and the overall importance of interventions. Specific areas that are addressed include benefits related to material conservation, social factors (primarily related to being able to access the site), natural environment conservation, and economics. The end result is a numerical score, known as the CPI Index, which is assessed on an annual basis for each property. In the United States, the National Park Service (NPS) partnered with the National Academy of Public Administration to define measures to assess the National Historic Preservation Program (Trudeau *et al.,* 2009). The outcome of this project was a list of objective, quantitative measures of items such as the number of properties inventoried, evaluated, designated, protected, etc.; the number of federal undertakings with a finding of no adverse impact on historic properties; and the number of visitors to historic preservation web sites. No attempt was made to understand and potentially measure the more subjective elements of conservation practice, such as the impact on authenticity that interventions may have or how conservation practice impacts people's quality of life.[1]

When developing a heritage conservation performance measure or indicator, it is important to first ask to what end should the measure be directed. Should it benefit the fabric of buildings and places? Should it benefit local economies? Should it benefit people directly – i.e., add to quality of life and human flourishing? Or perhaps some combination of the above? While some measures are likely to overlap, the basic argument is that heritage conservation should, first and foremost, benefit people unlike natural resource conservation, where the implicit primary beneficiaries are ecosystems. In heritage conservation, there is already a reasonable dimension of conservation performance to assess, which is the degree to which historic environments retain their authenticity.

2. Whose values? To what end?

Through education and practice, heritage conservation professionals are trained to view their own value system, predicated on the idea that meanings are contained within historic fabric (Muñoz Viñas, 2005, p. 86), as scientifically grounded fact. This paradigm has origins in the rise of scientific approaches to the practice of history and archaeology in the early twentieth century. With enough diligence, accuracy, and objectivity, the purity of the past could be revealed to the researcher through 'scientific accuracy and impartiality' (Williams, 1904) in a methodology driven by the acquisition of facts (Matson, 1957, p. 273). Moreover, this 'science' of "substantial accuracy and perfection" should be the sole responsibility of experts in achieving historical authenticity (Kimball, 1935, p. 359). The rise of technological methods, such as photography, which ushered in a "revolution [...] in regard to scientific observation and treatment" (Michaelis, 1908, pp. 303-304), helped to establish the objective, positivistic outlook of today's conservation practitioner. In this period, during the early twentieth century, the idea that the building itself is a container of meanings developed, which could be read to reveal its

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true historical character (Peers, 1917, pp. 65-66) in order to authentically guide restorations (Appleton, 1919). Thus, the building's fabric could present more accurate, or truthful, evidence than could any other method, and was perceived as a more accurate way of determining a building's significance than the difficult process of trying to understand people's 'personal opinions' (Brumbaugh, 1950) and emotional attachments to place (Campioli, 1964, p. 28). It is these latter concepts in particular that early conservationists strove to eliminate from their practice by establishing international conservation doctrines that survive to this day (Wells, 2007).

Before embarking on the challenge of defining conservation performance it is essential to understand the epistemological limitations of this dominant paradigm in the field. Salvador Muñoz Viñas (2005, p. 43) explains that "conservation is what the conservator recognizes as such. Thus, it is defined as it is performed, and its use and repetition is what allows us to know and understand it." Muñoz Viñas' idea is that because there is no formal theory of conservation, 1) conservators define their work through their previous work and 2) engage in interventions as "truth-enforcement" operations that are justified through the scientific method (*ibid.*, pp. 43, 91). Moreover, "no relevant theoretical effort has been made to justify the validity of this approach" because the scientific method is always thought to be good and proper (*ibid.*, pp. 71, 79). As much as practitioners may be reticent to acknowledge, however, the dominant objective values of conservation professionals are in fact a cultural belief system and not a scientifically grounded, objective endeavour (Muñoz Viñas, 2005, p. 86; Waterton *et al.*, 2006, p. 347). If we begin our understanding of conservation performance with the knowledge that heritage conservation is based on antiquated 'self referential' arguments (Smith, 2006, p. 11) substantiated under the guise of scientific objectivity, we can formulate a more effective approach to defining the nature of what 'performance' should be. Moreover, perhaps the idea of performance should be more inclusive of values from a wider array of stakeholders.

Laurajane Smith (2006) has conveniently packaged the values that heritage conservation professionals traditionally have for heritage places into the 'Authorized Heritage Discourse' (AHD). Specifically, the AHD dictates that "the proper care of heritage, and its associated values, lies with the experts, as it is only they who have the abilities, knowledge and understanding to identify the innate value and knowledge contained at and within historically important sites and places" (*ibid.*, p. 29). The AHD assumes that the meanings behind historical significance are an innate part of the fabric of buildings and places (*ibid.*, p. 349) and that these meanings can be deciphered through a hermeneutical process to reveal the 'true' way in which the historical object should exist (Wells, 2007, p. 11); in other words, significance is literally assumed to be contained *within the heritage object* instead of *within the meanings* that people ascribe *to* the object. This perspective is a natural outcome of the scientific approach that pervades heritage conservation practice, which relies on distancing the observer from the phenomenon. In addition, these claims of scientific objectivity help to "cement the authority" of the discipline's epistemological claims (Smith, 2006, p. 278). According to Muñoz Viñas (2005, p. 81), "scientific conservation actually emanates from an elliptic but overwhelmingly powerful set of principles: it is guided by the unspoken material theory of conservation which is, in turn, based upon the need to preserve the object's material 'truth', and the belief in scientifically grounded knowledge." One way in which the so-called true nature of heritage objects is conserved is by directing the differentiation of new from existing building fabric as found in item 9 in the *Venice Charter* (ICOMOS, 1964) along with numerous national doctrines, such as the Secretary of the Interior's Standards in the United States (NPS, 1995). This directive has no empirical evidence to substantiate its ethical claims and has more in common with the modern-era architectural movement's ethical principles of 'honesty' than of protecting a supposedly naïve public (Pendlebury, 2009; Wells, 2010b). Heritage conservationists are therefore charged with preventing the 'false images' of the past from proliferating by reifying this so-called true nature of heritage buildings and places (Cliver, 1992, p. 177) and eschewing any dalliance in 'illusion' (Huxtable, 1997).

What about the values of the rest of humanity – those individuals that are not professional heritage conservators and represent the majority of stakeholders? Their values are typically subjective and difficult, if not impossible, to relate to objective criteria; in fact, 'objectivity simply doesn't compute' in determining "the social and cultural values that people ascribe to aspects of their natural and cultural heritage" as Thomas King (2009, p. 165) explains. Mason and Avrami (2002, p. 25) uncomfortably reveal that "there is no simple, technical, objective way to make decisions about what heritage gets preserved and how," which makes the goal

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of objective conservation performance measures a seemingly difficult proposition at best. Indeed, basing conservation performance definitions on subjective sociocultural and personal values may lead us "into a relativistic morass" where there is no potential for a consensus on what is, and is not important (Gibson and Pendlebury, 2009, p. 9). Even recognition that a less extreme, pluralistic approach to defining heritage values plunges most conservation professionals into "deeply uncomfortable territory" (*ibid*.) because they do not have the training to understand values outside of their own expert, objective perspective (Clavir, 2009, p. 13).

Like experts, conservation performance for most stakeholders is related to the degree to which the authenticity of historical places is conserved, or in some cases enhanced.[2] Through this lens, it is immediately apparent that authenticity is not a universal concept; indeed, there are many dimensions of authenticity as I have explored in detail elsewhere (see Wells, 2010a) and which will be summarized briefly here. At a basic level, authenticity describes what is 'real' and what is 'fake'. Heritage conservation professionals traditionally define authenticity through the objective analysis of extant building or landscape fabric. Authenticity can also be constructed from sociocultural and personal meanings and experiences, however. In this sense, authenticity is not fabric-centred, it is idea-centred or meaning-centred as Jamal and Hill (2002) have shown. Thus, it is possible to have fabric-based authenticity, sociocultural authenticity, and experiential (or personal) authenticity, with the latter concept rooted in individual's experiences of being in historic environments that can be examined through a phenomenological reduction. Place attachment – an emotional and cognitive bond with place – is a key element of both sociocultural and experiential authenticity and without it, place is not authentic from these perspectives (for more details, see Wells [2009]).

How then, is it possible to reconcile the objective, expert values of professionals with the subjective values of most stakeholders? Such an endeavour is crucial to defining conservation performance if we wish to incorporate the perspective of the majority of those who use and value historic places. I am, however, under no illusion that this paper could possibly tackle this issue in a concise way; it is therefore at least sufficient to acknowledge the plurality of values (see Table 1) inherent in any historic place, from both the professional's and everyday person's point of view. As a first step, this practice is essential in gathering as many values as possible that are associated with an historic place. Once these values are known, the process of prioritizing which values are more important than others can begin. Gibson and Pendlebury (2009, p. 9), for instance, suggest a logical place to start is to address values that are in clear conflict with each other. By focusing on these dichotomies, an initial, context-dependent definition of conservation performance for a particular site may emerge.

3. Moving toward 'evidence-based' conservation with mixed-methods

If the goal is to understand conservation performance from a pluralistic perspective, tools to understand social, cultural, and experiential values associated with historic environments are required. This intersection of social science research and the built environment is well represented by the field of environmental design and behaviour research that has typically been used to consider human factors in architectural and landscape design (e.g., Groat and Wang, 2002; Zeizel, 2006). In a simplistic sense, environmental design and behaviour research looks at how human-modified and 'natural' environments

	Heritage expert	Most stakeholders
Experience of the world	Intellectual	Physical
Perspective	Objective, detached	Subjective, emotional
Epistemology	Fixed, doctrine-based	Varies, indeterminate
Basis of authenticity	Intact fabric from certain times	Sociocultural and personal meanings
Nature of significance	Fixed through lists	Varies depending on context
Temporality of significance	Significance resides in the past	Significance resides in the present

Table 1: Comparison of the values of experts and the values of most stakeholders.

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influence people's perception, valuation, and experience of and reaction to place. For instance, 'evidence-based design', typically used to design health care facilities, utilizes post-occupancy evaluations in an effort to identify design elements that contribute to positive patient outcomes. Designs that work are carried forth to new iterations, while failed ideas are modified or eliminated. In this way, a natural evolution of design takes place through slow, incremental improvements driven by research rooted in human values and perception. In a similar sense, the search for what constitutes 'good' conservation performance should be an endeavour in which the researcher seeks evidence to substantiate claims as to what is, and is not, acceptable performance with empirical evidence based in social science research. While currently not used to a large extent in heritage studies, environmental design and behaviour research offers a ready set of methods with which to explore people's valuation of heritage places.

There is, however, no single, universal procedure that can be used to collect, analyze, and then utilize sociocultural and experiential values to define heritage conservation performance in balance with the expert/objective values of professionals. In general, there are few publications that address the use of social science research methodologies in assessing heritage values outside of the anthropological/archaeological discipline (for some examples, refer to Sørensen and Carman [2009]). In the past few decades, the field of heritage studies has been built from what are principally ethnographic research methods. An example is Setha Low's (2002) adaptation of existing ethnographic methods for the purpose of assessing heritage values. Low developed her 'Rapid Ethnographic Assessment Procedure' (REAP) to "help conservation professionals and managers understand the complexity of social relations and cultural dynamics at play in the conservation planning and development of heritage sites" (*ibid.*, p.31). While framed in ethnographic traditions, the REAP approach also includes other social science methodologies including phenomenology and the historical/interpretive methodology. The methods utilized include physical traces mapping, behavioural mapping, transect walks, individual interviews, expert interviews, impromptu group interviews, focus groups, participant observation, and the use of historical and archival documents (*ibid.*, pp. 37-38).

While meanings that people have for places have been assessed by both qualitative and quantitative methodologies, it is widely acknowledged that qualitative methodologies have characteristics that make them better suited for an initial step of gathering meanings because they make fewer assumptions about the nature of reality, are explicitly aware of context, and are interested in understanding processes rather than determining relationships between cause and effect (Guba and Lincoln, 1994). Moreover, qualitative research approaches phenomena from the *emic* or internal perspective of people, rather then the detached or *etic* perspective of the researcher as Clifford Geertz (1973) relates in his well-cited description of the meaning behind a wink; a purely quantitative description – length of a wink, its frequency, etc. – cannot convey the meaning behind the action of one person winking at another. Thus, without a prior qualitative stage to gather meanings, the phenomenon that is being 'measured' with a survey instrument, for instance, is based on the *etic* meanings of the researcher and is not necessarily representative of the meanings of the population being studied. An example would be a survey that asks respondents if they like the use of basalt as cladding on buildings; if targeted to a population that has never seen basalt on buildings, what exactly is being measured? This example is complicated by the fact that many people may not even know what 'basalt' is. A prior qualitative study could establish the meanings and understandings behind stone cladding on buildings, including the language and terminology used by a particular population. In this case, the survey instrument could then be modified to ask people if they like buildings made of 'black stone'. It is therefore important that the meanings that inform quantitative methods, such as survey instruments, not only measure phenomena from the respondent's perspective, but also use language with which the respondent is familiar.

The measurement of conservation performance implies that a quantitative methodology is necessary, yet collecting and understanding the types of values that are being measured requires a qualitative methodology; in other words, it is not possible to directly measure values. How then, is it possible to move from qualitative meanings to actually measuring characteristics that are associated with conservation performance? A sequential mixed-method approach offers a way of addressing this sort of research problem in a holistic way that allows for improved internal validity (i.e., a valid cause and effect can be established through independent and dependent variables) and the reduction of measurement error for quantitative methods, such as survey instruments. A sequential mixed-method that

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begins with a qualitative methodology followed by a quantitative methodology provides a pragmatic way of conducting applied research through induction and deduction that is well suited for the study of people and behaviour (Creswell, 2007, p. 10). Moreover, using a qualitative methodology followed by a quantitative methodology, in this order, provides a number of unique benefits, as Alan Bryman (2008, p. 262) describes, including:

- Triangulation: using results of one method to help corroborate the results of another;
- Complementarity: using one method to complement another to provide greater clarity or coherence of the results;
- Development: the use of results from one method to inform another;
- Initiation: the use of different methods to explore novel positions;
- Expansion: broadening the nature of the research and increasing its depth.

In sum, the importance of using a mixed-methodological design comes from pairing weaknesses with strengths; the weakness of qualitative research is that it cannot be generalized, while the weakness of quantitative research is that is cannot produce meanings. By first generating the meanings that provide an interpretive context, the results of a later quantitative study can be more fully understood an interpreted. The end goal, therefore, is to increase the validity and reliability of the entire research design through this pairing of weaknesses and strengths.

4. An example of a mixed-method study that could be applied to performance measures

Place attachment can be used as a measure for conservation performance by relating variations in emotional attachment to place with various types of interventions. If attachment is maintained or increased, it can be said that the treatment was a success and therefore would be contributing to a positive performance by either maintaining or enhancing authenticity. A case study I conducted of historic Charleston, South Carolina, USA (Figure 1) examined residents' emotional attachment to their historic neighbourhood through a sequential mixed-method approach (Wells, 2009). While the aim of the research was to determine the relationship between place attachment and the physical age

Figure 1. Historic Charleston, South Carolina, USA (Source: author).

of the neighbourhood, the types of meanings that were revealed and the place attachment measures that were generated lent themselves to helping define heritage conservation performance.

The study began with a phenomenology – a qualitative methodology based on Merleau Ponty's (1962) approach to understanding the experience of being in certain places – that incorporated informants taking photographs of any object, scene, or place of any scale that were particularly meaningful to them. I purposefully selected informants for their propensity to regularly walk in their neighbourhood; all informants took their photographs while engaging in such walks. Upon taking all 24 exposures, the informants mailed the film back to me for development. The informants then used these photographs to guide the interview. The meanings collected from this process were then used to inform a web-based survey instrument that measured four dimensions of place attachment: general attachment, place identity, place dependence, and 'rootedness'.

The qualitative phase of the study revealed that residents defined experiential authenticity through emotional attachment catalyzed by the experience of what I term 'spontaneous fantasy'. Spontaneous fantasy is similar to the 'vicarious experience' described by Robert Riley (1992) where the patina, or decay, in historic environments catalyzes an impromptu vision of the past in the mind's eye that is neither premeditated nor based in historical fact. Accompanying this experience is a series of strong feelings that help to attach residents to their neighbourhood. What is perhaps most interesting is that the qualitative phase of the research revealed a potential relationship between the appearance of patina in the environment and attachment catalyzed

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by the experience of spontaneous fantasy that was later confirmed via statistical analysis of the survey data. Spontaneous fantasy is also present at the cultural level, which I discovered in a case study of a downtown 'Main Street' program in Anderson, South Carolina, where the ability of the built environment to engender spontaneous fantasies became part of the community's sociocultural definition of authenticity (Wells, 2010b). In this latter case, however, authenticity was not based on the presence of physical decay in an environment, but rather by the ability of new construction and modifications to the existing historic environment to present the appearance of historical homogeneity, in deference to conservation doctrine that dictates the 'old' must be differentiated from the 'new'.

Both of these studies reveal usable meanings and measures that can define and measure heritage conservation performance. For instance, if the authenticity of historic Charleston is defined by its residents through the presence of masonry patina, then interventions should seek to retain this patina, and even allow it to grow over time. Moreover, the measure of performance in this case could be defined by the degree to which these interventions maximize place attachment for residents. Thus the quantitative phase of the study, which measured place attachment, could serve as a proxy not only for experiential authenticity, but also for measuring heritage conservation performance.

Conclusion

While developing definitions and measures for heritage conservation performance is an important goal, there are many questions left to be answered. This paper presented the argument that unlike natural resource conservation measures, the explicit benefits of heritage conservation measures should be the stakeholders who ultimately reap the benefits of an historic environment that retains its authenticity. The values of most stakeholders, therefore, should be considered in the process which defines and implements performance measures and this process can be greatly informed through the use of social science research methodologies that can integrate both traditional expert/objective values along with these subjective values. Each approach has its advantages in different contexts, but ignoring the sociocultural and experiential dimensions of authenticity in assessing conservation performance will likely lead to misunderstandings and the creation of a schism between the experts charged with maintaining heritage places and the everyday people who live, work, and recreate in these places. The key, however, is to understand *what* needs to be measured before engaging in a campaign to measure conservation performance.

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Endnotes

[1] It is worth noting the irony in the stated aim of the report that promises 'more meaningful performance measures', but fails to deliver an approach to understanding the meanings people ascribe to historic preservation. The report relies instead on traditional, positivistic approaches to measurement and fails to provide much in the way of understanding qualitative meanings.

[2] Heritage conservation doctrine dictates that authenticity, or historical integrity, cannot be 'made' – it only exists; therefore the conservation professional can only prevent its loss, but not necessarily create more of it. This situation is, however, not the case for sociocultural and experiential authenticity where modifications can be made to the built environment that may, in fact, enhance the perception of authenticity.

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Green areas and urban climate: evaluating instruments for the conservation of natural urban heritage

Fátima Furtado[1] & Karina Barros

Abstract

This article presents the results of research that aimed to assess the effectiveness of an urban conservation initiative, called Protection of Green Areas Estates (IPAVs, in Portuguese), in Recife, the capital of the State of Pernambuco, in north-eastern Brazil. This tool, developed by the city administration in 1996, seeks to ensure the protection of the vegetation within private lots or those that are state-owned, with public but controlled access. The article discusses the connection between urban green areas and the mitigation of climate change, local and global. It is based on the understanding that the conservation of such structures is an instrument to face intra-urban climate issues and to mitigate the city's contribution to global warming. It shows that the instrument has a significant potential for urban conservation, since its objectives were achieved in approximately 70% of the cases, in a context of great pressure on land prices and problems with the management of the protected estates. On the other hand, the loss that happened during the time horizon of the study is associated with the failure to capture a substantial tonnage of carbon dioxide (CO^2) emitted into the atmosphere by the city. Additionally, the work points out some characteristics associated with a high degree of conservation of vegetation in the IPAVs, stressing the important role it plays in the drainage of the city, prone to floods and landslides. Finally, the article emphasizes the importance of developing tools and methodologies for monitoring and evaluating policies, projects and actions that aim at urban and territorial conservation.

Keywords: urban environment, urban climate, monitoring, urban conservation

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Climate change and cities

In recent years, the world has suffered many tragic events caused by acts of nature, which have generated hundreds of thousands of deaths, major economic losses, and which tend to influence important decisions, such as national energy matrices and the planning of cities. Decision makers and populations across the globe have been mobilized, as environmental disasters with unprecedented intensity and location, have been increasingly frequent. This broad set of phenomena has been analyzed within what has been named *climate change*. Literature and the press are filled with a large number of trends and facts tracked since the late 1990s in several places in the world which are consistent with the theories about climate change. These phenomena have various forms, characteristics and temporal and spatial variety. Although causes are still the subject of dispute, the main studies increasingly suggest the establishment of a global climate change as a real fact. The most important issue in this controversy is the influence of man on these phenomena.

Among those authors who believe this influence to be significant, many, like Dow and Downing (2007, p. 15), suggest changes in land use, including urban land use, as one of the man-made processes that contribute to these disasters. The increasing urbanization of the world population, therefore, puts cities at the centre of the current climate challenges. The scientific community believes that the so-called global warming is caused by the concentration of greenhouse gas (GHG) emissions in the atmosphere, and that cities are major sources of these gases. They are where the majority of the population (over 70%) live and where things happen. The climate challenge will only be overcome through cooperative work. Therefore, the planning and management of cities, guided by the notion of sustainability, should prioritize environmental conservation measures.

There is a set of conservation instruments that are used to ensure the quality of life in cities, but the same cannot be said about tools and processes for the evaluation of these policies and actions. One of the areas of territorial and urban conservation that needs to be further developed covers precisely the instruments for monitoring and assessing the levels of effectiveness of urban environmental conservation measures. Urban managers need to be informed about the performance of projects and actions towards environmental conservation, notably in relation to the emission of greenhouse gases. Among them, the conservation of urban green areas has a central role, since these areas contribute

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significantly to mitigating the negative effects of cities for local and global climate, because they help to purify the air, alleviating intra-urban climate problems and fighting the formation of *urban heat islands (UHIs)*.

In Brazil, there are few and tentative initiatives for prevention and mitigation of changes in temperature that cause climatic events, reducing the quality of life in cities. It is clear that cities must be prepared to face extreme events and their disastrous consequences for the population, but this should not reduce the importance of prevention and mitigation actions. In fact, the rationality of sustainable urban planning considers them as important. This is not yet on the agenda of the Brazilian municipal administrations generally.

1. Urban vegetation and climate

Conservation of urban vegetation is relevant not only to deal with adverse urban climate phenomena, but also as a tool for mitigating its effects, which will be felt by present and future generations. Some of the urban green areas are under public domain, but a considerable part is located within private lots, and both are important for the environmental quality of the city. Ensuring the conservation of these areas, private or public, is fundamental to the sustainability of each city and to the global climate, and this can only be achieved through monitoring and evaluating conservation instruments. Hence the importance of the present research, which has evaluated the pioneering initiative taken in Recife to protect green areas through the definition of what have been named Green Areas Protection Estates – GAPEs (*Imóveis de Proteção de Áreas Verdes* – IPAVs, in Portuguese).

Recife is the central city of a metropolitan region (*Região Metropolitana do Recife*), with approximately 3.5 million inhabitants. There, as in many other metropolitan regions in Brazil, the interference of climatic events in the everyday urban life is significant, affecting the population's quality of life and the region's economic dynamism. Events such as heavy rains, flash floods, landslides and urban heat islands (UHI) are examples of such phenomena that its population is forced to face. Human actions, together with the local climate and geography, cause this situation.

Freitas (2008, p. 78) emphasizes the great importance of vegetation for the local climate, stating:

> "[...] the local vegetation greatly influences the urban environment, perhaps being the main contributing aspect in the formation of a specific microclimate, as well as in the mosaic of ecosystems, verified in intermediate scales."

Despite being small green patches, scattered in an extensive urban fabric, vegetation plays a crucial role in the climate of cities and regions. Mascaró (2005, p. 32) expands the understanding of the environmental functions of urban green areas and states:

> "Vegetation affects the urban micro-climate and contributes to improving urban ambience in many aspects: it reduces solar radiation in the hot season and modifies the temperature and relative humidity through shading which reduces the heath to buildings, vehicles and pedestrians; it also modifies the speed and direction of winds and acts as an acoustic barrier; when in large quantities, interferes with the frequency of rainfall and, through photosynthesis, reduces air pollution."

The phenomena most often linked to the loss of green areas in cities are the formation of heat islands, increased soil impermeability, and air pollution. Vegetation acts positively on the temperature through photosynthesis, which purifies the air, and the process of transpiration, when plants release heat into the atmosphere. In fact, this whole process is a cycle: the vegetation influences the temperature, modifying the local climate, and temperature influences the vegetation, with the same purpose. The specificity of these urban sub-spaces rests primarily on the use of the land, characterized by a low constructive density and by the presence of vegetation, two of the main elements that interfere in the urban climate.

Lombardo (1985, p. 77) states that "urbanization, considered in terms of built space, significantly changes the urban climate, considering the increase of surfaces for heat absorption, impermeable areas, changes in vegetation, concentration of buildings that interfere with the winds and contamination of the atmosphere through the emission of gases."

UHIs are associated, on one hand, with increased rainfall and modified wind currents in urban areas, and on the other hand, with the land use and meteorological variables. The increase of impermeable areas and buildings and the decrease of permeable areas covered with vegetation cause local heat storage, provided by a greater intensity of solar radiation and increase in temperature. Also, the emission of gases into the atmosphere, particularly GHG, is

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a characteristic of large cities, where motor vehicles and industrial equipment abound.

Urban vegetation should be treated as a system, since its parts interact. It should be protected as a totality that includes public gardens, parks and squares, private gardens and backyards, street trees, green roofs, etc., since their functions are always interrelated and interdependent.

In addition to those relating to climate, some other urban vegetation functions must be stressed:

(i) *definition of the ambience of a place*, by composing the landscape and urban design;

(ii) *aesthetic enjoyment*, contributing to economically enhance spaces;

(iii) elements of *thermal comfort and well-being* of citizens, because it minimizes the aridity of the landscape and psychologically extends public space;

(iv) *conservation of the memory of the place*, as living monuments of the city, many of them with lists of trees protected by specific rules, as in Recife;

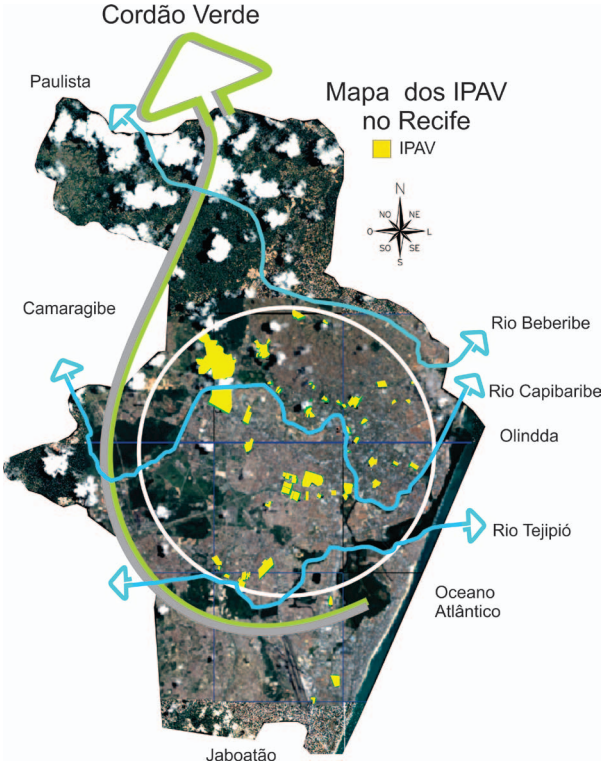
(v) *protection of slopes and water bodies*, once they stabilize soils, avoiding landslides and helping to conserve riparian areas. Acts as a soil water filter for the formation of aquifers and watersheds, as natural rainwater drainage. Also contribute in natural drainage, functioning as a reserve for the excesses of torrential downpours;

(vi) *assists in the protection of biodiversity*, directly, when acting as urban wildlife habitat and, indirectly, in the regularization of the climate.

2. GAPEs in the city of Recife

In 1996, aiming to enhance the conservation of the city vegetated areas in public and private properties, the local government selected 63 real estate properties that had continuous green areas, significant for climate regularization and landscape quality, and it then defined them as Green Areas Protection Estates, whose maintenance meets the interests of the municipality and the wellbeing of the population. This pioneering initiative was inspired by the experience of the so-called *green sectors* of Curitiba, capital of the State of Paraná.

GAPEs are properties – isolated or grouped – measuring 2,000 square metres or more, with arboreal or other significant vegetation. Their green areas were registered on images of 1986 and their owners were obliged to preserve at least 70% of the registered green area. These estates are scattered around the central areas of the city, mostly in the vicinity of the Capibaribe River, as shown in Figure 1 and Figure 2, below.



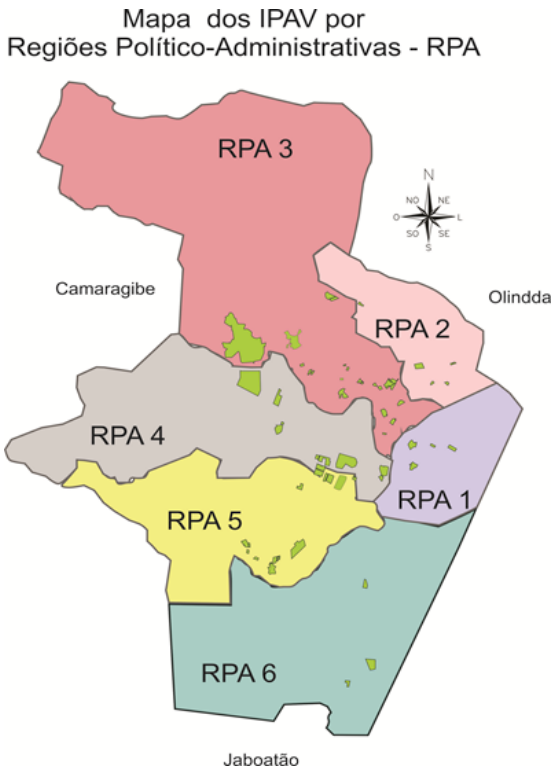


Figure 1 (left) and Figure 2 (right). Location of GAPEs in Recife, 2011 (Source: DIRMAM/SEMAM – PCR).

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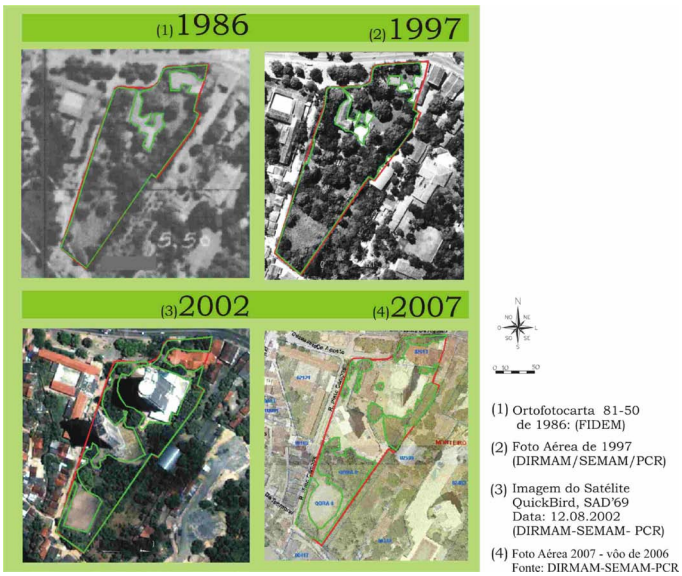

Figure 3. Evolution of GAPE #4 green area (Source: Barros, 2011).

3. Analyses

For the evaluation of the GAPEs' effectiveness, analyzes were developed, based on images of 1986, 1996, 2002, and 2007, obtained from official sources of the metropolitan and municipal management bodies (FIDEM and the City of Recife). Using AutoCAD 2010, four maps were produced of each of the 63 existing GAPEs, as exemplified in Figure 3, showing their green areas (herbaceous, shrubby, and arboreal), plotted on the PCR's UNIBASE images (1: 1,000) already containing the launch of the geodetic coordinates. This allowed the comparison of the green areas extension in each date and the quantification of the losses or gains. The results showed the number of GAPEs in accordance with the law (minimum of 70% of green area preserved).

A second study sought to identify the level of association between certain variants of the GAPEs and the level of conservation of its green area, in order to better understand which aspects are relevant to their effective conservation. Conservation levels achieved in GAPEs were measured, ranked, and crossed with the following aspects: *ownership, size, usage, and location* (administrative region).

As already pointed out, Recife has morphological characteristics that, combined with an inadequate and precarious drainage infrastructure and insufficient housing policies, lead to problems related to floods and landslides. This informed the decision to make a third analysis to assess the significance of GAPEs to its surrounding region in regard to urban drainage. Based on previous studies in São Paulo (Lombardo, 1985) and in cities of the United States (Gartland, 2010), five types of urban land use were set out:

(i) built areas, constructions that influence directly in the micro-climate of the city, predominantly in the process of formation of UHI;

(ii) paved areas, parking lanes, and other impermeable floors;

(iii) permeable areas, open areas, soccer fields, and unpaved streets;

(iv) wet areas, bodies and watercourses, such as rivers, ponds, streams, etc.;

(v) green areas, lawns, herbaceous, shrubby, and arboreal areas.

These areas were measured within each GAPE and in 25 ha of its surrounding region, in the years 2002 and 2007, as shown in Figure 4. Calculating the percentage of each of these areas, with and without those inside the GAPEs, allowed the quantification of their level of contribution to the drainage of the region where they are located.

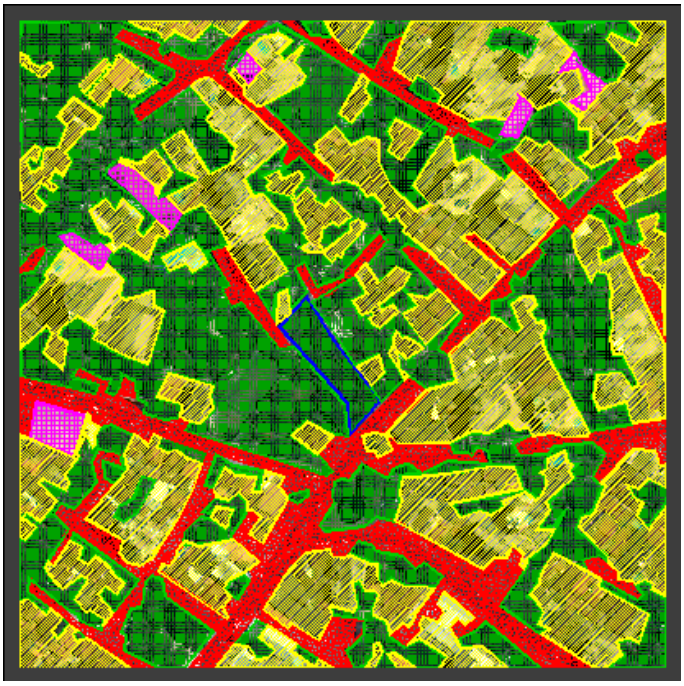

Figure 4. Example of an area of study around GAPE #4 (Source: Barros, 2011).

4. Results

4.1. Effectiveness of the instrument

The effectiveness of GAPEs as tools for the conservation of urban green areas was measured by level of compliance with the law. The results showed that, after 21 years (1986-2007), in 19 out of 63 cases the

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level of conservation of the registered green areas was below the 70% defined by law. In other words, in 2007, 69.84% of the GAPEs complied with the law, as shown in Figure 5.

The percentage of well protected GAPEs, approximately 70% of the total, should be considered unsatisfactory, but, once the difficulties in the management of these estates is considered, particularly in terms of monitoring and supervising what occurs within private lots, and the high level of pressure on the price of land in the region where GAPEs are located, the instrument shows a high potential

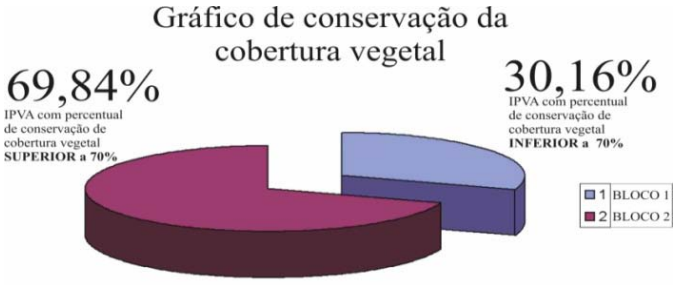

Figure 5. Percentage of GAPEs in accordance with the law, 2007 (Source: Barros, 2011).

effectiveness, strengthening the need to a better municipal management of these properties.

4.2. Levels of conservation

Ranking GAPEs by level of green areas protection shows that in 15.87% of them, only 50% of the vegetation has been conserved, a percentage categorized as *insufficient protection*. For example, in nine of the 63 GAPEs more than half of the green area that should have been protected was lost. This shows a clearly unsatisfactory situation. In ten GAPEs (14.29%) the percentage of protection was between 50 and 69%, categorized as *deficient*. This means that in almost one-third of the properties protection was *insufficient* or *deficient*. The level of protection was *good* or *excellent* in 58.73% of the GAPEs, and *regular* in 11.11% of them, as shown in Figure 6.

These percentages show that, although green areas have environmental functions essential to urban life, currently, they present a worrying level of vulnerability, in Recife. Figure 7 shows the percentage of conservation found for each of the 63 GAPEs.

Even considering the GAPEs as instruments for the conservation with great potential effectiveness, the municipal management, in Recife, has not exploited this capacity. When established, the 63 GAPEs contained 3,397 925.00 m² of green area. In

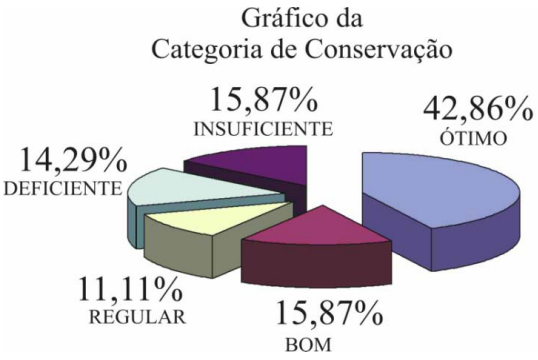

Figure 6. Level of vegetation conservation in GAPEs, 2007 (Source: Barros, 2011).

2007, only 2,999 697.50 m² of these areas were found. Thus, the absence of an effective monitoring and active supervision resulted in a total loss of vegetation as large as 398,228.00 m², equivalent to nearly 100 soccer fields. According to some authors such as Solari (2010), this loss implies that over that period, approximately 39.72 tonnes of CO2 released into the atmosphere ceased to be captured annually. Figure 8 (next page) illustrates the loss of vegetation.

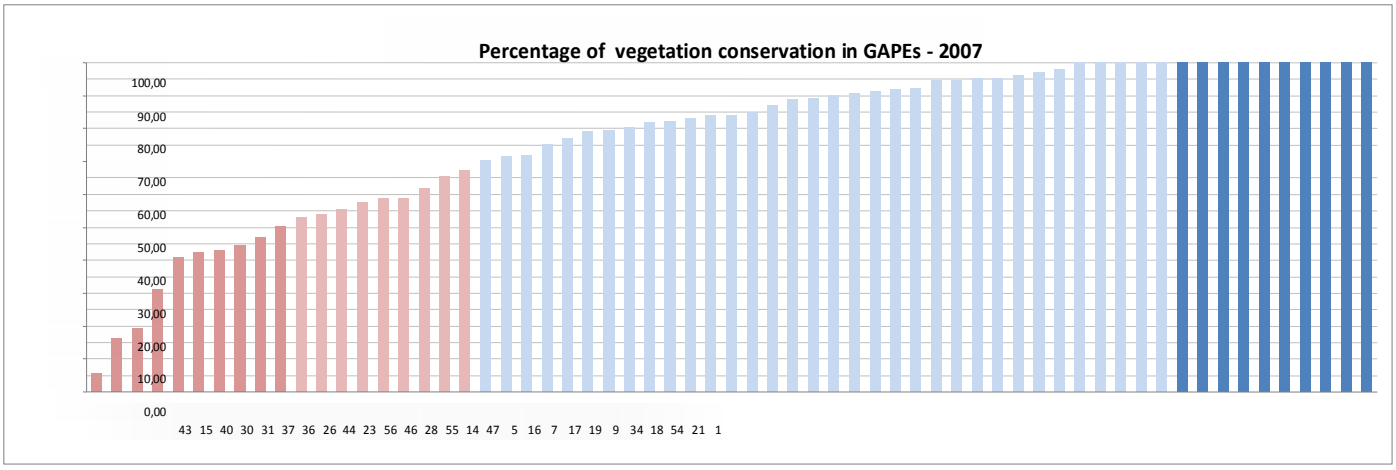

Figure 7. Percentage of vegetation conservation in GAPEs, 2007 (Source: Barros, 2011).

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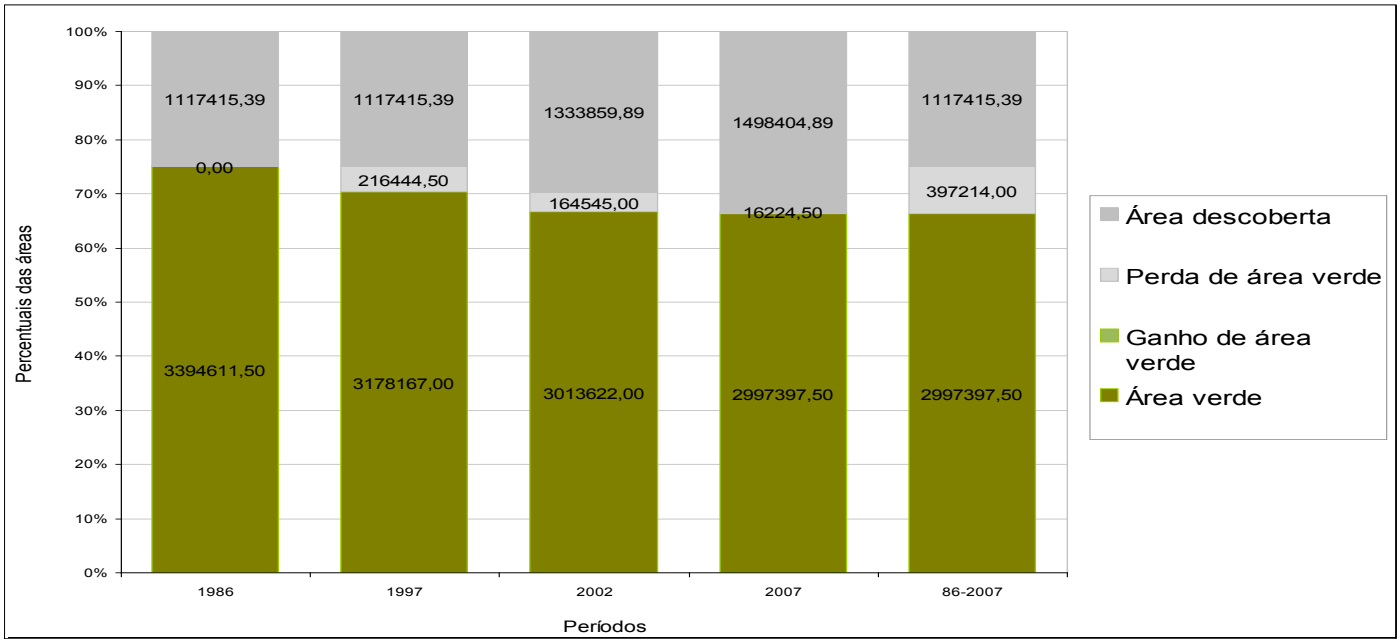

Figure 8. Extension of green areas, 1986 to 2007 (Source: Barros, 2011).

Obviously these values are not significant enough *per se* to the total emissions of Recife, but they certainly have relevance when we consider that the reversal of the damage caused by the cities to the global climate must be addressed through a set of policies and actions, public and private, across the world.

4.3. Characteristics of GAPEs and level of conservation

As for the results in relation to the association between the level of conservation in GAPEs and their main characteristics, the following has been found:

Location: the location of GAPEs refers to the administrative region (RPA) to which they belong. This analysis provided conclusions related to the quality of the GAPEs' monitoring and supervision in each RPA, and conclusions related to the neighbourhoods with greater losses of vegetation.

The best-preserved GAPEs are in RPA 3, which comprises 60% of those GAPEs with smaller vegetation losses. In the northern part of the city, RPA 3 contains 29 districts, predominantly residential and with middle and upper class populations. There is a strong pressure on land price in these areas, but in 2001, Law No. 16,719 established the Area of Urban Renovation (ARU), completely inserted into RPA3 and comprising 12 neighbourhoods. Among the requirements of this law, there is a general restriction on increasing impermeability of the soil, varying according to stipulated sectors. The less preserved GAPEs are in the southern part of the city, a worrying result since this region has very few public green areas already.

Property: it was found that 32.65% of private GAPEs are among the least preserved. Since monitoring green areas inside private properties poses difficult problems, the research concludes that, in such cases, conservation instruments should be less coercive and give more incentive to owners.

Use: the results showed that 50% of the most preserved GAPEs are institutions of higher education and/or research, health services, and social and soccer clubs.

Size: the size of GAPEs varies between 2,416 m² and 470 m². The analysis showed that there is a tendency of the biggest GAPEs to have higher percentages of conserved vegetation.

In Recife, the level of green area loss is very significant, including economically, due to the above-mentioned characteristics of the city. As highlighted by Mendonça and Monteiro (2003), soil impermeability and suppression of vegetation lead to a lower pluvial waters infiltration capacity, one of the central urban factors for the occurrence of disasters, with continuous human and material losses.

4.4. Contribution of GAPEs to urban drainage

The research showed that GAPEs have a strong contribution to the city's drainage, since ensuring the amount of permeable areas is a fundamental point to reduce the problems. Between 2002 and 2007, in the areas of the ten best-preserved GAPEs, there was a decrease of impermeable areas and an

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increase in green areas, despite the severe land price pressure that occurred in this period. In areas where the GAPEs were poorly preserved, the permeable areas presented a decrease in relation to impermeable soils, during the period.

Final remarks

Barros (2011) points out some improvement measures for the management of GAPEs, varying from the implementation of a permanent monitoring system to policies of incentives for the owners. The author also emphasizes the need for a categorization of GAPEs, considering their different types of vegetation, since they have distinct functions in the urban environment.

Additionally, she suggests the creation of new GAPEs, particularly in areas under strong land market pressure, areas that have great relevance for the drainage of the city, and at-risk areas. Finally, she recommends that the new estates follow the green belt of the city, thus guaranteeing ecological corridors between Natural Conservation Units.

To summarize, the survey showed that the municipal and metropolitan administrations would benefit from the development of regular evaluations of their policies, projects, and instruments for the conservation of the natural heritage. However, there is a lack of simple and effective tools for monitoring and of evaluation methods which can easily be incorporated into the everyday management of cities. Such instruments are fundamental to guiding and supporting the decision making processes that enhance citizens' quality of life through conservation of the patrimonial structures, natural or built.

Referneces

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