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PRIVATE USES VERSUS PUBLIC INTERESTS IN THE MANAGEMENT  
OF VENETIAN VILLAS: A MULTICRITERIA APPROACH

by  
Chiara D'Alpaos and Valentina Zanatta

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# PRIVATE USES VERSUS PUBLIC INTERESTS IN THE MANAGEMENT OF VENETIAN VILLAS: A MULTICRITERIA APPROACH

CHIARA D'ALPAOS<sup>1</sup> and VALENTINA ZANATTA<sup>2</sup>

## Abstract

Venetian villas, which make up one of the most typical systems of historical architectural goods in the Northern Italian countryside, are a clear example of the allocation problems of merit goods management. These problems derive from the differences between the limited financial resources available and both the actual distribution of the benefits received by the public at large and the preferences expressed by the majority. In fact, the Venetian villas are risking progressive degradation from abandonment or invasive transformations due to unsuitable management politics and scarce financial resources. For this reason, the management policies regarding these merit goods must be reexamined both theoretically and in practice. Furthermore, the legal constraints, whose purpose is to conserve the goods, must be accompanied by appropriate economic uses which offer the financial resources to conserve the goods.

An exhaustive analysis of these historical architectural goods must be carried out by adopting a multidimensional approach to take into account technical, social, economic and political aspects. Therefore, a multi-criteria approach was developed in order to determine the best “feasible” compromise solution of the decision problem which policy makers have to solve.

In this paper, a multiple criteria model to evaluate the aptitude of Venetian villas to sustainable economic use is illustrated. The results show that a compromise solution between sustainable economic use and conservation must be met in order to exploit the synergies between the cultural characteristics of Venetian villas and their aptitude to sustainable economic use.

**Keywords:** Multi-Criteria Analysis, Merit Goods Management, Economic Use of Historical architectural Goods

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## **Introduction**

The Venetian villas are internationally known architectural treasures important for their artistic, historical and typological characteristics. Nonetheless, due to inadequate management policies and insufficient financial means, they now suffer as much from abandonment as they do from the invasive transformation caused by speculation. Therefore, there needs to be a careful reexamination of the management policies of the Venetian villas on both the theoretical and operational levels which aims to conserve the villas by finding the appropriate use for them. This innovative approach, however, is difficult to implement because of the significant limitations on structural renovation imposed by the law and because of the lack of resources available.

The present work, starting from an analysis of the trade-off between conservation and transformation of architectural treasures, proposes a multi-criteria analysis model to evaluate what will here be called the ‘aptitude’ of the villa to economic use, i.e. the potential a villa has for hosting an successful economic use which respects the typological, morphological, structural and artistic characteristics of the building and its estate. This is an aspect of primary importance for two reasons: to avoid abandonment and to evaluate the impacts of the implementation of economic activities since the necessary transformations and interventions can be invasive regarding the structure and decorative elements of the villa. Another aim of this work is to test the possibility of reconciling the needs of the economic use with those of the conservation of the monument, so that they can be complementary and exploit one another, as was the case historically. In fact, the Venetian villas were built with the precise aim of creating impressive and monumental artistic forms while at the same time meeting the practical

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economic needs of running a farm. This concept can be expressed as sustainable economic use, i.e. a compromise between the success of an economic use and the state of conservation of the architectural goods.

## **1. The Venetian villa**

The architectural culture the Venetian villa grew out of was the promoter of its own genre which offered great creative vitality for future genres, but which is difficult to define in easy and precise terms. This genre is completely different from the canons which inspired the same genre in Central Italy: the Venetian villa was not born out of suburban idleness or to create elegant natural spaces, but rather were built to be the main residences of the land owners. These lands functioned as actual farms and what was particularly new for the Renaissance was the desire to bring together the aristocratic world and the rural world.

The glory days of the villas in the Veneto Region were reached during the seventeenth and eighteenth centuries. A fundamental moment for the beginning of this period was when the noblemen, following the peace of Bologna (1529-30), no longer had to pay taxes to finance the war and saw land investments as a safe refuge for their patrimonies. From this moment on, following the cultural revolution of the Renaissance and a long period of peace and prosperity, the taste for beautiful landscapes began to take hold. At the same time, new technical, economic, social and cultural processes lead to a new landscape, which was an expression of the recent degree of development reached in agriculture. The systematic policy of transforming the countryside can be seen in the attempt to create forms of rural architecture which were clearly different

from the architecture of the city residences of the landowners. The impulse which dictated the architectural and building canons was mostly economic: the proportions of the different parts, the important size of the annexes for agricultural uses, the composition of the *barchesse* (porticos which served as sheds), which were often integrated into the body of the main building, all demonstrate the way in which the various functions of the villa were brought together into one closed organism. However, it is important to underline that the perfection of the architectural forms of the villa was entirely related to the needs which came out of the new agricultural techniques and relationships. Pure and simple agglomeration was substituted by a hierarchy of functions: the different parts of the structure were strictly separated with a new decreasing order of dignity based on their use. This formula thus reconciled capitalism and agricultural humanism, the cultural pretences of the city and the economic activities of the countryside, changing it all into those classical forms of expression which managed to spread as far as the Anglo Saxon countries.

## **2. The present situation of Venetian villas**

The significant number of Venetian villas and their fairly homogenous diffusion all around the regional territory lead to problems in maintaining and managing this patrimony. In fact, very few villas have been able to achieve the status of protected good for their monumentality and international fame which leads to the possibility of receiving subsidies. In most of the cases studied here, the villas are maintained thanks to the good will of their landowners or because of a phenomenon that is becoming more and more popular which involves using the building for economic reasons in addition to its traditional function as a residence. Some surveys carried out in the Veneto Region

and in the Province of Treviso as preparation for this study<sup>3</sup> showed that, overall, the villas are used in around 80% of the cases (70% almost completely) and of these, around 60% are used as residences. However, the tendency remains abandonment since the average state of conservation of the cases analyzed was considered ‘fair’ and ‘at a standstill’: were the present conditions to become permanent, they would indicate, in the long run, a concrete risk of degradation.

The surveys mentioned above further highlighted a meaningful relationship between the degree and type of use of the building and the state of conservation of the architecture. The only uses which can sustain the high management and maintenance costs of these buildings, and of the inseparable contexts in which they are located, are those which are at least partially for economic reasons. The economic uses found were both more ‘consolidated’ business, such as hotels and restaurants, as well as new types of business which are less costly and invasive than the former type, such as bed and breakfasts, the organization of events and farmhouse holidays. An interesting new fact is that the demand for Venetian villas seems to indicate a growing preference for contexts and spaces which have been preserved through conservation interventions which maintain the structure and its parts as they originally were by respecting the unique artistic, historical and traditional characteristics only an ancient building can offer and which have intentionally avoided standardized hotel parameters. Finally, it is worth pointing out that the use of these buildings as museums has been sporadic and regards only a limited number of cases. Nonetheless, this number may increase since the data show that most of the spaces used for museums or exhibitions are located on the same site as structures which are already being used for other economic reasons. The

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<sup>3</sup> The authors would like to thank Orietta Teso and Benedetto Giustiniani for their work in gathering this data.



growing interest that the villas are experiencing with cultural tourism, especially from foreigners, could lead to the more widespread use of exhibition space as an important and much-asked-for complementary service.

### **3. Venetian Villas as Merit Goods**

The concept of merit goods can be helpful in explaining the allocation problems of historical architectural goods<sup>4</sup>. A typical example of these problems is public financing for the conservation of these goods. In general, a merit good is a good or service considered to be intrinsically or socially valuable for other people to consume, regardless of their actual desires or preferences. The merit good concept defines a semi-public asset whose non-exclusion features are felt as real benefits only by a part of the community. Because of this and the rivalry in their consumption, market failure occurs, in particular when social demand in resources allocation diverges from the preferences expressed by the majority. It thus becomes necessary to develop public policy regarding the supply and management of merit goods. In compliance with the Musgrave theory, merit goods can be defined with three basic features: 1) they are not rewarded sufficiently by consumers, because of imperfections in the information system; 2) they are sources of positive externalities; 3) they highlight the differences between the ideal of consumer sovereignty and the reality of difficult choices in conditions of misleading pressures from the market. The problems with the information system always imply a distortion in the consumer's preference because of the uncertainty and irrationality of the choices made. On the other hand, the nature of public goods derives from the presence of externalities and the combined production of private and public benefits.

Finally, political participation in the management of merit goods emerges not only because of the existence of merits themselves but also because of the consumer's inadequate individual choice in defining optimum consumption<sup>5</sup>. It should thus be clear that the definition of merit goods is particularly suitable to historical architectural goods such as Venetian Villas, whose merit features require both private and public intervention to prevent degradation and abandonment.

#### **4. The conservation of historical architectural goods and economic use**

In the last decade, notable scholars have begun an important debate about historical architectural goods and environmental amenities as sources of market power (Taylor and Kerry Smith, 2000). Even classical appraisers, and not only environmental economists, have been recognizing the potential of non-economic uses of real estate, in particular conservation and preservation use (e.g. historical, geological, cultural and open space), analyzing their implications in real estate appraisal (Mundy and Kinnard, 1998). In particular, the definition of *highest and best use* is here extended to include preservation and conservation uses of particular kinds of goods. In fact, even though this definition traditionally refers to an 'economic use', economic use remains undefined and unclear. Samuelson<sup>6</sup> defines an economic good as "a good that is scarce relative to the total amount of it that is desired. It must therefore be rationed, usually by charging a positive price." However, if such a good can have alternative uses, it is unclear how to define those alternative uses which are not appraised by market prices (e.g. the conservation use of historical architectural goods). Environmental economists

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<sup>4</sup> A lot of significant studies have been written in economic literature regarding the definition of merit goods: Musgrave (1959), Head (1966 and 1968); Culyer (1971).

<sup>5</sup> In particular, coercion is assumed to be an essential component in the production and consumption of merit goods. See Musgrave (1971).

have used the hedonic price method to resolve the controversy about the economic value of amenities, partially demonstrating the value of conservation (Parson and Wu, 1991). However, cultural heritage in general, and Venetian villas in this case, are often in a state of decay and abandonment, particularly derived from non-use. As will be shown below, data show that this is particularly the case for Venetian villas without an economic use, especially because of the scarce public resources available for such a large stock of architectural goods in need of conservation. It thus becomes important to identify economic uses which at the same time help avoid abandonment and maintain the original typological and technologic features of Venetian villas. This remark comes from an awareness that an improper or unbalanced use may threaten the public and merit features of the villa itself. So, when a particular use leads to congestion or when restoration is too invasive, (e.g. invasive transformation shaped by the competitive forces of the real estate market) there is a high risk that negative externalities be generated. For these reasons it is clear why the economic use of Venetian villas must be carefully evaluated.

## **5. Multi-criteria approach**

Historical architectural buildings are goods which are used in multiple ways and as such have a complex economic value. Their value is related both to how they are used socially and economically and to their historical and cultural features. Their unique characteristics, artistic contents and status as historical buildings lead to important positive externality flows which make it difficult to attribute an explicit monetary value to these goods and services; in fact, they rarely have a market price (Fusco Girard,

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<sup>6</sup> Samuelson and Nordhaus, 1995.

1987). Therefore, a thorough analysis of these goods must use a multi-dimensional paradigm which considers not only technical criteria but social-economic and political criteria as well. Since, all of the methods which tend to reduce the problem to a single dimension risk over-simplifying the problem, it was necessary to take a critical look at the classical costs-benefits analysis. This is why a methodology which favors a multi-criteria approach was chosen for the analysis at hand. The multi-criteria approach makes it possible to simultaneously consider a significant number of variables and objectives, which are often in conflict with each other, in order to thoroughly examine the decision problem from many points of view. Only in this way can the best compromise-solution be reached.

### **5.1 Analytic Hierarchy Process**

Analytic Hierarchy Process (AHP) is one of the techniques used most often when analyzing real case studies because of the flexibility of the method it is based on. Furthermore, because the different stages of the evaluation process are both transparent and intuitive, they can be easily understood even by those who are not experts in the field. AHP, a method proposed by Saaty in the Eighties, belongs to the family of multi-attribute analyses and is based on the hypothesis that the decision-maker always be able to express a preference. In this way it is always possible to judge the importance of or preference for the single evaluation parameters. In other words, AHP makes it possible to order a finite number  $n$  of actions  $A_i$  (in this case the villas being studied) (Roy, 1985; Vincke, 1992) by evaluating them with respect to a finite number  $k$  of attributes  $a_j$ , each of which has been assigned a score qualifying its performance.

Analytic Hierarchy Process is an evaluation method which has proven to be useful most of all when there is little quantitative information on the effects of the actions to be evaluated. This is the case because it makes it possible to translate quantitative and qualitative judgements into scores based on a given measurement scale. The evaluation process is divided into stages in the same way that classical multi-attribute analysis is. This makes it possible to build the evaluation matrix and to determine the value functions even when quantitative information and data are lacking. The stages are the following:

- 1) stating the problem and selecting the criteria and their relative weight;
- 2) compiling the analysis matrix;
- 3) building the evaluation matrix by starting from the analysis matrix and determining the value functions;
- 4) ranking the actions according to the degree to which they fulfill the general goal.

The decision problem is represented by building a hierarchy which is nothing but a particular type of ordered set<sup>7</sup> where the main objective is the top vertex, the actions to be evaluated are the bottom vertices, and the criteria (which are more and more aggregated as one moves higher up in the hierarchy) on the basis of which the analysis will be carried out are the intermediary vertices.

A series of partial sub-decision problems are defined by structuring the problem through successive decomposition stages. These problems are smaller, less complex and are easier to solve since formulating a preference judgement is more simple when dealing with a limited number of decision criteria. A problem can be divided into its parts to greater and greater degrees of detail by identifying any finite number of

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<sup>7</sup> The  $S$  ordered set is a set where a  $\geq$  binary relation is reflexive, symmetric and transitive.

hierarchical levels, allowing the analyst to order the various pieces of information on the basis of reciprocal relationships which are established between the variables involved in the choice. At each level of the hierarchy, a pairwise comparison of the vertices is carried out according to their contribution to each of the higher-level vertices they are linked to. The pairwise comparisons are expressed on Saaty's numerical scale which is based on 'preference ratios' in the case of actions or 'importance ratios' in the case of criteria. This type of comparison can lead to redundant information which can also be more or less incoherent since, for example, the ratio between  $a$  and  $c$  isn't always exactly equal to the product of the ratio between  $a$  and  $b$  by that between  $b$  and  $c$ . The complete scale of comparative judgements used to express preferences which was created by Saaty using logical-mathematical considerations and a psychological analysis on the 'classes of indiscernibility between objects' is shown in the table below (tab.1).

The comparisons are initially formulated with a verbal judgement which is then given a corresponding numerical value. This judgement is expressed by comparing an element according to its strength of influence on the other elements on the same row in the different columns. For example, for each node  $k$  in the tree-like structure, an  $n \times n$  pairwise comparison matrix is created in which the generic element  $a_{ij}$  represents the degree of preference of attribute  $i$  with respect to attribute  $j$  for sub-criteria  $k$  and so on for the other levels of the hierarchy. The pairwise comparison matrix is a square positive reciprocal matrix where the elements on the main diagonal are equal to 1, since the  $\geq$  binary relation is reflexive, and the elements in the lower triangular sub-matrix, defined starting from the main diagonal, are the reciprocals of the elements in the upper triangular sub-matrix ( $a_{ji} = 1/a_{ij}$ ).

Comparative Judgement	Numerical Equivalent <sup>8</sup>
Absolutely more important	9
Much more important	7
More important	5
A little more important	3
Same importance	1
A little less important	1/3
Less important	1/5
Much less important	1/7
Absolutely less important	1/9

Tabella 1 – Saaty’s hierarchical order.

The next step is determining the relative importance of the single attributes with respect to the single criteria they refer to and defining the relative importance of the single criteria with respect to the general goal in order to clearly describe the tree-like structure where, as has already been said, the trunk is the goal, the branches the family of criteria and the leaves the actions to be evaluated. At the end of this stage, each node corresponds to a weight which defines the relative contribution of each element of level  $i$  of the hierarchy to the corresponding node of level  $i+1$ . Saaty showed that the best solution to how to create a ranking is to calculate the largest eigenvalue of the  $k$  pairwise comparison matrix  $A^k = a_{ij}^k$  and the eigenvector it is associated with. The overall vector of the weights is found starting from the single weights of the various nodes of the tree-like structure and then carrying out successive processes of aggregation.

<sup>8</sup> The even numbers 2, 4, 6, 8, and their reciprocals are used to allow for compromise between slightly differing judgements.

The global vector of weights is found by aggregating each single weight of the various nodes in the tree-like structure, moving towards the top of the structure. Since the composition of the hierarchy is theoretically a linear and additive transformation, the ordinal preference scale expressed between one level and the next remains unchanged.

Once the attributes that will be used to compare the different actions have been chosen, the analysis matrix can be built. The number of rows is equal to the number of actions and the number of columns to the attributes believed to be important in solving the decision problem. At this point, the real evaluation matrix can be built where each row is an vector of  $n$  elements which represent the performances of each action according to the value function found for all the  $n$  decision attributes. The product of this matrix and the global vector of weights is then used to obtain an vector whose elements represent an overall performance for each action according to how much the actions fulfill the general goal. The ‘best’ action, i.e. the most efficient from the Pareto point of view, is the one having the highest preference index. A global ranking of all the actions can then be carried out based on this assumption.

The consistency of the judgements in the pairwise comparison matrix determines how much the ranking reflects the real situation. In fact, inconsistency arises when the judgements expressed are not transitive, e.g. even if action  $c_1$  is more important than  $c_2$  and  $c_2$  more than  $c_3$ ,  $c_1$  is not necessarily more important than  $c_3$ .

In order to estimate the consistency of pairwise comparison matrix  $\mathbf{A}$ <sup>9</sup>, a so-called ‘inconsistency’ index of  $\mathbf{A}$ , which shows how much the judgements expressed differ from those in an ideally consistent situation, is calculated. Saaty defines the inconsistency index (I.I.) as follows:

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<sup>9</sup> Matrix  $\mathbf{A}=(a_{ij})$  can be defined as consistent if and only if  $a_{ik}a_{kj}=a_{ij} \forall i, j$ .



$$I.I. = \frac{\lambda_1 - n}{n - 1}$$

where  $\lambda_1$  is the eigenvalue associated with the maximum eigenvector and  $n = \sum_{i=1}^n \lambda_i$ .

It can be shown that if  $\mathbf{A}$  is a square positive matrix and  $a_{ji}=1/a_{ij}$ , then the rank of matrix  $R(\mathbf{A})$  is the same as the sum of the eigenvalues of  $\mathbf{A}$ . Saaty showed that if  $\mathbf{A}$  is consistent, then  $\lambda_1 \cong n$ ; the range of I.I. goes from 0 to 1 where 0 means consistent and 1 totally inconsistent. An index performance less than 0,1 is usually considered acceptable.

## 6. The aptitude evaluation model (*Apt* model)

The hierarchical evaluation model used in this study was created with reference to a sample of 247 Venetian villas taken from the huge number of historical buildings catalogued in the Regional Institute of Venetian Villas which were built between the fifteenth and eighteenth centuries and are located in the provinces of Treviso, Padua, Verona and Vicenza.

The structure of the model (fig.1) is similar to that of the classical Multi-Attribute Analysis model. Using input data which have been organized in a database, an overall index was created which represents the relative aptitude of a given villa to host an economic activity. In fact, the output of the model is a ranking of the aptitude of the villas in the sample.

The model was implemented using a worksheet together with the software '*Valuation and Choice*'. It is based on a hierarchical structure and is an additive multi-

attribute model based on the assumption that the structure of the preferences is a ‘complete preorder’<sup>10</sup> type:

$$v(a) = \sum_{i=1}^n v_i(g_i(a))$$

where  $v_i$  is a monotone value function relative to the  $i$  attribute  $g_i$ .<sup>11</sup>

By structuring the problem on the basis of a hierarchical order, it was possible to assign each variable, appropriately normalized, and each criteria the relative weights needed to build the linear multi-attribute model. However, to verify the robustness of the aptitude indicator, the validity of the main model was first analyzed by building an analogous evaluation model dealing only with the sustainability of the economic use of the villa. Since there was information regarding the economic use for only 33 of the total 247 villas in the sample, this analogous model analyzed the performance of only these 33.

The *Apt* model, therefore, was built in the following stages:

- 1) building the *Use* model to assess the performances of the sub-set of 33 villas in terms of the success of the implementation of a sustainable economic use (**u** index) and rank the villas in terms of **u**;
- 2) building the *Apt* model to assess the aptitude of the sub-set of 33 villas (**v** index) and rank them in terms of **v**;
- 3) analyzing any shifts in the **v** index ranking with respect to **u** index ranking (robustness analysis) to validate the *Apt* model;
- 4) applying the *Apt* model to the complete set of 247 villas.

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<sup>10</sup> If  $A$  is a finite set of actions (Vincke, 1992),  $a$  and  $b \in A$ ,  $P$  is the preference structure, and  $aPb$ , then  $P$  is a complete preorder if and only if  $v(a) \geq v(b) \forall a, b$ .

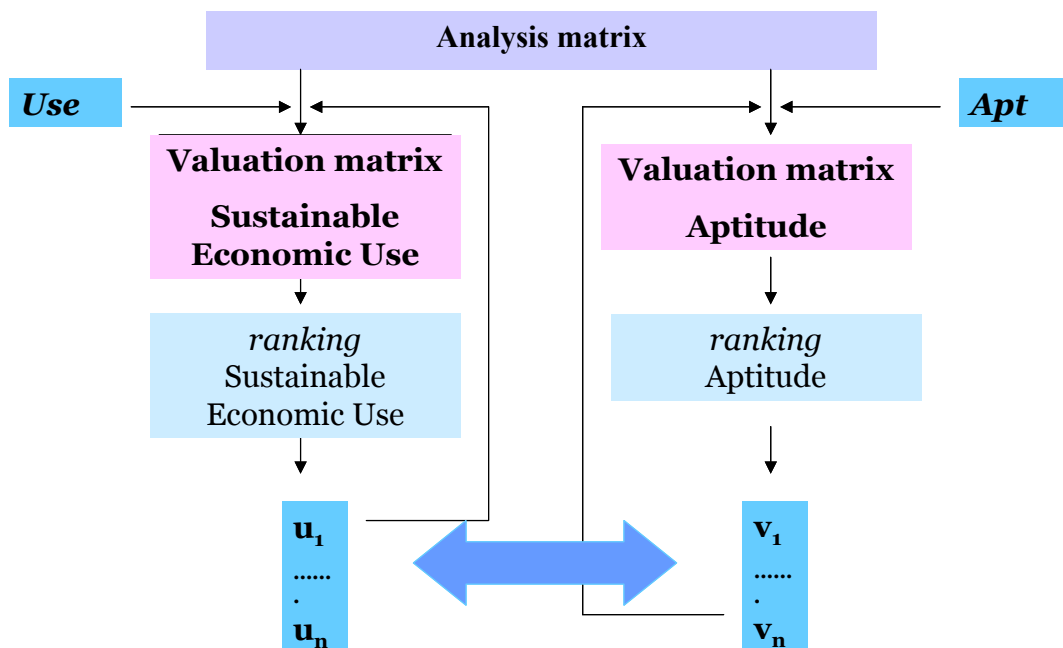


Figure 1- Flow chart of the validation of the model.

## 6.1 The Use Model

The compatibility of the sustainable economic use to the villa is a conceptual parameter which expresses the possible compromise between the profitability of the economic use and the state of conservation of the historical building. Here it was used as the index to verify the validity of the aptitude model which showed that as the profitability of an economic use increases, its state of conservation improves. The index was evaluated by first taking a group of variables needed to analyze the present uses of the 33 villas considered, their relative possibility of sustainable economic use and their contribution to the general state of conservation of the villa and its estate. The variables used to evaluate the sustainability of the economic use were (fig. 2):

<sup>11</sup> Linear continuous value functions were used to represent the quantitative and dummy attributes, while the value functions for the qualitative attributes were found using pairwise comparisons (Keeney, Raiffa 1976).

- the profitability of the economic activity hosted in the villa (FATT);<sup>12</sup>
- how much of the main house is used (GRUP);
- how much of the *barchessa* is used (GRUB);
- how the main house is used (MDUP);
- how the *barchessa* is used (MDUB);
- the state of conservation of the villa and its estate, expressed in the form of an overall qualitative judgement (SC).

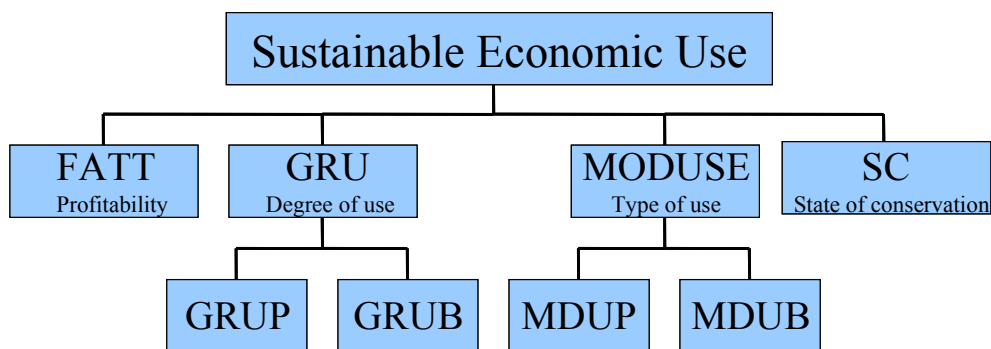


Figure 2- Structure of the *Use* model

## 6.2 The *Apt* Model

To evaluate the aptitude the 247 Venetian villas in this case study, the role of a given set of indicators in the creation of a demand function for the use of the building was analyzed. These indicators make up a group of variables which are important in analyzing the present use of a villa and in evaluating its aptitude for other uses, thus offering a valid support in choosing the best possible use. The indicators (fig. 3) were chosen based on how important they are to the intrinsic characteristics of the villa, how

well they describe the environment in which they are located and their ability to adapt to the technological, functional and formal transformation needed to implement the possible alternative economic activity.<sup>13</sup>

The aptitude of the villas for an economic activity was therefore determined using the following families of variables:

1. Characteristics of the location of the villa This is a group of variables which are useful in identifying the existence and importance of a potential demand to use the building for economic reasons. This can be inferred from indicators such as the number of potential customers in the area around the historical building (determined by considering the town which is the main economic center in the area), how much the area is potentially appealing for tourists, the distances from the main arteries of communication and the vicinity to other tourist attractions or economic centers. This family of variables is made up of:
  - population of the main area of attraction (PPA);
  - whether the main type of economic activity in the main area of attraction is based on tourism or not (TPA);
  - distance in kilometers of the villa from the main area of attraction (DPA);
  - number of kilometers from the nearest highway exit (DSA).

This family of variables, with its simple indicators of potential demand, can be used both to analyze the present economic uses as well

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<sup>12</sup> In this model, profitability is considered a simplified index which takes into account the turnover, type of management, estimated income and economic sustainability.

<sup>13</sup> In fact, it is obvious that projects or strategies which propose multiple uses lead to a series of actions to transform the architectural good which affect, to varying degrees, the status quo.

as encourage the possibility of alternative uses which could offer enough financial support to help conserve the historical buildings without having to ask for external financing.

2. Intrinsic Characteristics of the Villa (CIN) This group of variables can be divided into two sub-groups:

a) Typological Characteristics (CTI) - This family of variables deals with how the spaces in the building are divided and set up and is thus useful in evaluating the present uses and choosing future ones. Even though it is not made up of quantitative variables which numerically describe the actual surface space available, it can nonetheless offer a clear and concise image of the qualitative characteristics of the spaces. These variables are:

- the number of main houses (NCP), which must be specified since the main house has been destroyed on some very important monumental estates of historical interest;
- the number of wings (NAL);
- the number of *barchesse* (NB);
- the number of rustic annexes (NAR);
- the presence of a park and/or garden (PG);
- space for parking (PPK);
- the type of facade (TF).

It is important to briefly highlight the way in which the unique characteristics of the buildings that make up the estates of the Venetian villas and the different degrees of monumentality and artistic elaboration which characterize each type indicated can indicate the different forms of

economic use appropriate for a given villa. Once these forms are known, it would be possible to develop various complementary activities on one estate. The variables PG and TF are useful for identifying the aesthetic, symbolic and evocative characteristics which often have a secondary, but not marginal, role when deciding what can be done with an estate since they nonetheless serve a function. This is particularly true regarding the new forms of economic use (organization of events, conferences and ceremonies) which have become popular in the last decade and will most probably continue to do so in the future.

b) Historical-Architectural Characteristics (CSA) – These variables must be used to make an initial classification of the possible project choices when there is the desire and intention to carry out functional and technological transformations. Their importance is even more evident when they are considered as the very catalysts for the demand for these buildings for recreational, cultural or public relations activities. This family is made up of the following variables:

- identification of the original architect of the building (AC);
- identification of the main artist responsible for the internal decorations (AD);
- presence of frescos inside the villa (PAFF);
- presence of stuccos on the inside walls (PST);
- presence of stone decoration elements inside the villa (PDL);
- presence of valuable floors (PPP).

Basically, these variables help explain why the constraint *ex lege* 1089/39 is imposed on most of the villas which were part of this study. Nonetheless, in this analysis, their role was not seen as a limitation: if, on the one hand, the constraint can limit, at least during the initial stages, the possibility of an economic use for historical buildings, often, on the other hand, they are the very catalyst for the design of valuable, impressive spaces which respect the historical dimension. When the design choices and economic use come together in a harmonious union which is confirmed by the demand, the buildings gain a sort of added value characterized both by non-use values, because of their uniqueness, and use values, such as complementary values<sup>14</sup>.

3. Legal Characteristics (CLE) – These variables provide information regarding the type of property and presence of legal constraints on the buildings. The data collected in this study highlight the close relationship between the use chosen for the building and type of property as well as the limitations of protection laws which dictate many constraints. The variables in this group are therefore:
  - type of property (public, private or ecclesiastical) (TPR);
  - presence of protection constraints from national laws (*ex lege* 1089/39, 1487/39 o altro) (VIN).

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<sup>14</sup> A statistical analysis of the data in this study highlighted the fact that this is mainly the case for villas located in tourist areas or villas which are not located in these areas but which are historically and architecturally important.



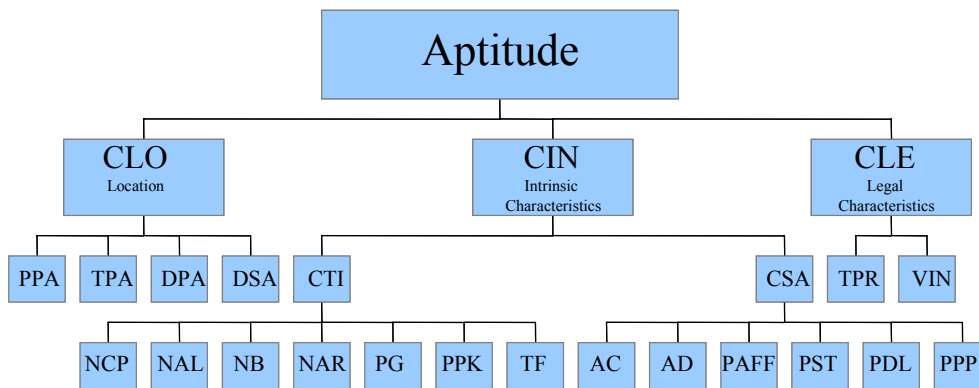


Figure 3- Structure of the *Apt* model.

### 6.3 Validation of the *Apt* evaluation model

The overall model was validated by verifying the coherence between the  $u$  and  $v$  index rankings of the 33 villas used for well-known economic reasons.

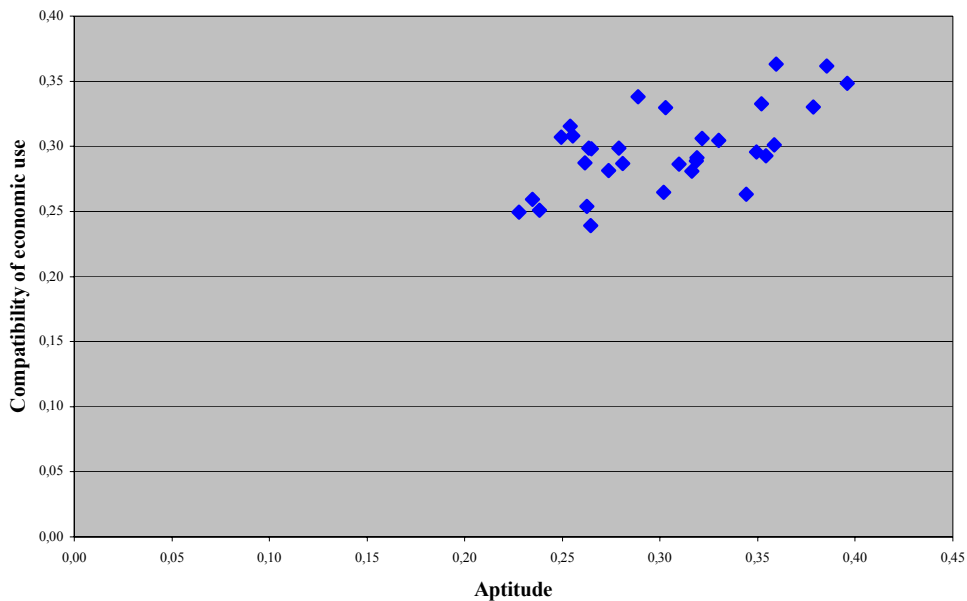


Figure 4- Trend of the economic use with respect to aptitude in the sample used for the validation of the model.

As can be seen from the graph in figure 4, the data observed are located mostly in the upper right-hand quadrant, confirming that villas used for economic reasons have a good aptitude which is one of the reasons why they are economically successful.

Furthermore, what may be more significant, is that when the villa hosts more than one economic use which can be considered complementary, e.g. bed & breakfast and restaurant or farm holiday and museum, it has an even higher ranking and thus more successful. The dispersion along the trend of the regression line can be explained by the problems related to the nature of the data, e.g. qualitative judgements, incomplete information, etc., and the lack of robust indicators regarding the management. Nonetheless, the model defines a trend which is evident enough to allow for the assumption that a more exact survey of the economic characteristics of the management and its relationship with the conservation of the building would confirm the findings of this study. However, given the fact that the success of an economic use of a villa greatly depends on specific factors, such as the type of management and the different availability of financial resources, there will likely be great variability in the relationships between potential aptitude of a historical building and the actual success of a sustainable economic use, especially for economic activities in the services sector.

## **7. Results of the application of the *Apt* evaluation model to the**

### **Venetian villas**

The model used to evaluate the aptitude of a villa for economic use was validated, as explained above, by applying it to a sub-set of 33 villas and then applied to the remaining 214 villas in the total sample of 247. These 214 were all located in the province of Treviso and built between the sixteenth and eighteenth centuries, i.e. during the golden age of this type of architecture. The results are partially reported in tab.2.

N°IRVV	TOWN	VILLA	APT
92			0.727
1096			0.711
4116			0.696
4123			0.694
70			0.676
862			0.659
853			0.658
68			0.645
146			0.643
...	...	...	...
4184			0.279
296			0.278
125			0.278
2684			0.268
4189			0.263
4092			0.259
4067			0.254
272			0.249

Tab. 2-Ranking of the villas in the province of Treviso according to the aptitude index.

The table shows the ranking of the villas in the sample based on their potential for economic use. The results, which should be considered preliminary, are coherent with the situation indicated by the results of the *Use* model, i.e. the better and more the villa is used, the better it is conserved. The results can be shown graphically according to the frequency intervals, as shown in fig. 5

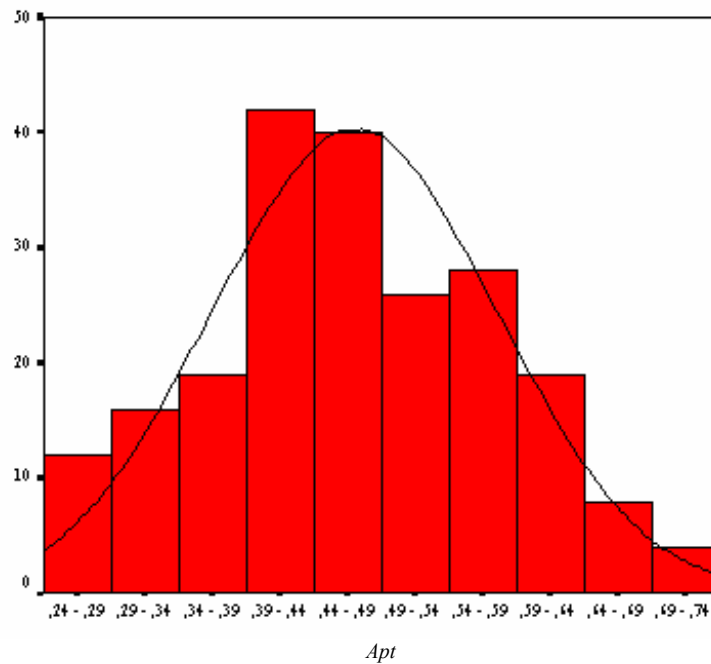


Figure 5-Distribution of the frequency of the aptitude index in the Venetian villas in the province of Treviso.

The potential of the villas in the sample describe a reality which can be commented on from various points of view. In particular, only a few of the cases at the top of the ranking are buildings known outside the region or attributed to famous architects. In fact, the characteristics which seem particularly significant are a favorable location together with a certain aesthetic value. This implies that at the top of the ranking there are not many cases of villas which, because of their characteristics of ‘visibility’ related to their fame as a monument or to their particularly valuable works of art, have their conservation sponsored by private institutions or non-profit organizations. What does seem to have a positive influence is the availability of vast outdoor spaces in addition to closed spaces complementary to the main house, such as wings and *barchesse*, which can be used for economic activities involving recreation or tourism. For the same reasons, villas with a low aptitude index are generally located in peripheral areas; the distance from main urban centers seems to count more than the distance from main

highway arteries. The limited aptitude of these cases can most likely be attributed first of all to functional problems, such as lack of parking or limited spaces complementary to the main house. At the same time, however, the lack of intrinsic historical-artistic characteristics also constantly shows up as an indicator of low ranking, highlighting the importance the model gives to this family of variables.

## **8. Conclusions**

The study reported in this paper proposes a model to analyze and evaluate the aptitude of historical buildings for economic uses compatible with the needs to protect and conserve these buildings. Though this potential is quite evident, building the model proved to be rather complicated for mainly three reasons. The first is due to the difficulty in finding an essentially quantitative algorithm since the variables used were in part qualitative and in part quantitative and very interrelated. This made it particularly difficult to build the hierarchical model to evaluate aptitude. The second reason is the absence of consolidated models for studying sustainable use of a villa from both the economic and conservation points of view which could be used to validate potential aptitude. Finally, it is important to point out the typical and chronic lack of information regarding the financial situation of the villas. In fact, while there is an abundance of data regarding the historical and architectural characteristics of the buildings considered, as well as the state of conservation, there is a total lack of information regarding how they are managed and what the economic results are. It was only possible to partially make up for this lack of information by using indirect indicators such as turnover, profitability and/or the degree and type of use. This is a result of the fact that, faced with the enormous expenses of maintaining the villas, only recently have the owners begun to

consider economic use as a possible alternative to abandonment. Apart from a few cases, however, these initiatives have been relatively limited and are still in the initial stages. Consequently, the study had to deal with a rather changeable and unstable situation in a state of uncertainty between: 1. unnatural uses, such as dividing them into many apartments; 2. recuperating the original function of the villa as a prestigious home, particularly in the case of the better conserved buildings; 3. abandonment in more peripheral areas; 4. public use (libraries, offices of institutions, museums).

Even considering the limitations just mentioned, the model nonetheless proved to have a certain ability to identify the situations which can most likely successfully be used for economic activities compatible with conservation. The Analytic Hierarchy Process offers the possibility of building articulate models which can incorporate and work with very different aspects in the same evaluation. Clearly further refinement must be carried out to be able to evaluate aptitude as a function of the different forms of economic use (hotels and B&Bs, residences, museums, libraries, etc.). This analysis will have to be based on a substantial improvement in the quality and number of economic data. In fact, only in this way will it be possible to improve the model. Once this has been done, the model will be able to provide useful information to categorize the patrimony of the Venetian villas in order to recommend strategies for privately managing the single goods, help create adequate protection policies, and last but not least, improve the efficiency of the few public funds available for safeguarding a patrimony which is unique for its architectural consistency and historical importance.

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## Bibliography

Ackerman J.S. (1972) Palladio, Einaudi, Torino.

Belton V. (1999) Multi -criteria problem structuring and analysis in a value theory framework, in Gal T., Stewart T., Hanne T. (editors.) Multicriteria Decision Making, Advances in MCDM-Algorithms, Models, Theory and Applications, Kluwer Academic Publishers, Dordrecht (12, 1-32).

Bouyssou D., Marchant Th., Perny P., Pirlot M., Tsoukiàs ,Vincke Ph. (2000) Evaluation and Decision Models: a Critical Perspective, Kluwer Academic Publishers, Dordrecht.

Buchanan M., and W.C. Stabblebine (1962) Externality, *Economica*, n. 29: 371-84.

Culyer A.J. (1971) Merit Goods and the Welfare Economic of Coertion, *Public Finance*, n. 4: 546-62.

D'Alpaos C, Rosato P., and V. Zanatta (2001) Il riuso economico degli edifici storici. Un modello di valutazione gerarchica, Proceedings of the workshop“Riconversione dei Manufatti Storici in Musei”, Name, Torino.

Fishburn P.C.(1970) Utility theory for decision making, Wiley & Sons, New York.

Fusco Girard L. (1987) Risorse architettoniche e culturali: valutazioni e strategie di conservazione. Una analisi introduttiva, Franco Angeli, Milano.

- Fusco Girard L. (1992) La valutazione multidimensionale nella pianificazione territoriale paesistica, Genio rurale n°3, Edagricole, Bologna.
- Fusco Girard L. (editor) (1993) Estimo ed economia ambientale: le nuove frontiere nel campo della valutazione, Franco Angeli, Milano.
- Head, J.G. (1966) On Merit Goods, *Finanzarchiv*, 1: 1-29.
- Head, J.G. (1968) Merit Goods Revisited, *Finanzarchiv*, 3: 215-25.
- Istituto Regionale Ville Venete (1994) Ville Venete. Decreti di vincolo e relazioni storico artistiche, Marsilio, Venezia.
- Istituto Regionale Ville Venete (1996) Ville Venete. Catalogo e atlante del Veneto, Marsilio, Venezia.
- Keeney R.L., Raiffa H. (1976) Decisions with Multiple Objectives: Preferences and Value Trade-offs, John Wiley & Sons.
- Lichfield N., Lichfield D., Di Stefano R., Forte F., Fusco Girard L., Realfonzo A. (1981) Verso una strategia integrata dei beni culturali in Campania, *Restauro* n°53/54.
- Mazzotti G. (1952) Le ville venete, Libreria Editrice Canova, Treviso.
- Mundy B., and Kinnard W.N. (1998), The New Noneconomics: Public Interest Value, Market Value, and Economic Use, *The Appraisal Journal*, (Apr.) 207-14.
- Muraro M. (1986) Civiltà delle ville venete, Magnus, Udine.
- Musgrave, R.A. (1971) Provision for Social Goods in the Market System, *Public Finance*, 2: 304-20.
- Nijkamp P. (1993) Lo sviluppo sostenibile e la valutazione socio-economica ed ambientale, in Fusco Girard L. (editor) Estimo ed economia ambientale: le nuove frontiere nel campo della valutazione, Franco Angeli, Milano.



Nijkamp P.(1977) Theory and Applications of Environmental Economics, North-Holland, Amsterdam.

Parson G, and Y. Wu, The Opportunity Cost of Coastal Land Use Controls: an Empirical Analysis, *Land Economics* 67 (Aug.): 308-16.

Rosato P., and V. Zanatta (2000) Economic Instruments for Architectural Goods Conservation, Proceedings of the meeting “Human Being and the City: toward a Human Sustainable Development”.

Roy B. (1985) Méthodologie multicritère d'aide à la décision, Economica, Parigi.

Roy B., Bouyssou D. (1993) Aide multicritère à la décision, Economica, Paris.

Saaty T.L. (1980) The Analytic Hierarchy Process, McGraw Hill, New York.

Samuelson P.A., and W.D. Nordhaus (1995), Economics, 15<sup>th</sup> ed., McGraw Hill, New York.

Taylor L.O., and V. Kerry Smith, Environmental Amenities as a Source of Market Power, *Land Economics* 2000 (Nov.) 76: 550-68.

Vincke Ph. (1992) Multicriteria decision aid; J. Wiley & Sons, New York.

Von Winterfeld D., Edwards W. (1986) Decision Analysis and Behavioral Research, Cambridge University Press, Cambridge.

Wittkower R. (1984) Palladio e il palladianesimo, Einaudi, Torino.