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The control of transformations in the architectural heritage development

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In the light of modern acquisitions, the rehabilitation of cultural heritage is closely linked to the concept of sustainable development and sustainable use of resources. It is therefore necessary to apply strategies aimed at the exploitation of the capital to product services, thus cultural heritage must be preserved. It can produce benefits but it can also impoverish, hence the need to identify compatible uses with the resource's development together with their preservation. This paper presents a methodology for assessing the impact of transformative interventions on the architectural resources in relation both to the needs of conservation and heritage protection.

Keywords: identity, building rehabilitation, transformation.

Introduction

Since the 1990's, governance has become a significant vehicle for policies targeting the social improvement of communities and the implementation of sustainable development programs

The idea of conservation as a strategy of intervention is beginning to define not only the preservation of existing assets but also the projection of it over the time through the adaptation to changing patterns of usage to ensure the renewal and the availability of resources.

I am here referring to the architectural goods that are often defined as "minor architecture" because of their low cultural or historical interest; those architectures nevertheless represent something that could be important to asses before deciding to process any transformation. This work does not want to provide a strict method for allowing or not new design on minor buildings or to point the right changing, it is more properly a methodology to let the designers be able to understand what is the impact of any project on the identity of buildings and what is the range of compatible transformation with the nature of assets. The control variable "time" in the management of changing in the physical environment is directed to protect the value of resources by protecting them from possible impairment. The current cultural assumption (Istanbul Declaration and the Habitat Agenda - Istanbul 1996) considers "natural capital" not only the environmental resources but also the products of human activities as the architectural resources, infrastructure and cultural activities. The proper use of natural capital requires knowledge of the carrying capacity of resources, that is, how much a resource can be exploited without impoverished. The primary objective is to give substance to the idea of development that combines productivity and renewal with the protection and conservation of the resources and of the values that the environment houses, we are not proprietary but usufructuaries of cultural heritage, therefore we are obliged to protect it for future generations (S. Musso, 2000). The depletion of heritage, for past exploitation, produced serious repercussions on social and economic systems and a more conscientious approach towards the need to ensure the heritage over time has emerged.

Generation after generation the structure of the city settles meaning which is increasingly complex to manage, the evolution of the modus vivendi changes the settlement of the places and evolves with it in an ever more rapid way affecting the recognition of urban space. The changing way of life and work involves adaptation activities to satisfy new needs and it forces a change in the physical space. It must be considered that the changes, over time, affect the concept of "efficiency" and that, in a process of sustainable development, the solution is in mediating between the needs of users and the safeguarding of heritage (Lourdes Arizpe, 2000).

With regard to the development of architectural resources, the desire acquires special importance to promote a widespread dissemination of a critical behaviour in interventions on heritage which, by their nature, defy the principle of normalization that cannot reflect the richness and diversity of existing settlements.

The recognition of cultural identities in the building restoration

The recovery process starts from the recognition of values in a building system, those values that make up a composite and multi-scalar picture that is extremely variable over time and in places. You need a first distinction between intrinsic values, or inherent to the goods themselves and not necessarily recognized, and extrinsic values that represent values that interact with external factors of social, economic and cultural. The identification of heritage values is the first step in the decision-making that leads to actions for the protection and recovery of local identities in the process of development (Values and Heritage Conservation 2000).

The lack of knowledge of intrinsic values is often the cause of the propensity to adopt foreign models to local culture or to adopt innovative models without checking the impact on pre-existence. In light of these considerations the planning stage in recovery takes on a complex meaning because it introduces the variables coming from heritage and then amplifies the impact of any intervention. The pre-existence is therefore a starting point and guiding the whole process, it is the system of reference for all the choices.

In the historic cities the restoration often acts on a very stratified heritage that has taken different meanings over time reaching a complex physical substance and iconography (Bluestone D. 2000). The awareness that the built heritage is a potential resource for the fulfilment of a requirement and, at the same time, the recognition of its value system pose a reflection on the necessity of finding a balance between preservation and transformation in decision making, in terms of consistency with the material and immaterial characteristics of goods and with the new requirements dictated by new functions.

The adjustment of performance requires a control on the requirements for protection of the good's values, the "expectations of use" of the transformation process are therefore dimensioned with respect to instances of the heritage's identity protection. The architectural and environmental layout is the common denominator of new features in relation with transformations that trigger chain reactions according to multiple and sometimes unexpected directions.

The value of existing assets and return on socio-cultural

The value of existing assets is a composite value as reported to inclusive goods, that is enjoyed at the same time by several people; it can be defined as the set of social, economic and cultural benefits that an environmental or architectural resource can directly or indirectly deliver to users. The value of a resource is expressed by two components: one related to the "intrinsic value" of the good that can be independent of the use of the resource and represents its uniqueness and irreproducibility, and one referring to the "instrumental value" of the resource that is related to the use and generally to the relationship with the environment to which it belongs. The complex value is not an absolute, but reflects a range of values dependent on relations with the environment (L. Fusco Girard).

The reference is no longer a unique value but a multiplicity of values, it effects large and differed perspectives of action and reinforces the need for selection of project objectives through community participation in decisions. In this goal, it is evident that any action on the cultural heritage should take into account the effects that can have on the way of life of users and should assess the "socio-cultural efficiency" as well as economic impact. The objectives involves direct and indirect benefits according to whether internal or external impact of the scope of the project in question, we define these as "intended effects" (Randall F. Mason, 2005).

It should begin by explaining the nature of benefits that are produced by environmental and cultural resources. We could speak of two classes of benefits: direct and indirect, meaning those related to direct benefits to the use of the estate and indirect benefits to those induced by the fallout in areas external to the design. The benefits of an environmental resource or architecture are closely linked to their own context, so that the potential to produce benefits must be sought in relation to the characteristics and needs of the context, it means that the production potential of an asset derives from the intersection of the resources that the good is able to offer and the needs of social and cultural context to which it belongs. This equation means the ratio of an architectural good and its environment, meaning that the

mutual bond of membership has the dual capability of potential and limits and it may significantly vary when conditions change to the context (Cassar M., 2000).

The protection of identity

The knowledge of the value system is the basis of the definition of the constraint system for the identification of characters to be protected in the process of transformation. The project of knowledge is oriented to reflect the complexity of the built heritage which, by its own nature, is inseparable from the physical matter that constitutes it, here we want to discuss about the necessity to preserve material testimonies in the development process in order to comply "the need to respect a continuum" (UNESCO Preliminary report 2010).

The tools for analysis and classification can not return the physical perception of an object and it was found that reliance on descriptive and complex models is not a guarantee of a "real" knowledge, it is useful, therefore, the definition of a simple analytical model easy to the compilation and consultation in order to focus on immediacy with the characters of an architectural identity. Of course a first look at an architectural good captures the dissonance, the changes, the enlargement or the mutilation that marked the evolution of the original model in its life cycle. Therefore there is a tendency towards the identification of remains and the transformations trying to understand the historical motivations that produced them. The analysis of transformations to the original configuration researches "what" is changed and "when" and it is analysed in conjunction with technological and environmental units that have been affected by the changes as new constructive technologies and new models of use.

The set of signs, shapes, lights, colors, that are transmitted to the observer defines the memory of places and things, sometimes small changes can make their mark more than great works in relation to which parts are interested in and what mechanisms trigger in the life of the building. The evolutionary cycle of the structure analysis is returned via a registry card model that relates the changes with the events that have been generated and the functional and structural components affected in this process. The analysis starts from the original constructive layout to the changes that over time have given new meanings to the structure. Figure 1 shows what transformations affected the structure of the Convent of San Domenico in Benevento (Italy) from the original conception in 1267 one up to the restoration works in 1992; changes are analysed in relation to what were the reasons of modifying, what kind of works were done, which architectural elements were involved in those processes.

Through this approach we want to ensure not only the essence of the architectural material, but the trace of its experience bringing together the constructed space with the functional space (modus vivendi and modus aedificandi).

The preservation of architectural identity poses the need to define constraints to ensure the features of the structure. In this sense, the constraint is the system of rules for the control of transformations and ,at the same time, defines the space of the possibilities of transformation that outline the process of exploitation. The definition of constraints is not an exogenous factor, it is not imposed on the project but we mean it as generated from the building itself. For this purpose we define the criteria for recognition of the peculiarities of a building by formulating the categories of constraints (constructive, morphology, colors, etc.). Especially in the traditional building the link between forms, materials and technology is insoluble, it gives life to the building through an irreversible process of a perfect architectural fusion.

Compared to canonical methods of reading, the research of the values and the identification character differs from the scientific analysis method due to the fact that the process of knowledge is not given by a progressive deepening of data and their relations, rather, the process of "recognition" is developed through continuous changes of viewpoint and scale passages from general to particular. Therefore we will meet entities from different systems that characterize a same constraint because they share a common ability to confer uniqueness and recognition to the good.

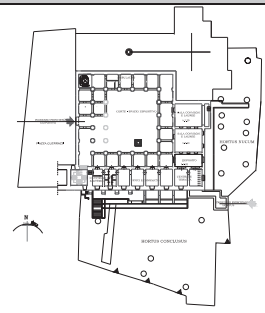
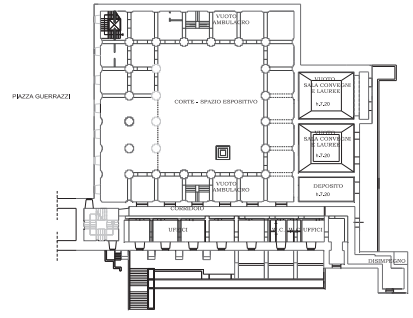
History of transformations	Interventions	changes due to:	categories of transformation	Spatial units / technical elements involved by the transformations	
1702 The monastery and the church are largely destroyed by the earthquake, they are entirely rebuilt between 1705 and 1707.	– reconstruction of the church and the convent according to the pre-existing scheme but with different styles and techniques from the original.	Ruins of the factory due to the earthquake (1702)	– construction techniques – materials	The whole complex	
1702-1877 changes affecting the main floor	– closing the east and west wings of the gallery floor (it is only the north side adjacent to the church)	Adaptation of performance	– volumetric – geometric – distribution – fruition	The porch floor	
1877 transformation of the convent in the Palace of Justice (arch. Satriano)	– closure of the arches of the arcade – insertion of a mezzanine floor in the porch and three stairwells to access – construction of a new order of arcades on the ground floor at the side of the entrance – building on the top floor	– Change of use	– volumetric – geometric – distribution – fruition	– enclosure wall – vertical internal partitions – horizontal internal partitions – coverage	
1992 restoration project	– Reopening the porch of the central court (PT and raised) – Removal of internal partitions on the main floor and top floor – Implementation of new internal partitions on the first and second floor	– Change of use	– volumetric – geometric – distribution – fruition – plants – users	– enclosure wall – vertical internal partitions	___ front wall before the nineteenth century ___ front wall of the nineteenth century. ___ front wall of the nineteenth century. (1861) removed during the restoration and rebuilding in 1992 ___ elements introduced during the restoration and rehabilitation conservative in 1992

Figure 1. Identification of transformations of the Convent of San Domenico in Benevento from the original building (1268) up to the restoration in 1992.

The control of the transformations

The proposed methodology is based on developing two tools that allow the identification of all components of a building that could not be transformed, because they constitute its own identity system, and the comparison with the system of requirements for different uses. This methodology is based on the identification of areas of impact of the architectural components that might be affected from adjustments for new uses. The architectural structure is represented by Impact Areas, so named because they are exposed to the effects of the transformations; the System of Constraints is represented by the factors that characterize each bond. The binding factors are linked with the elements of building systems through a matrix of Perpetual Elements; in this sense all the elements to be preserved are pointed out and, as shown in the Figure 2, you can extract diagrams on the relevance of different technical elements on the bounding system for preserving the nature of the assets. This tool allows you to determine the "transformation range", it becomes even more significant if a weights is assigned to different binding factors in order to obtain an order of priority in the safeguard of the technical elements.

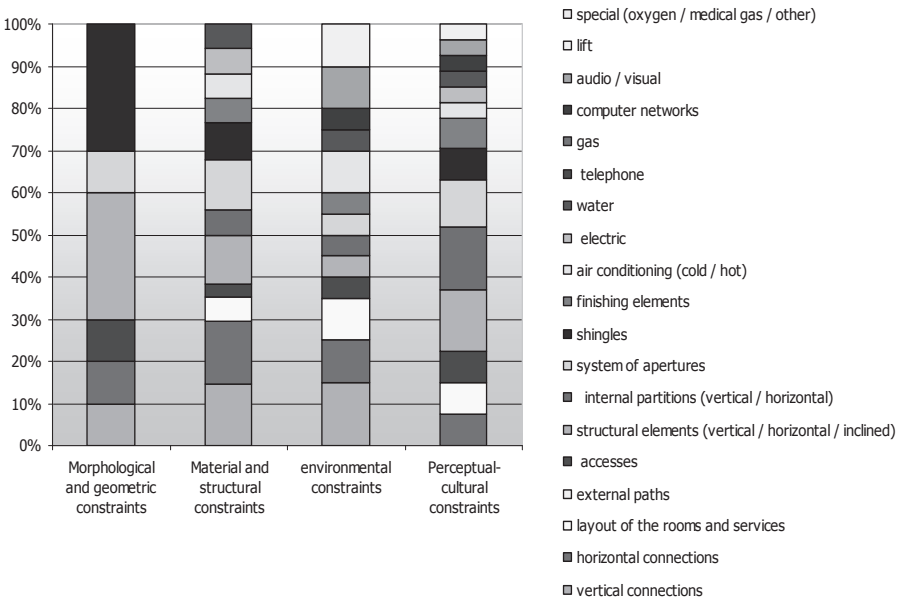


Figure 2. Diagram of the Perpetual Elements

The Matrix of Perpetual Elements allows the comparison of the building characteristics with various new uses. The requirements system must be designed for each new use or adaptation. The identification of the perpetual elements is necessary for the subsequent recognition of the impact areas; a new matrix is structured by linking the architectural system with the requirements of each new use (Matrix of Impacts). The graphs in the Figures 3 and 4 highlight the impact on the building of the future use so as to isolate the impact of various sectors and to have knowledge of any changes on parts of the building. The Perpetual Elements identifies the requirements that can not be satisfied (in whole or in part), thus the possibility to adapt the structure to a specific new use is limited.

The Matrix of Perpetual Elements all the elements are known to protect in the building transformation; the combination of data of the two matrices outlines these requirements that can not be satisfied because they affect unchangeable parties for the protection of good's identity.

					Areas of impact	
					Distributive System	
					Vertical Connections	Horizontal Connections
Intended Use: Educational institutions	Requirements Class: SAFETY	Emergency Evacuation	E1	Spaces frequented by students or faculty and staff must have at least 1 scale or external security of a ladder-proof evidence of smoke or smoke inside (dm dell'interno 26.08.1992 art. 5.2)	1	
			E2	2-story buildings: it is allowed the creation of a single scale, which is protected under the following conditions: number of people present at the second floor must be commensurate with the width of the scale with flow capacity ≤ 50	1	
			E3	≥ 1.20m Width ways out (2 modules)		1
			E4	Length of exit routes: Route from the local crowd of students and teachers to safety output ≤ 60m (dm dell'interno 26.08.1992 art. 5.4)		1
			E5	≤ 15 m path plan		1
			E6	path from every point of the building to a safe place to ≤ 45 m **(circular letter 30 ottobre 1996, n. p2244/4122 sott. 32 ministero dell'interno)**		1

Figure 3. Relations between design requirements and technical elements. The boxes in red indicate the inability to adapt to the requirement for compliance with a bond of protection.

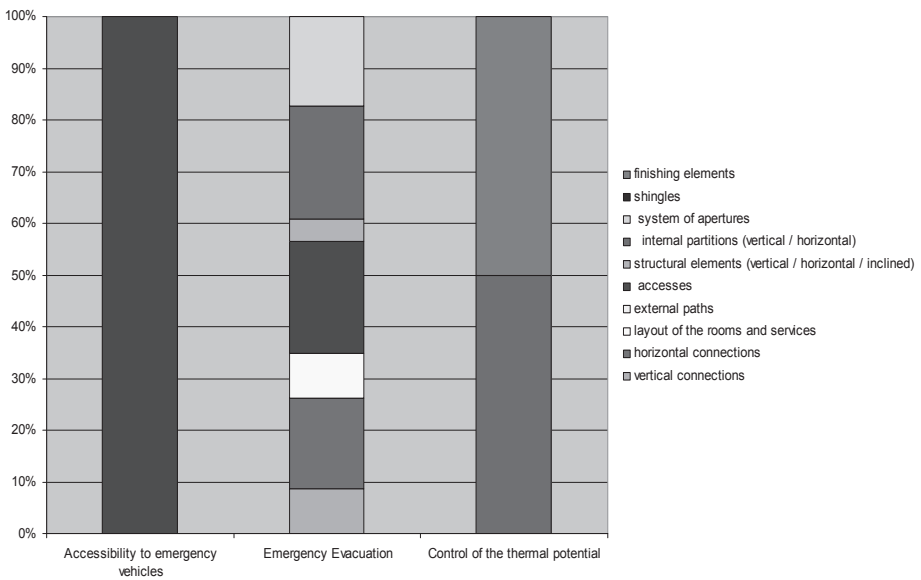


Figure 4. Figure 4: Diagram of the impacts of the category of Security Requirements

Conclusions

This methodology is based on the Matrix of Perpetual Elements, which is unique for every building and reflects the transformability of the built system, and on a number (n) of Impact Matrices, which express the impact of different uses on the structure, or the invasiveness of transformation works. The analysis is aimed at defining the area for possible designs that is the intersection between design requirements and

constraints for the protection of the identity of the building, this intersection can represent the actual space of the potentiality in the design for heritage. The process can be repeated for various new uses; graphs can be extracted which highlight the extent of each different scenario in affecting the building in the adaptation of the existing structure to new uses or activities. Finally different design scenarios can be compared by giving different weights to the criteria of choice.

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