

HERITAGE BUILDINGS' SUSTAINABILITY ASSESSMENT FRAMEWORK

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Summary

Heritage buildings by definition are specified to be preserved through ages as they are attributed as sustainable building practices of their construction time with regards to their correspondence to their contextual characteristics and function. Nowadays, in the framework of sustainable development, the objective of sustainability of heritage buildings is widely acknowledged both for ensuring the continuity of the descendant values as well as for maintaining the use of non-renewable resources consumed for the heritage buildings' practice.

The present paper sets historical buildings and their restoration activities as a focal interest in building sustainability studies, given the fact that 30 % of EU-27 building-stock dates before 1945. To this end, sustainability aspects in restoration of heritage buildings are introduced, while a review of existing assessment methodologies with regard to their coverage of heritage building based construction activities' sustainability performance is conducted. The herein presented study aims to define a specifically developed approach and criteria to assess the sustainability performance of heritage buildings and their restoration activities.

Keywords: sustainability, building sustainability assessment methodology, heritage building, restoration

1 Introduction

Sustainability of buildings is basically an approach that building industry has adopted to achieve sustainable development. It is a role that serves for the already defined tenets of sustainable development: economical, social, cultural and environmental sustainability through building industry. Exceeding the initial concern for environmental sustainability through raw material supply for construction activities, sustainability of buildings has extended to cover building components, buildings and even built environment related issues and technologies.

In parallel, assessment of sustainability of buildings has extended from individual environmental and economic assessment studies to a comprehensive approach where each tenant of sustainable development is considered as a complementary input for any classified sustainability study. What is more, the subject of the assessments developed from production and erection stages of buildings to a more integrated study that covers or concentrates on the use, renovation and management processes of buildings.

As for the interest of this study, environmental sustainability studies that dealt mostly with the solutions for reduction of the environmental impact of the construction activities in 1990s, recently works also in a ‘comprehensive approach’ that integrates environment performance, building performance, economic performance and social concern. Consequently, LCA based studies got altered to comprehensive assessment methodologies enabling diversity in assessment approaches.

Today, building sustainability assessment methodologies are likely to form the base of an assessment for heritage buildings, can mainly be grouped as:

- LCA based where building is taken as a product with an expiry date and so several ends like demolition, recycling and reuse of the building and its components are described to run the environmental impact assessment of the building.
- LCA inclusive comprehensive assessment where building is scored and ranked regarded its performance in management, sustainable sites, indoor environment quality, quality of service, outdoor environment, energy, materials, resources & material, off-site environment, transport, water, land use & ecology, emissions/pollution, innovation, health & well-being like categories that correspond to social and economic sustainability through environmental sustainability point of view.

2 Sustainability of heritage buildings and its assessment

2.1 Heritage buildings in sustainable development time line

Heritage buildings and built environment are well acknowledged media of sustainable development studies. In 1996, it was noted in United Nations policy framework that ‘conservation, rehabilitation and cultural sensitive adaptive reuse of urban, rural and architectural heritage are also in accordance with the sustainable use of natural and human-made resources to protect the global environment’. Following, in 1999, in Agenda21 on Sustainable Constructions ‘cultural issues and cultural heritage implications of the built environment have to be regarded as preeminent aspects in sustainable constructions’ was sentenced specifically confronting the role of heritage buildings in sustainable development. Henceforth, the ‘World Sustainable Building Conference, which was held in Oslo in September 2002, concluded that the existing building stock and rehabilitation of neighborhoods should be the main starting point for sustainable building and housing strategies’[6]

Today, ‘statistics reveal that 14 % of EU-27 building-stock dates before 1919, other 12 % between 1919 and 1945 (with considerable national differences), corresponding to 30 resp. 55 million dwellings and 120 million Europeans living there ’[4]. The lateral fact confronts that heritage buildings’ sustainability is not only a concern for environmental sustainability but is highly related with economic and social sustainability criteria of sustainable development.

2.2 Heritage buildings’ sustainability assessment methodologies

Heritage buildings are attributed as sustainable building practices of their construction time regarded their correspondence to their contextual characteristics and function. Today, they receive recognition both for sustaining the continuity of the descendant social and cultural values and for sustaining the use of non-renewable resource which were consumed for the heritage buildings’ practice.

Apparently, they are registered historical buildings and referred as listed buildings of a kind; as monumental or secular heritage. Yet, their related practices that vary from conservation to adaptive reuse restoration or reconstruction are determined according to their classification.

Until recent times, heritage buildings are being approached as common historical buildings and their sustainability is discussed through improving the building's mechanical systems in regard to their comfort and energy performance or upgrading structural performance through low environmental impact solutions.

As for building sustainability assessment studies, the subject of the assessment of heritage buildings' relate to adapted construction practices. However, heritage buildings' sustainability cannot be discussed without considering the input of the **heritage value** of the building, perquisites of the legislation that depends on the **principles of the conservation and restoration of** heritage buildings and/or the restrictions of the **authentic architectural characteristics** and its **condition** at the time of the project.

Recently, no heritage building oriented assessment studies exist. Despite discussions on the topic date older, noticeable publications appear since 2011. Regarded the studies presented in [2] and [5] the sustainability assessment methodology studies of heritage buildings is being conducted, in parallel with the existing approaches, for mostly energy efficiency aimed restoration projects. As [5] aims to build a LCA based methodology, [2] explains how and with what categories to integrate a section to a prevailing scoring comprehensive scheme, DGNB, to assess heritage building oriented practices.

Furthermore, Triple Bottom Line approach developed by John Elkington is being adapted to assess heritage building oriented projects in a more comprehensive point of view, more specific to UK. On the whole, each study brings out a heritage building oriented criteria and tries to develop an interpreted methodology over the prevailing paths described for existing buildings.

3 Conclusion

'Heritage buildings of the age of the skilled craftsman, were traditionally designed, constructed and maintained on the assumption that their service lives could be extended practically without limit by suitable maintenance measures' (Koning et others, 2010). Henceforth, heritage buildings can be described as long-lived products that have life expectancies many times longer than those of their maintenance repairs, interventions and their users. Within this framework, several questions appear to be answered to structure a framework for heritage building oriented assessment studies. In reference to the pre-described classification of existing methodologies;

1. In a LCA based study,
 - a construction activity is assessed through the 'cradle to grave' approach. How would a building conceived to have an endless life line be assessed with an end scenario oriented, cyclic methodology?
 - valuations regard mainly the embodied energy and relevant issues of the initial construction to develop evaluations on environmental impacts but for heritage building this information is mostly impossible to possess.

2. In a LCA inclusive comprehensive assessment study,
 - a construction activity is assessed through the new criteria of modern times; how would heritage values and economic valuation of the heritage building be achieved and got integrated to the prevailing methodologies?

In short, as Alonso, V. I. and V. M. Meurs state in their article “Assessing the performance of conservation activities, such a methodology would involve “using different indicators, both quantitative and qualitative, which depend on the type of heritage, the type of intervention, and the socio-cultural context in which restoration projects take place” would create many methodological problems. Regarded this fact, “specific methodologies need to be developed locally, that may only work for certain types of interventions or certain types of restoration projects”[1].

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