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The Sustainable Heritage of Vernacular Architecture: the Historic Center of Oporto

Sílvia Alves^{a,*}

^a*Instituto Universitario de Arquitectura y Ciencias de la Construcción, Universidad de Sevilla, Av. de Reina Mercedes 2, 41012 Sevilla, Spain*

Abstract

Architecture is the result of different generative dynamics. Vernacular architecture is an example of building within inherent sustainable characteristics. By using a conceptual structure based on the architectural main components, it is possible to recognize the interrelations established in the past, and the ones crucial to respect in the present. The architectural values of the historic center of Oporto are analyzed, regarding the interactions of both its generative main topics and inherent sustainable values. In our historic centers we can see sustainability within architecture, as a whole, helping us to understand what components we must focus, why, when and where.

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1. Introduction

Vernacular architecture is often an example of building within inherent sustainable characteristics: energy, materials and local resources¹. It was sustainable without being aware of it, maybe because the main goal was not to define sustainability concepts, but to work with architectural ones. A sustainability conscience was intrinsically present, as an ideal to pursue good architecture. It was a natural language of place and time. The environmental ethics of building was a natural guideline for the concept of *dwelling* in a specific place. Afterwards, the notion of *machines for living* overwhelms this concept. The physical environment became a material, easy to manipulate and

* Corresponding author. Tel.: +351-966283027.

E-mail address: silvia_alves2003@yahoo.es

control. Architecture was global. When this global *way of living* failed due to environmental risks, sustainability arises again, though announced as a new concept to integrate in our architectural conscience. Therefore, several design measures attempt to establish a path for architecture, so to reach sustainability. It is widely accepted that an ecological building must consider local materials, wherever it is possible². Moreover, “tomorrow’s sustainable architecture” should be adequate to its *use*, its *stability*, *durability* and *delight*³. In addition, “Green Vitruvius” alerts to the importance of solar passive design in order to improve the energy performance of the building². Although it is crucial to validate both the environmental efficiency and performance of a building, this approach tends to reduce architectural values to quantifiable *data values*. Some attempt to elaborate a checklist for sustainable architecture, electing as main topics for the analysis the “environmental impact, social and cultural relevance, occupants, economic performance, the building”⁴. However strange may seem to consider *the building* as a detached topic. Also by measuring the range of *Input* (use of resources) and *Output* (environmental impact), we may even define the *Architectonic Ecosystem*¹. Furthermore, with the *Sustainability Assessment Model* (SAM) we may evaluate a project by analyzing 22 performance indicators, divided in four groups of impact: resource consumption, environmental, social and economic¹. Consequently, architecture is often qualified only by its level of sustainability. Nevertheless, sustainable architecture within these definitions is not, by default, good architecture. Good architecture can and should be able to absorb these notions. Some authors recognize it, by defining as main topics for grouping sustainable attitudes the *functional quality*, *architectural quality* and *use of resources*⁵. This approach, by assuming architectural values as guidelines, unfolds the vernacular *way of thinking* architecture, which define the character of our historic centers.

This paper aims to establish this sustainable inherent value, by exploring the potential of a conceptual model, further developed in previous studies^{6,7}, due to its ability for managing complex and interdependent forces acting within a common field, which defines architectural dynamics.

2. Architectural dynamics

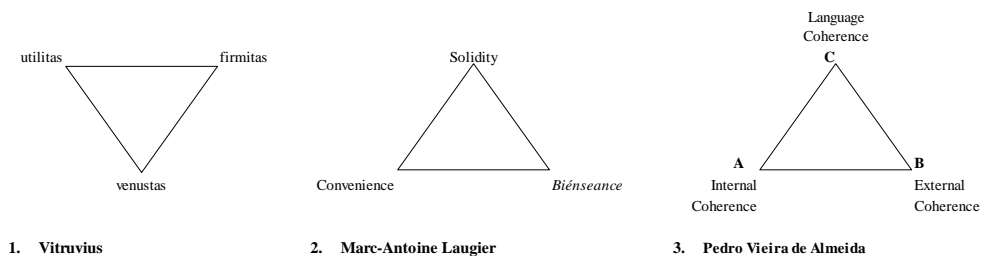


Fig. 1. Architectural conceptual models.

The vernacular *way of thinking* architecture unveils key strategies in order to materialize *dwelling*, emphasizing the notion of *shelter*. Since the seminal Vitruvius’ triumvirate, several authors established conceptual models looking for structuring these strategies (Figure 1). Vitruvius (1st century BC) stated that “In all construction should be taken into account its solidity (*firmitas*), its utility (*utilitas*) and its beauty (*venustas*)”. Marc-Antoine Laugier (18th century) also established several reflections about architecture: “one must build with solidity, for convenience and according to *bienséance*”. Pedro Vieira de Almeida (20th-21th century) defines three main poles that interact in the design process. Pole A, *Internal Coherence*, comprises the program formulation, the function. Pole B, *External Coherence*, gathers the determinants of the site and landscape. Pole C, *Language Coherence*, comprises the expressive means that compose the language of architecture, mainly its formal and spatial structures. In its conceptual triad, Pole B, the conception of “site and landscape” might tend to be interpreted as a single reference to local materials and solar passive design. Nevertheless, it relates more to the romantic principle of the humanized landscape, defending that architecture is mainly poetry, arising the notion of an immaterial essence.⁸ It must be contextualised that, at the time of this conceptualization, the *firmitas* vertex was not an issue, all materials and constructive systems were available everywhere and the environmental comfort can easily be produced. On the other hand, it was upraised a fourth vertex, the *site and landscape in its poetic sense*, reflecting the immaterial variables of

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