



Improving Sustainability Concept in Developing Countries

Materiality and Architecture: Potential Strategy for achieving Sustainable Design

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Abstract

This study proposes that the impact of the built environment on the natural environment can be mediated by adopting a sustainable approach to building material selection and specification, particularly when articulated at the design stage of the building process. The aim is to identify the main drivers and barriers to sustainable material specification by built environment design professionals. This study carried out for Cyprus where attempts have been made to uncover the attitudes of Cypriot built environment design professionals towards the natural environment, identify the process employed in specifying building materials, and the extent to which they draw inspirations from the natural environment.

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1. Introduction

Evidently, the built environment sector is not only natural resource consumption intensive; it also generates huge amounts of wastes, resulting in major environmental pollution and degradations. This study proposes that the impact of the built environment on the natural environment can be mediated by adopting sustainable approaches to building material selection and specification, particularly when articulated at the design stage of the building process. Evidence abound suggesting that a sustainable approach to material selection and specification can reduce built environment material consumption intensity by as much as 60 per cent, assigning a prominent role to built environment design professionals in the delivery of sustainable development. (Coulson, J. R., and R. J. Fuller 2009). The policy implication is that global environmental sustainability can be achieved proactively, requiring effective strategy to drive the process. Little is known of the process used by built environment designers to select or specify construction materials, what drives or hinders this process, and the extent that environmental concerns influence the process. (Gluch, P., & Baumann, H., 2004).

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Thus, the aim of this study is to identify the main drivers and barriers to sustainable material specification by built environment design professionals. Having such knowledge is critical to any efforts directed at motivating and

encouraging built environment professionals to fulfil expected roles required of them by society in the delivery of sustainable environment. (Bond, S., & Perrett, G., 2012). This study is carried out for Cyprus where attempts are made to uncover the attitudes of Cypriot built environment design professionals towards the natural environment, identify the process they employ in specifying building materials, and the extent to which they draw inspirations from nature and historic buildings. A questionnaire survey is the instrument used for data gathering, and the Statistical Packages for Social Science (SPSSx) was used to analyse the data. The results identify a number of drivers and hindrances to sustainable material specifications by Cypriot architects, allowing a number of policy recommendations to be drawn. This study is expected to be of benefits to policy makers contending with issues of sustainable development strategies.

2. The Impact of Built Environment on the Natural Environment

Throughout the world the building industry is responsible for high proportions of the pollutions as a result of the energy consumed during extraction, processing and transportation of raw materials. For instance, the energy for manufacturing and transporting building materials represents nearly 8% (350 PJ per year) of all primary energy used in the UK, whereas 50% of all energy consumed is attributable to occupation of the dwellings (Adalberth K 1996). These sums exclude energy consumed during the construction process, added together, buildings are energy intensive. Thus, Architects have an important role to play in global environmental sustainability by ensuring designing buildings to sustainable principles and criteria. (Bryan, et.al 2004) Importantly, if the need to design out non-renewable materials completely is not feasible, efforts must be directed at designing buildings that minimise the consumption of non-renewable materials throughout the life-cycle of the building. While the non-renewable use in buildings, not mainly at the construction stage, but also, at the post-construction stage when buildings are in use. Hydes and Creech (2000) concluded that though sustainable buildings are perceived to be relatively more expensive compared to conventional buildings, the associated environmental benefits in reduced carbon emission together with lower running costs are positive outcomes not to be ignored.

2.1. Traditional Architecture in Cotemporary Built Environment.

In most developing countries it can be clearly seen that with the modernization of the construction sector the traditional knowledge that previously underpinned climate responsive vernacular designs are rapidly declining. Instead, modern building designs pervade, often paying little attention to local materials and traditional methods of construction, hence local climate conditions (Bodach, S., Lang, W., & Hamhaber, J., 2014). Vernacular architecture exudes strong local content both in traditions, materiality, building skills and methods, and responds to local needs. Thus, vernacular buildings tend to be less natural resource intensive, generating materials and structures that are far more environmentally sensitive compared to conventional buildings and materials (John, G., Clements-Croome, D., & Jeronimidis, G., 2005)

2.2 Displacement of Traditional Local Building Materials by Conventional Materials

In traditional architecture, buildings are built with materials gathered within 400 yards of their locations. This rule seems almost universal for simple vernacular buildings, due to the cost and difficulty of transporting building materials over long distances. This means that buildings are designed specifically in view of materials and skills available locally, in addition to local environmental conditions. This being the case, it means material selection for traditional buildings is reflective of local climatic conditions. In essence, designing to local conditions not ensure buildings are integrated with local surroundings, but this leads to significant savings in embodied energy. As traditional cultures receded, and replaced by popular cultures fuelled by industrialization, the demise of traditional material specification in house building was only a question of time. This manifest change to traditional materials' use in dwellings are reflected in increased use of manufactured materials; these are often imported, and even where manufactured locally, they remained foreign to local contexts.

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