

# Chapter 11

## The BIM Model as an Opportunity Area for Sustainable Processes in Green Library Buildings

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### ABSTRACT

*The purpose of this chapter is to review the literature on green buildings and the BIM model to see in which aspects of the sustainable library this technology can be implemented in to identify areas of opportunity to introduce the BIM model in green libraries. It is important to note that a search in major databases such as Scopus and Web of Science has identified a considerable number of academic papers that talk about green libraries, green buildings, BIM model, and BIM model in green buildings; however, there is still no literature on green libraries using green BIM. In this sense, the chapter offers the current view on green buildings, green libraries, and BIM model and the possible future implications of the use of technology and BIM model in libraries to increase processes, reduce margins of error in construction, costs, and waste of resources. The present research opens a wide range of possibilities for information exchange and opportunities for green library construction and remodeling, especially in developing countries.*

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## INTRODUCTION

The purpose of this article is to analyze and provide theoretical concepts on the BIM model and how this technology is applied or can be applied in green libraries, so the structure of this chapter is designed to provide a global overview in which is shown first, the subject of green buildings, its importance and the current context. Secondly, the paper discusses What is the BIM model? And its relationship with building projects, to give way to another section of this article and with which begins to make sense of the link BIM-Green Library and is the Green BIM, this concept has been a trend in recent years, even systematic reviews of the literature on Green BIM have been made.

Regarding the literature review conducted for this research, it was identified that an important aspect and that can be a transversal axis for Green BIM and Green Libraries is the evaluation of the life cycle of a building since it allows to evaluate the environmental impacts of a building throughout its life cycle. In the last section of the theoretical framework, the concept of green libraries and the strong implication they have with sustainability is studied.

Let us now look at these new models that are revolutionizing construction and helping to meet the global objectives of the United Nations sustainable development agenda.

## Green Buildings

Buildings are responsible for approximately 35% of global energy consumption and 38% of total Co2 emissions (Sharma, Kaur, and Goel, 2018), it remains to add that currently, 55% of the world's population lives in urban areas and it is expected that by 2050 this sum will rise to 68% (United Nations, 2018), so the issue of sustainability application in the design and construction of buildings becomes a matter of utmost importance.

There are many problems arising from the poor sustainability activities of organizations, where sustainable developments are needed in the event of global climate change, such as air pollution, water pollution and many other factors. To solve this problem, a green building model has emerged, which consists of the realization of buildings that are environmentally friendly, from their construction to their operation. Barnes (2012) argues that although green building projects have become much more prevalent in recent years, there is still a perception that they are expensive and that green technologies are not sufficiently proven, the author notes that this is due to a lack of understanding of the costs of buildings that do not incorporate green design principles.

Subki and Mahazir (2019) categorize the benefits of green buildings into three aspects which are, environmental, social and economic. The environmental benefits of the first aspect involve waste reduction, improvement in air and water quality, securing the ecosystem and preservation of natural resources while, the social aspect benefits include enrichment of the comfort and health of the occupants, aesthetics and quality of life, increased productivity and the increased useful life of the building. Finally, the financial benefits, including increased markets for green products and services, improved life-cycle economic performance, reduced operating costs and maintenance costs.

According to the US Green Building Council's LEED performance system, a green building is one that is constructed incorporating the following design elements.

- Sustainable site selection and development.
- Water conservation.

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