

# The Role of Value Engineering in Building Construction Resources Optimisation and Environmental Protection: An Overview

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## Abstract:

Building construction is an integral part of national economic development. Nevertheless, it requires enormous capital to implement sustainable building construction. Construction activities contribute to environmental degradation and pollution by material extraction and carbon emissions, amongst other problems. Stakeholders in the industry continue to seek ways to optimise resources to save costs and protect the environment. Value Engineering (VE) seeks to strike a balance between costs and functions performed by buildings and infrastructures without compromise. Therefore, this survey aims to understand how VE principles can optimise building resources and protect the environment without loss in quality, performance, and reliability. The assessment reveals that using VE principles optimises building functions at the lowest overall cost without affecting quality and performance. The approach addresses the oversizing of structural elements of buildings and mechanical and electrical systems. It resolves the complexity of building sizes and shapes via material diversification. It identifies the function of a building before investing to save costs and avoid project abandonment. The practice has the potential to provide an environmental advantage through the dematerialisation of the building structures to mitigate greenhouse gas emissions linked to the built environment occasioned by the energy released from fossil fuels. The method simplifies multi-objective resource optimisation associated with supertall building construction. In addition, abandoned projects can be revived by identifying the status and challenges with the project and suggesting strategies that facilitate the easy take-off of the rehabilitation of such projects. Furthermore, building projects can achieve green and sustainable construction by adopting value engineering strategies.

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## I. Introduction

Building construction is integral to national economic development because of its benefits to man and society at large. Nevertheless, it requires enormous capital to implement sustainable building construction. Also, building activities contribute to environmental degradation and pollution by extracting materials from the environment, demolition of buildings, and carbon emissions during and after construction, amongst other problems. On the other hand, Value Engineering (VE) seek a balance between costs and functions performed by buildings and infrastructures without compromise. This situation leads industry stakeholders to seek alternative solutions (materials and processes) to save costs and mitigate the impact of construction activities on the environment. Therefore, this survey aims to understand how applying VE principles in building construction can optimise resources and protect the environment without compromising the structure's quality, performance, and reliability.

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