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THE SCHOOL OF THE BUILT ENVIRONMENT

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VALUE ENHANCEMENT TECHNIQUES AND TOOLS

# INTRODUCTION

Construction is distinguished by a set of precise project delivery goals that include concurrent product and process design, application of production control throughout the project life cycle, and maximization of value for consumers (Oladapo  Ogunbiyi et al., 2012). To obtain the best performance of a built facility over time, construction projects require the proper application of project management approaches including risk and value management. According to (Oladapo  Ogunbiyi et al., 2012)it has been argued to have developed because of traditional project management's failure to provide an integrated project delivery process in which design, construction, operation, and maintenance are taken into account as a whole with an understanding of how to improve value delivery to clients, stakeholders (including occupants), and society at large.

An in-depth examination of Value enhancement methods and techniques that promote advantages to the environment and value creation in the design and building processes is provided in this write-up (including supply chain management). It also explains how applying lean principles to procurement strategies and construction project delivery yields significant advantages and value, including partnerships between contractors, consultants, and manufacturers.

# VALUE ENHANCEMENT

Businesses have been focusing more and more in recent years on methods to raise their worth. Investment banking firms and consultancy businesses have created and sold a variety of competing metrics, each claiming to be the "best" strategy for value generation (Damodaran, 1999).

Value enhancement refers to the process of improving or increasing the value of a particular asset or business entity. The goal of value enhancement is to increase the return on investment (ROI) for the owners or investors of the asset or business.

Value enhancement can take many forms, such as improving the efficiency of business processes, enhancing the quality of products or services, expanding the customer base, optimizing the supply chain, reducing costs, increasing revenue, and improving the overall financial performance of the company.

Value enhancement can also involve strategic initiatives, such as mergers and acquisitions, joint ventures, partnerships, or divestitures. These initiatives can help to create synergies and unlock additional value for the business.

Overall, value enhancement is a continuous process that involves identifying opportunities for improvement and implementing changes to maximize the value of an asset or business over time.

### Ways of Increasing Value

A company's worth may be increased by raising present cash flows, raising predicted growth and the period of high growth, and lowering its overall cost of financing (Damodaran, 1999). Yet, none of them are actually simple to complete and are likely to take into account all of the qualitative variables, such as solid management, a strong brand name, strategic decisions, and effective marketing, that we are sometimes accused of overlooking in valuation (Damodaran, 1999).

# Value Enhancement in Construction Context

Value enhancement in construction refers to the process of improving the value of a construction project by optimizing the cost, quality, and performance of the project. It involves identifying opportunities to improve the value of the project and implementing changes to achieve those improvements.

# Recent Trends in Construction Value Enhancements

There are quite a number of trends and discoveries that are helping to improve the value of construction projects by optimizing processes, reducing waste, improving sustainability, and leveraging technology and these include:

* Building Information Modeling (BIM): BIM is a digital tool that enables architects, engineers, and contractors to collaborate on a construction project from the design stage through to completion. BIM provides a more detailed and accurate representation of the project, enabling stakeholders to identify opportunities for value enhancement.
* Lean construction: Lean construction is a process that aims to reduce waste and increase efficiency in the construction process. By eliminating unnecessary steps and optimizing processes, lean construction can help to improve the value of a construction project.
* Prefabrication and modular construction: Prefabrication and modular construction involve the use of off-site manufacturing to produce building components that are then assembled on site. These approaches can help to reduce construction time and costs, while improving quality and sustainability.
* Green building: Green building involves the use of sustainable materials and construction methods to reduce the environmental impact of a construction project. Green buildings can also help to reduce operating costs and improve the overall value of the project.
* Artificial intelligence (AI): AI is being used in construction to optimize the design and construction process, improve safety, and reduce costs. For example, AI can be used to analyze data to identify opportunities for value enhancement and to optimize building systems for efficiency and sustainability.

# Supply chain management in construction

It involves the coordination and management of all the processes, activities, and entities involved in the supply of materials, equipment, and services needed for a construction project. Effective supply chain management is essential for ensuring that construction projects are completed on time, within budget, and to the required quality standards.

Some of the key elements of supply chain management in construction include:

* Planning and forecasting
* Sourcing
* Inventory management
* Logistics and transportation
* Quality control
* Risk management

# TOOLS AND TECHNIQUES USED IN VALUE ENHANCEMENT

Each of these concepts involves systematic approaches and will require some changes in management perspectives to fully realize the benefits of their implementation. The key principles for each of these concepts will be elaborated in turn.

# Design optimization

By optimizing the design of a construction project, it is possible to improve its value. This can be achieved by selecting the most appropriate materials, technologies, and construction techniques that will result in a high-quality, cost-effective, and sustainable project.

Several design-related construction issues, such as those caused by access limits and incompatibilities between design and construction timelines, can be resolved with construction input during the design phase (Chua, 2003). Knowledge of regional elements and site circumstances can impact the design and, in turn, the building technique of choice.

# Value engineering

This involves reviewing the design of a construction project to identify opportunities to reduce costs while maintaining or improving quality. This can be achieved by optimizing the design, materials, and construction methods used in the project.

Value engineering may be used at any point in a project's lifecycle. Yet, it is important to keep in mind that by using it sooner in the project, more advantages might be obtained (Chua, 2003). Early in the project, there are fewer rigid restrictions, which allows for more freedom in implementing creative options. More restrictions are applied as the project develops. Then, there won't be as much room for adjustment, and it will cost more money to make the required design changes (Chua, 2003).

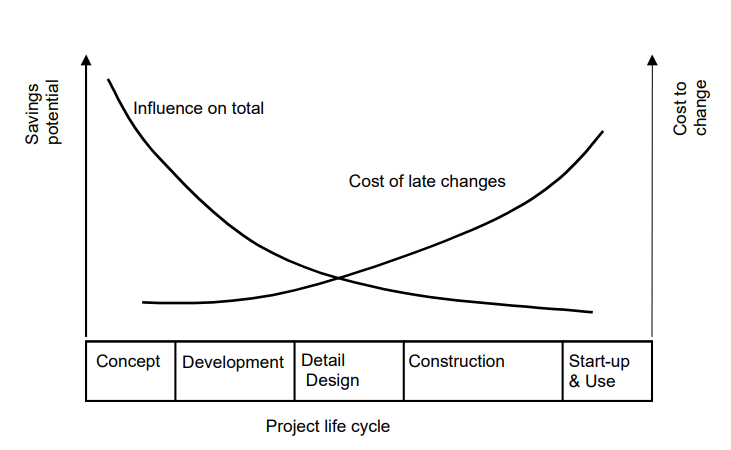


Figure :Cost savings potential over the project duration.

# Life-cycle cost analysis

During the past few decades, life cycle costing (LCC) has gained importance in construction projects. Nevertheless, minimal empirical research has been carried out on the factors influencing its implementation in building projects, particularly in poor nations. Our study's goal is to fill in this information gap (Opawole et al., 2020)

This involves evaluating the total cost of a construction project over its entire life cycle, including construction, maintenance, and operation costs. By considering the entire life cycle, it is possible to identify opportunities to reduce costs and improve the value of the project.

Academics have long supported the use of this evaluation technique as a way to ensure that the best value, not the lowest cost, is the driving factor for business choices connected to future built environment initiatives (Higham et al., 2015). Thus, it is necessary to evaluate its present levels of adoption among built environment specialists and determine whether there are any obstacles preventing its usage.

According to (Higham et al., 2015), LCC is still not frequently utilized by built environment specialists. The necessity for clients to budget on short-term horizons is the biggest barrier to the tool's adoption. Other factors that continue to impede the widespread adoption of LCC as an early-stage project evaluation tool include a lack of practitioner and client awareness of the tool, the long-term unreliability of data, and the overriding need for commercially driven projects to achieve maximum return on investment (Higham et al., 2015) The capacity of the construction sector to fulfill its pledge to improve built environment sustainability is affected by these results.

# Risk management

Risk management (RM) is a crucial procedure that is essential to the survival of many businesses. Project risk management (PRM) has emerged as a key strategy since projects are regularly used to carry out the strategic plan of the businesses(Ferreira de Araújo Lima et al., 2021), the study and comprehension of the important PRM processes in SMEs is a pertinent and urgent subject given that SMEs contribute significantly to the economy, and the standards and tools used by large businesses are typically either too expensive or too difficult to be appropriate for SMEs

By managing risks effectively, it is possible to reduce the likelihood of unexpected costs and delays, which can improve the overall value of the project.

The main project risk types are (Ferreira de Araújo Lima et al., 2021):

* Technical-operative risks: technology selection, risks related to materials and equipment, risks related to change requests and their implementation, design risks
* Organizational risks related to human factors (organizational, individual, project team): risks derived from regulations, policies, behavior (lack of coordination/ integration, human mistakes related to lack of knowledge)
* Contract risks: risks of the contract related to the project.
* Financial/economic risks: inflation, interest rates fluctuation, exchange rate fluctuation
* Political risk: environmental authorizations, governmental authorizations

# Sustainability

By incorporating sustainable design principles into a construction project, it is possible to reduce operating costs and improve the value of the project over its life cycle.

Due to the paucity of knowledge on this topic in the literature that is currently accessible, it is questionable if sustainability concerns will be given priority within value management (VM) methods. (Zainul Abidin & Pasquire, 2005) recognizes that sustainability concerns should be included in VM as a value enhancement strategy since they will have an impact on the final product's quality. Investigating VM to raise sustainability problems at the early stages of building, will provide insight into its potential and present practices, igniting greater interest in this area in the future (Zainul Abidin & Pasquire, 2005).

# Constructability

Constructability involves more than just checking completed drawings for ambiguities or inconsistencies in specifications and features that might cause construction issues later on during the execution process. However, it goes beyond just improving the efficiency of building techniques after the project has been deployed (Chua, 2003).

Another important consideration for meaningful construction input to design is the commitment to preconstruction planning. Preconstruction planning determines three important elements affecting design and plan sequence:

* + Select construction methods and sequences so that designers can incorporate them into their designs.
  + • Ensuring that the design is constructible with at least one feasible way to execute the work.
  + • Assuring that all necessary resources will be available when required, including accessibility, construction space, and information.

# SUMMARY

VM (Value Management) may be viewed as a tool that will give the customer value for money based on the discourse above, emphasizing the time, cost, and quality of the projects. As a result, it will increase the projects' worth.

However, the specific guideline is still insufficient for specific construction fields, i.e., residential projects. It is not an easy task as it requires more effort from all related parties to be fully implemented in the construction industry (Yassin et al., 2022).

All parties engaged, including the educational system, professionals, and government agencies involved in the building business, will need to make a sizable contribution. Hence, the main requirement for sustainability (i.e., quality) may be met with the integration of VM to create a sustainable and advanced national construction industry (Yassin et al., 2022). The stakeholders are also provided with a variety of options for implementing VM utilizing different phases and approaches. The RIBA Plan of Work allows for the implementation of VM across the whole building process (Yassin et al., 2022).

Thus, the value maximization process should be monitored from beginning to end.

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