

# A Review on Implementation of Lean Construction Principles in Construction Projects

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## Abstract:

Researches have shown advantages for an organization that can be obtained by implementing lean methodology, however, when implementing new philosophy like lean construction, there are always some challenges to overcome. For example lack of basic knowledge about the philosophy behind lean, lack of willingness to change, implementation processes in an organization lack of clear objectives with the implementation factors, etc. In this research, attempt was made to gain knowledge on how the organization should plan to implement lean principles in an efficient and sustainable way. Further research will be carried over in identifying the factors affecting the implementation of lean principles in construction projects.

**Keywords:** *Lean principles, construction projects, waste management, questionnaire survey, lean construction, construction business.*

## I. INTRODUCTION

The development venture includes numerous members to perform their exercises in order to cope up with the developing infrastructure around the world. Every member is associated with one another until all stipulated work is done. All represent their own advantages, attempting to advance the utilization of work, hardware, and materials they give. Each undertaking is one of a kind as far as plan particulars, strategies, organization and individuals included. The strategy picked to use during the development venture procedure will give way for the assets that must be accessible without any wastages to achieve the goals. In the serious development world, diminishing expenses with an end goal to build advertise seriousness and benefits is a shared objective among all development organizations.

Work profitability and efficiency factors can be improved with implementing lean principles in an organization. Efficiency in the development division encountered a negative improvement contrasted with the construction business. The degree of advancement right now excessively low considering numerous individuals, with the goal that endeavours individual achievements, hence lean construction

principle implementation with ease of work through coordination among individual is expected to improve it. Efficiency is firmly identified with accomplishing various creation units at a specific time to achieve the desired objective. Profitability has to be met with suggestions required for betterment with removal of wastages in all levels of organization. The best strategy implies more creation as well as less expensive expenses while as yet making quality as an imperative that must be satisfied.

## II. RELATED WORK

Ballard observed that the Nigerian structure industry (NIB) is confronted with various difficulties. Best among these is the manner by which it is best to deal with the various types of squanders produced during the structure acquisition process and by doing so will improve the maintainability record of the business. Cost overwhelm, times invade, and misuse of building materials are the serious issues devastating the business. In any case, lean methodology has been set up in western world, for example, the USA, UK and others as a methodology that helps in achieving manageability in the structure ventures. This paper

presents after effects of an investigation directed to recognize benefits logical from the appropriation of lean practices (LPs) by firms in the NIB. The methodology embraced for this investigation was the audit of writing to recognize the advantages of Lean Practices (LPs) appropriation and a poll overview of engineering, building counseling, contracting and looking over firms in Abuja, Lagos, Port-Harcourt, Enugu and Kaduna [3,4].

Koskela observed through their findings about implementation of lean principles from an empirical study to explore basic waste variables (CWFs) affecting the organizational behaviours of development ventures. Twenty-four CWF were identified through a broad writing survey and united by semi structured interviews with construction experts. A questionnaire was structured and surveyed among 330 members from open and private activities in Morocco. The factual examination demonstrated the top five factors as activity start delays, rework, unused employee creativity, long approval process, waiting due to work not completed by others. The research findings of this investigation give direction to rehearsing engineers to manage and develop appropriate strategies to effectively manage CWFs through implementing lean principles [5].

Hassan gokberk bayhan found that lean intends to amplify consumer loyalty while limiting the waste. In any case, Lean way of thinking has not been surely known at this point in the development of construction business for the way that the unpredictability and dynamic nature of development ventures raise vulnerabilities that might be not really taken care of by development experts. In addition, venture based nature of construction business makes Lean usage considerably trying for development in terms of individual projects. Despite the fact that Lean endeavors in development that have as of late expanded, there are issues with the usage forms. It is certain that effective Lean usage emphatically influences venture execution. In this way, it is fundamental to uncover empowering agents and boundaries in Lean execution with the goal that the construction business experts may lead more adequately and fulfill venture necessities. This examination intends to provide a lot of center empowering influences and obstructions of Lean usage in development undertakings and guide

construction experts to more likely fulfill the business necessities [7].

Xervier in his article, principle design is to depict the collaborations produced from the concurrent use of the Lean Construction theory (LC) and Management of Heritage Structures and Conservation Strategies. They clarify the primary standards, devices, procedures, present day advances and practices of the Lean Construction theory and Lean Project Delivery System that could coordinate and cause cooperative energy with the elaboration of the study and with the implementation of the plan. Also it helps to relate the work flow plan, work flow execution, their components and the necessities. The system utilized depends on the audit of the writing distributed over the most recent 10 years, in which the data was gathered from International Conference of Lean Construction papers and a lot of standards in common and building designing diaries [14].

Aakanksha observed that a development venture is an impermanent creation framework which is structured and conveyed in a predetermined time and spending plan. As the customary ways can't deal with unpredictable and questionable exercises, there is a requirement for inventive and propelled frameworks that will help the undertaking groups' arrangement with the issues in ventures. Lean methods, Enterprise Resource Planning and Artificial Intelligence are such creative systems which have a decent effect in the development business. As every framework has the effect just in the executed phase of development, there is a degree for loss of assets in the other development stages. This paper proposes an infectious circle framework involving Lean methods, Enterprise Resource Planning and Artificial Intelligence [11].

Oyedolapo said that the development business is regularly positioned top in delivering the biggest measure of waste during a task, be it the misuse of material assets or the misuse of labour. This has raised the requirement for an improved and increasingly organized administration method. This investigation will investigate the standards and practices of lean administration relevant to development undertakings to break down whether lean administration practices can improve the administration efficiently for complex ventures. This study adopted quantitative approach and a linear

regression model has been used to investigate connections between the lean test factors and the efficiency subordinate factors. It was discovered that lean administration devices that are utilized over and over again and the ones that require an elevated level of itemizing are decidedly connected with efficiency improvement in roadway development ventures [12].

Richard observed that the investigation of different kinds of stream in development is generally a new field. This paper uncovers that they have applied a creation line illustration with acknowledgment of two creation streams. Procedure stream: areas are liked with items descending a creation line and Activities stream: work groups are compared to work stations. Their work proposed a record of the nature of creation stream in development, however the exploration configuration has three critical defects: the gifted translation of stream line diagrams was not thus applied to the understanding of their model graphs; the theoretical structure recognizes that the fundamental analogy requires levels of detail in both area and assignment that are bolstered in their examination. The importance of "nature of stream" right now not characterized and this discussion brings up significant epistemological issues for those working in lean development and area based administration [10].

Nilmini said the motivation behind their paper is to give exhaustive investigation and comprehension of lean development (LC) and to assist analysts with finding new holes and research openings and thereby create potential cooperation possibilities. The bibliographic information was acquired in peer-explored diaries. The science mapping investigation and informal community examination (SNA) were utilized to direct the investigation and perception. Science mapping was performed to recognize the examination subjects, advancement and the connections between these points. Additionally, the most persuasive LC-related articles in every theme were recognized dependent on the concept of H-classics. SNA was also used to explore the collaboration status of authors and to identify the core writers in the LC field [13].

Yan researched the lean principles considering fabricating industry was found to be effectively

applied to the development business by lean development and it can help ventures to improve the general monetary advantages. In his paper, the usage subject and advancement status of lean development in China were broke down and the lean development method of 3RD Construction Co., Ltd of China and 5TH Engineering Bureau is taken for instance to break down the run of the mill improvement method of lean development in China at present. At long last, the paper abridges the improvement techniques of lean development in China with the end goal of giving reference to the advancement of lean development in China [15].

Abdul said in his paper that development began in lean excursion with gaining from assembling. In contrast to lean assembling, barely any examinations to date have researched lean development in both broadness and profundity, particularly from the point of view of development supply chains. The constrained comprehension of lean development brings about an examination issue. This exploration expects to investigate the execution of lean standards with regards to extent based on development supply chains. It accomplishes its point through an exact examination in the UK. A mix of quantitative and subjective strategies gives this exploration legitimacy and dependability. Lean standards are discovered appropriate to both private structure ventures and numerous different sorts of development ventures. It is likewise discovered that lean development can be upgraded on the off chance that it synergizes with production network coordinated effort. Another finding is that lean administration has a significant sway on venture execution [1].

The development business is one of the most deadly enterprises, so it is essential to give more consideration to security arrangements. Despite the fact that business related mishaps are known as a significant waste in development ventures, little consideration has been paid so far for consolidating security into the lean development structure. Right now, development hypothesis is inspected through the perspective of wellbeing. Thus, the challenges in past researches on improving the well being in development ventures are arranged and those identified with the idea of lean task conveyance are presented. In such cases, the standards of the lean

development system are clarified and the significant changes for joining wellbeing into the structure are presented and talked about [2].

### III.CONCLUSION

In this review paper we conclude that various factors considered in implementing lean principles in construction industry have errors and some papers described own their methods to decrease those errors in them. The possible difficulties in implementation of lean principles are rectified by analyzing the early signals from the factors influencing them and from which they will work to execute the project in efficient manner. This study helps to consolidate the points to be considered in implementing the lean principles through various influencing factors and we can include our own methods pertaining to work nature in lean construction. The factors to be considered can be identified through real field observation and questionnaire survey from various engineering contacts and analyze their views through the responses obtained from various respondents pertaining to our areas of interest. However, Lean implementation is still a challenge for the most practitioners in the construction industry due to varying reasons involved with different levels of personnel involved in various processes involved. Thus lean principles can introduced to the construction industry in order to manage construction processes in best way possible by rectifying all resisting factors to the maximum possible extent.

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