The Understanding on Lean and Value in Construction Project Management

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WHAT IS LEAN CONSTRUCTION?

Lean construction is a production management-based approach to project delivery, derived from a philosophy based on the concepts of lean manufacturing. It extends from the objectives of a lean production system - maximise value and minimise waste - to specific techniques and applies them in a new project delivery process. The reliable release of work between specialists in design, supply and assembly assures value is delivered to the customer and waste is reduced. Lean construction is particularly useful on complex, uncertain and quick to deliver construction projects.

Lean construction works by focusing on improving the quality, cost, efficiency and delivery of a product or service to achieve greater customer satisfaction. It provides the knowledge and practical skills needed to turn the highly theoretical concept of lean construction into a practical tool which can be implemented effectively. More of such concepts are being applied recently in construction projects in certain developed countries. Such lean principles are currently being developed and practiced in construction projects in Malaysia. The Lean Principles involve:

- Eliminate waste
- Precisely specify value from the perspective of the users and customer and eliminate all non value adding components
- Make the remaining value adding components flow without interruption by managing the interfaces between different components
- Let the client pull – do not make anything until it is needed, then make it quickly
- Pursue perfection by continuous improvement

HOW DO THE LEAN PRINCIPLES WORK?

Lean is about designing and operating the right process and having the right systems, resources and measures to deliver things right the first time and then able to duplicate it thereafter. Essential to this is the elimination of waste – activities and processes that absorb resources but create no value. Waste can include mistakes, redundant activity and movement, delayed or premature inputs, and products or services that do not meet customer needs. The primary focus is on moving closer and closer to providing a product that customers really want, by understanding the process, identifying the waste within it, and eliminating it step by step.

Lean is focused on value, more than on cost, and seeks to remove all non-value adding components and processes whilst improving those that add value. It aims to define value in customer terms, identifying key points in the development and production process where that value can be added or enhanced. The goal is a seamless integrated process (value system) wherein products 'flow' from one value adding step to another, all driven by the 'pull' of the customer or market forces.

The idea of 'right the first time' is essential to the lean philosophy. 'Right' in this context means making the procedures checkable with the means to check made possible so that it cannot go wrong. This approach involves an extremely rigorous, questioning analysis of every detail of product development and production, seeking continuously to establish the ultimate source of any problems. Only by eliminating the cause at source can the possibility of that fault recurring be removed.

APPLYING LEAN THINKING TO DESIGN AND CONSTRUCTION

Lean results can be realised by means of the following measures taken in the design process:

- Use of visualisation techniques such as Virtual Reality and 3D CAD to fully define the product requirements from the customer's perspective.
- Use of integrated design and build arrangements (including partnering) to encourage close cooperation between designers, constructors and specialist suppliers.
- Design for standardisation and pre-assembly – both of components and processes to achieve higher quality, cost and time savings.
- Value Management (VM) to achieve more understanding and focus on client value.

The lean principles can only be applied fully and effectively in construction by focusing on improving the whole process. This means all parties, *i.e.* the approving authority, client, consultants, contractor or the specialist subcontractor have to be committed, involved and work to overcome obstacles that may arise from traditional contractual arrangements.

VALUE MANAGEMENT (VM)

Another concept closely related to lean principles in project management is VM.

VM seeks to provide the owner/stakeholder with an item that satisfies the basic function they require at the best value for the money spent. VM

is defined as a rigorous, systematic and innovative methodology with a multi disciplinary approach to achieve better value and cost optimisation for projects, products, facilities, systems and services without sacrificing the required performance levels.

The term VM encompasses both value engineering and value analysis. Over the years, the term "Value Analysis" has generally become associated with applying value techniques to systems, organisations, strategic planning, standards, quality control and environmental impacts. "Value Engineering" (VE) implies the application of value techniques utilising the engineering and architectural disciplines to the design of products, facilities, renovations, etc. VE is a continuous process in which all the components and processes involved in construction are critically appraised to determine whether better value alternative or solutions are available. It is helpful for reducing wasteful processes and inefficiency in specific aspects of design, construction and management. Such VE study is to optimise whole-life design quality and cost to assess the buildability of options selected. All construction projects are likely to include some unnecessary costs. However, cutting cost without proper analysis is likely to lessen value; only unnecessary cost should be removed where wasteful processes and/or practices contribute to cost. There must be no loss of functionality or quality as otherwise value is diminished.

The benefits of the VM approach are significant if a formal methodology is applied:

- If involving major stakeholders, an excellent opportunity to form a team with common objectives focused on the project
- Better understanding of the required functionality of the finished product, giving the client/end user not only what he wants but what he needs
- A more sustainable end product
- The ability to record in an audit train how all options were considered and why one was chosen above all others (reduces the risk of late comers changing the project with "nice to haves")

The reason for holding a VM workshop is to facilitate better value system solutions by identifying and analysing the functions that make up the system, determining the cost and worth of the functions and then seeking the best value solution from alternatives. Function Analysis allows this process to be performed and is pivotal to the determination of value. Without it, we rely on judgement or the "gut feel" of our experience, which in rapidly changing times, may soon be out of date.

Is it Important to apply the VM concept in Construction?

The answer is obviously "yes" and lies in the basic reason for holding a VM study; to add value to a process, proposal, project or system. Adding value is generally understood to be achieving an increased level of functionality with no additional cost or achieving the same functionality for less cost. Value can also be added through a higher level of investment that results in a disproportionately higher level of functionality.

One way of defining cost is "the investment required to achieve a functional outcome". Value, on the other hand, entails the size of investment required to achieve a functional outcome. A lower investment to achieve the same outcome is thought to be good value. It follows that acquisition of a function can cost anything but there is generally only one cost that represents best value.

Traditional VM for construction contracts has traditionally focused primarily on cost reduction. This fixation on cost has led to the perception that VM is essentially a cost cutting methodology rather than one that focuses on true value improvement. Cost reduction tends to infer a reduction in project scope and/or performance. True value improvement for construction projects requires that cost and performance are given equal consideration.

Value, in its broadest sense, is the benefit to the project client – that is, the project is worth doing and can be quantified as real benefits in business terms. In this respect, value means ensuring that the right choices are made about obtaining the optimum balance of benefit in relation to cost and risk. VM provides a structured approach to the assessment and development of a project to increase the likelihood of achieving these requirements at optimum whole-life value for money.

VM in the Malaysian Construction Industry

VM has been widely practiced in countries such as the United States, the United Kingdom, Australia and Hong Kong. There is some evidence of VM applications in the Malaysian construction industry; it is, however, still not so in demand due to the lack of knowledge and awareness of its applications. In fact, VM can be considered still in the infancy stage in Malaysia as only a small number of construction projects have been known to apply VM so far (Ong,2003).

Key messages about VM

VM is about enhancing value and not about cutting cost, although this may be a by-product. The principles and techniques of VM aim to achieve the required quality at optimum whole-life cost during the process of developing a project, *i.e.* VM aims to maximise project value within time, cost and quality constraints. However, it should be recognised that improving whole-life project value sometimes requires extra initial capital expenditure. The key differences between VM and cost reduction are that the former is:

- Positive, focused on value rather than cost, seeking to achieve an optimum balance between quality, whole-life cost and time
- Structured, auditable and accountable
- Multidisciplinary, seeking to maximise the creative potential of all project participants (including the client) working together as an integrated project team

Value methodologies can be applied during any stage of a project's development cycle, although the greatest benefit and resource savings are typically achieved early in development, i.e. during the conceptual stages. Hence, the early implementation of VM in a large construction project is recommended for reaping greater value and business benefits.

Conclusion

Although lean construction principles are related in some ways to VM, the latter is a more structured, systematic and integrated approach to eliminate unnecessary costs and to achieve better value from the construction project or any products, facilities, systems and services where the formal value methodology is applied. Risk management is interrelated to both lean construction and VM, and they are a continuous process throughout the procurement and construction lifecycle. Due to the constraints of space and time, the author has excluded risk management from both the topics, although it is an integrated part of the whole scope. ■

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