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## Communication protocol for implementation of Target Value Design (TVD) in building projects

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### Abstract

One of the main objectives of Lean Construction is the generation of value for all building project stakeholders. Based on this approach, value can be generated by reducing the cost of products or services delivered and/or by improving the performance or satisfaction of participants involved in the project. The Target Value Design (TVD) is a Lean tool that enables the design to meet such an important purpose. The objective of this article is to present a protocol for the implementation of the TVD during the Project Definition and the Lean Design in building projects with a particular emphasis on office and housing construction.

For such purpose, a Value Stream Mapping is presented including the most important areas intervening in a building project. Through the use of flow charts, the various stages and activities are shown from the point in which the project idea arises up to the stage where plans and technical specifications are submitted. These charts display the moments when the best opportunities take place to add value by eliminating waste, reducing lead time, optimizing costs, and/or improving the quality of products. Along with the charts, a cost structure following the same sequence as that of the design process is also shown, which allows economic valuations at any stage of process development. This prevents the frequent need for re-work that results from having such cost available just at the end of the whole design process.

The contribution of this study is to provide the project design team with this protocol together with its corresponding cost structure. We are sure this will be useful for promoting the TVD implementation during the Project Definition and Lean Design phases, which may be subject to improvements or customized for each project case.

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## 1. Introduction

During the construction project definition and design phases, there are great opportunities to generate value for the benefit of all project participants; however, our experience in this field shows that these opportunities are not being taken advantage of.

This problem arises because designers develop their work flow in an isolated way and with very little interaction; they work sequentially and; finally, because some designers ignore the detailed work of their other colleagues. A work flow mapping of each design area will be helpful as a protocol in order to avoid rework, and it will identify the times when information exchange is necessary to maximize value. Additionally, a construction cost structure with a similar pattern will permit to make economic valuations at early stages, thus ensuring the objective cost and objective value of the project.

In order to understand what the TVD is, it is important to know what the Value Stream Mapping and the Target Costing are. They are defined as follows.

## 2. Value Stream Mapping (VSM)

The Value Stream is a set of interconnected actions—either adding value or not—that are necessary to manufacture a product or perform a service [1]. As stated by Rother and Shook [2], the Value Stream Mapping is an essential tool for identifying and understanding the production chain. Furthermore, the VSM aims at enabling the identification of waste sources such as excessive inventories, reworks, lack of information in the process, activities that do not add value, as well as unnecessary work [3]. Likewise, the VSM helps to identify opportunities for improvement and further actions to generate value [4].

The main objective of the VSM is to visually show how the production system under study works. The use of this tool helps to visualize the flows within the system going beyond the analysis of its processes separately. Instead of only showing any loss in the system, it indicates the source of it, and contributes to connect Lean concepts and techniques, which eventually prevents the use of Lean tools individually without adopting the philosophy in the organization [1]. A VSM is developed in the following three stages:

- Preparation: At this stage, the mapping limits and team are decided. Here, it is important to ensure the company has a clear understanding of the client's needs and what value means to him [5].
- Implementation: The current value stream or chain mapping is conducted during this stage. Here, it is very important to set the objectives leading to the elaboration of the VSM, in other words, what outcome is expected and what can be improved. Simple symbols should be used in order to make the process easy to understand.
- Follow-up: At this stage, an ideal value stream map is proposed, as well as the process to achieve such value [5].

## 3. Target Costing (TC)

Target Costing (TC) is a management tool that involves putting in order, adjusting, and assembling the activities of the organization and their relevant costs in order to achieve a profit level in accordance with the targets set by the Management Department [6]. Understanding the TC is an essential step to know how the Target Value Design works since the TVD results from the TC adjustment to construction [7].

This approach includes radical changes when compared to traditional costing. First of all, the market is the element that directs cost planning. Second, design plays a very important role in projects, aiming at preventing losses and waste in the whole design and implementation processes. Finally, costs are determined by multidisciplinary teams, and suppliers start having a significant role at early stages of the project [6]. This relationship is clearly explained through Equation 1 proposed by Clifton et al. 2004 [8]:

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