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Proposal of Performance Indicators for the Design of Housing Projects

Pablo Orihuela^{a,b*}, Santiago Pacheco^b, Jorge Orihuela^b

^a*Pontificia Universidad Católica del Perú, Lima 15088, Perú*

^b*Motiva S.A., Lima 15073, Perú*

Abstract

In general, every project should have indicators that monitor compliance with established goals. In construction projects, there is a large number of indicators proposed by many researchers; however, an analysis of the state of the art shows a frequent confusion between Result, Process and Leading Indicators.

This article presents a proposal of these three types of indicators for the design phase of housing projects, based on indicators proposed by the same authors in a previous research.

Thus, all project stakeholders can have a Control Panel that will monitor if an indicator exceeds the limits, thereby allowing taking corrective actions in a timely and effective manner.

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1. Introduction

After project execution, every project requires Result Indicators to confirm if the goals set at the beginning were met. These indicators will serve as feedback for future projects and to complete the continuous improvement cycle. Furthermore, just as the crew members of a ship need to know throughout the journey if they are on the right course, the project team needs Process Indicators to make sure that the project—during its development—is moving towards the expected goals. In that way, if we are diverting from those goals, we can make necessary and timely corrections.

* Corresponding author. Tel.: 51 1 2211093.
E-mail address: p Orihuela@motiva.com.pe

As these indicators are obtained a certain period of time after execution, they are known as post-mortem; thus, it is necessary to use Leading Indicators which will help achieve the expected goals.

The review of the current state of indicators in the construction sector shows that it is usual to mistake these three types of indicators in literature. For this reason, this article proposes a Control Panel with a Result Indicators group oriented to building projects, and it then develops the Process and Leading Indicators for the Design Phase.

2. Current State of Performance Indicators in Construction

Performance measurements in the construction industry have been carried out under different approaches over the last two decades [1]: (1) Enterprise performance measurements, (2) Project performance measurements, and (3) Benchmarking Programs. Besides this classification, the indicators used in such measurements can be divided into Result Indicators, Process Indicators and Leading Indicators.

2.1. Enterprise and Project Indicators

Enterprises used to be evaluated using financial and accounting indicators until the introduction of the Balanced Scorecard [2], in which user, innovation and internal processes indicators were taken into account [1]. Additionally, enterprises are based on projects and they have their own indicators to measure the level of compliance with established goals; nevertheless, a better differentiation between Process, Result and Leading Indicators is needed.

2.2. Result Indicators

Result Indicators seek to evaluate goal achievement or the achievement of expected results. The report on them must be submitted to the project owner and the top management [3]. They can refer both to internal results (at the end of each phase) and final results (at the end of the project).

2.3. Process Indicators

Process Indicators seek to measure the development of activities related to the necessary processes to obtain the final product, which is a building in this case. In other words, they seek to evaluate the steps to reach the goal, such as design, construction, planning and procurement [3].

2.4. Leading Indicators

Leading Indicators are related to proactive or preventive actions; they can be used as predictors of future performance levels of any project's aspect [4,5]. In other words, Leading Indicators measure variables that are known to be related to certain Result and Process Indicators [6]. However, unlike these indicators, which are post-mortem, Leading Indicators can be timely measured to take corrective actions.

2.5. Benchmarking Programs

Benchmarking is a tool to identify the performance in all kinds of enterprises and projects, and it is also used by construction companies [7]. Benchmarking programs are divided into internal benchmarking, when it comes to projects within the same company, or external benchmarking, which refers to other companies or other projects from other companies [8].

In any case, benchmarking programs should be carried out using Result Indicators, since Process Indicators are not definitive and may lead to wrong comparisons.

Some examples of these initiatives are the UK Construction Key Performance Indicators (2000); the National Benchmarking System for the Chilean Construction Industry developed by the Technological Development Corporation-CDT (2001); the US CII Benchmarking and Metrics developed by the Construction Industry Institute - CII (1993); and the *Sistema de Indicadores de Qualidade e Produtividade para a Construção Civil-SISIND* from

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