



API TOOL: AN APPROACH TO CONSTRUCTION SITE MANAGEMENT ASSOCIATED TO VALUE ADDED, PRODUCTIVITY AND INNOVATION

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ABSTRACT

Considering the efforts in the implementation of simplified tools for managing and controlling productivity and innovation in the construction industry in Latin American developing countries, especially in small and medium-sized enterprises, in order to meet quality and value-added requirements in construction sites, this article illustrates the API Tool as an approach to management: A proposal for implanting productivity and innovation steps in construction sites, searching for possible paths for the sector to allow their improvement, in times of increasing productivity and competitiveness in the global economy.

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INTRODUCTION

The construction scenario in Latin American developing countries

The construction sector plays an important role in the economy of Latin American developing countries, with direct participation in the GDP and acting on an extensive productive chain of suppliers, commercialization services and maintenance (SINDUSCON, 2015). The sector has undergone major changes in recent years, facilitated by factors such as the resumption of public investments, the creation of laws that facilitate the construction of real estate, investments and funding of external resources.

However, the sector faces problems of productivity that can meet the growth needs of the sector. According to the World Economic Forum (WEF, 2015), even with the economic growth of the last years, an analysis of industry productivity in Latin American economies identifies the low levels of productivity of the workers in relation to other countries. The aspects of lack of skilled labor, nonconformity, low quality, high tax burden, outsourcing and informality of the workforce were not adequately addressed and resolved. The construction industry seeks an alternative managerial model with direct and facilitated vision and objectives focused on value added and productivity to support small and medium-sized enterprises.

Considering also the financial instability and the constant political-economic difficulties faced by Latin American developing countries, it is observed that foreign investors, due to their good practices of compliance, have acquired participation

in companies that can show good governance and that have Capacity to grow in the medium term, especially medium and small companies that have a reasonable stock of certificates and, preferably, good traffic with important customers (UNGOR, 2016).

In parallel with today's management technologies and models, innovation is proving to be an important alternative in the construction industry. There is broad consensus on the role of innovation as a major source for countries' economic growth (DEMIRDÖĞEM & IŞIK, 2016). The relationship between innovation and economic growth has been demonstrated by several studies over several decades that have found positive correlations between various measures of innovative performance and economic growth (ARCHIBALD & PRADO, 2014).

Proposal of actions based on productivity and innovation available

A control option is planning is through actions based on productivity and innovation available in the company or in the market, which is known to those involved.

The productivity control associated with the value added in the activity and the innovations available in the company can be managed in the construction industry through the API Tool. It is a proposal for simplified control of the priority actions to be provided by the company, focusing on productivity optimizations in the most significant items of significant value added, which have alternatives and / or innovative solutions available in the company or in the market. Figure 1 illustrates the proposed API Tool, as shown.

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Actions based on available productivity and innovation				API Tool					
Productivity ↑	Productivity ↓	Productivity ↑	Productivity ↓	<table border="1"> <tr><td>Priority</td></tr> <tr><td>Important</td></tr> <tr><td>Regular</td></tr> <tr><td>Good</td></tr> <tr><td>Ideal</td></tr> </table>	Priority	Important	Regular	Good	Ideal
Priority									
Important									
Regular									
Good									
Ideal									
Added Value ↓	Added Value ↓	Added Value ↑	Added Value ↓						
Innovation ✓	Innovation ✓	Innovation ✓	Innovation ✓						
Productivity ↑	Productivity ↓	Productivity ↑	Productivity ↓						
Added Value ↓	Added Value ↓	Added Value ↑	Added Value ↓						
Innovation ×	Innovation ×	Innovation ×	Innovation ×						

Figure 1 Proposal of a management tool that identifies priority actions based on productivity, associated with added value and available innovation - API Tool.

For the application of this model, a simplified graphic arrangement is elaborated from positive and negative indicators of the parameters: productivity, added value and innovation.

An action priority indicator is presented, where it can be observed that the activities with low productivity and high value added have greater importance in the improvements to be implemented. The other actions are classified as important, regular, good and ideal. And, they are organized in the same indicators in descending order of priorities.

From worksheets to job productivity and value added, options for implementing improvements through innovative solutions known to those involved and applicable to processes are indicated. It is a simplified option especially for companies that are unfamiliar or specialists in project management, but need to be guided by indicators for decision making in the planning and development of processes.

The main objective is to suggest the adoption of decision-making that adopts the productivity and added value associated with the parameters and using methodologies already tried by the involved ones. Making the actions available to professionals is more pleasant beginning and does not change the daily routine of professionals. In Brazil and other developing countries of Latin America, especially in the construction industry, it is observed that the traditionally high margin of gains and coefficients of safety make global control, which makes it difficult to act in Gaps. With the globalization and advent of information technology expanded today, the industry needs transformation, which is felt especially in times of economic challenges, as today.

For analysis and classification of activities will be necessary to know the productivity and financial value of reference considered in the work. The productivity measure is classified as low or high, and must be periodic and constant, following the units of measurement provided in the spreadsheets and technical memories of the company, allowing the identification of the actual amount produced by the workers and their staff in carrying out the activities. The value added considers the value of financial importance through the unit values or critical path of relevant interference of the observed activity. The innovation stage is adopted from the identification of the critical path of the importance of the analysed activities. An analysis and discussion of the available techniques, materials and processes and

knowledge among those involved in the process should be made and is classified as available with an alternative of improvements in identified bottlenecks and priorities. It is emphasized that innovation in this model is a new action that seeks different results through practical actions. And not an invention or model unheard of in the construction industry. From these elements and classification, periodically manage the classification of activities and results obtained from the actions implemented.

The proposed API Tool approach can be expanded and consider the context of sustainability or other topics that the company can reconcile its management objectives, as shown in Figure 2:

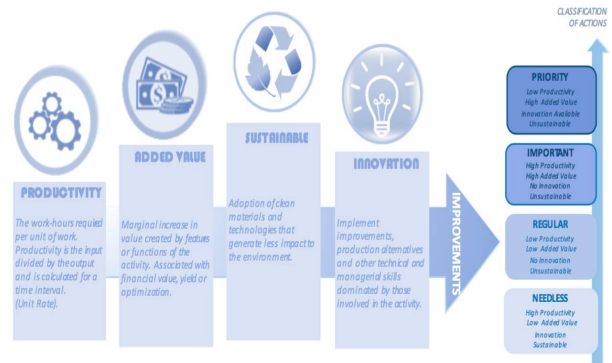


Figure 2 Magnification option in the API Tool approach

CONCLUSIONS

The control and practice of productivity of workers, staff and construction site, priorities of actions, available innovations and results obtained in the implementation of actions are important parameters to be considered in the next projects and constructions, and plan needs, for a search for continuous improvement in the process. It is proposed adoption of decision-making that adopted the productivity and added value associated with the parameters and using methodologies already tried by the involved ones.

Construction performance needs to be less volatile and susceptible to national change. Although there are crises in the Latin American and world scenario, the real growth of construction can make this sector become more solid. Social security incentives and laws that improve the condition of corporate earnings and consequent social improvement of workers and society.

The Latin American developing countries needs to overcome difficulties and restore growth in order to converge with the socioeconomic pattern of developed countries. It is of the utmost importance for construction firms to increase competitiveness, which depends on raising productivity and developing innovative technological capabilities.

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