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## Agile PM and BIM: A hybrid scheduling approach for a technological construction project

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### Abstract

This paper introduces synthesis of the Agile Project Management and Building Information Modeling in construction industry and its practical application with the accent on economic incentives of their implementation as the most significant factor. The executed synthesis of both concepts' features leads to the representation of the general process of integration, thereby the general development of integrated product and process model for addressing the on-site management phase of a construction project. That is when Building Information Modeling technology plays a key role in Agile method not only as the technological container for information model of a construction project, but as a new construction approach bringing in the additional benefits described in the literature.

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### 1. Introduction

The effort of shortening construction project duration usually increases the complexity of the project, creating real problems for the project team. The main problems arise in the relationships between the project's phases and reactions to changes during the project period. Also most overlapping techniques - such as concurrent engineering, parallel engineering, phased construction, fast-tracking, flash-tracking, and agile project management - reduce the time from the start of construction of separate parts of the project to completion [1,2,3,4,5]. This happens because the reduction of the investment process duration in the construction process is the major component in the whole

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control system. First, the changes and instability in the market conditions together with the exposition of considerable funds for the project represent a great risk for the Investor. Secondly, the reduction of the project realization terms involves the reduction of the period of a recoupment and improvement of some other indicators of economic efficiency of the projects.

Naturally, the Investor is interested in a faster start of the project operation for an earlier return on investments and subsequent receipt of the profits. Designers and Contractors are also guided by the similar reasons. Therefore all used guidance systems are subordinated to the idea of acceleration of turning of the capital. The integral purpose of schedule compression techniques consists in the decrease or the reduction of the project duration. In such projects in which schedule compression techniques and BIM processes and tools have been simultaneously involved, the Investor and the General Contractor can achieve considerably important economic advantages. The reason for the usage of schedule compression techniques is clear enough and is supported by the possible economic gain [6]. The reason that BIM is used in our case is the requirement for the optimization of existing project delivery. To be more exact the project requirement was for higher quality in design/construction and the elimination of rework [7,8] (Figure 1).

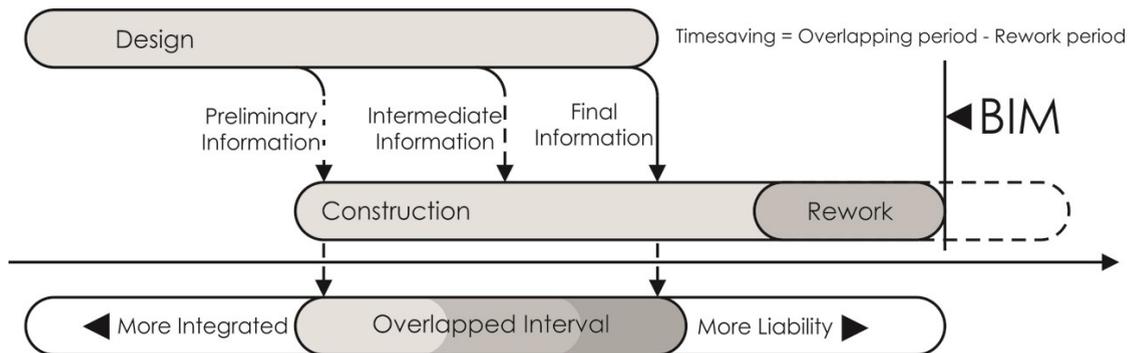


Figure 1: The role of BIM in the mechanism of activity overlapping. Source: Own elaborations.

In this paper, we present a real world concept of compressing the project schedule by running design and construction phases simultaneously based on an Agile approach for the schedule compression. By contrast to traditional approaches, Agile's approach assumes that the detailed design specification can be improved with intensive Investor, Designers and General Contractor collaboration during the process. This approach requires two kinds of plans: longtime (complete project realization) and short-time (iteration) plan [9].

Building Information Modeling technology plays a key role in the Agile method not only as technological container for information model of construction project [10,11], but as new construction approach bringing together the other additional benefits described in the literature [12,13,14]. As a consequence, during project planning phase, these two methods collect the essential information inside Building Information Models for the longtime plan (i.e. design features allocation to the stages). After project planning is finished, the Building Information Model only collects more detailed information on the design features of the next iteration of the given project realization stage to stage the short-time plan.

## 2. Synthesis of the approaches towards an integrated product and process model

Agile and BIM definitely have things in common. It will be logical to use the best practical experience of both concepts not only for fast-tracking a project but for profound mapping-out and monitoring of the whole process of integrated construction model and each stage of preconstruction, design, construction and post construction studies.

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