Challenging electronic procurement in the AEC sector: A BIM-based integrated perspective

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\textbf{A B S T R A C T}

The AEC sector has been lagging behind other sectors in the adoption of e-procurement. Building Information Modeling (BIM) is changing the way companies in the AEC sector are working, providing new processes for collaboration. This paper describes how the BIM combined with the Model-Driven Architecture, Service-Oriented Architecture, and Cloud Computing may challenge e-procurement in the AEC sector. It presents the application of the SOA4BIM Framework in the context of electronic procurement and describes an industrial research case study for validation of the proposed approach in the conception and design phases of building/construction projects.

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1. Introduction

Procurement activities are quite intensive and important in the Architecture, Engineering, and Construction (AEC) sector, and occur in the different phases of any building/engineering project. Procurement can be of products or services that are highly structured, standard, or of routine nature. This type of procurement has been the main target of existing electronic platforms, namely the e-procurement systems and particularly e-marketplaces. These systems have proved to provide positive impacts in the supply chain management and the particular e-marketplaces. Procurement, through the use of the BIM and the convergence of recent technological architectures.

Recent developments in the use of Information and Communication Technologies in the AEC sector, namely the Building Information Modeling (BIM) approach promise to introduce major changes in visualization, coordination and planning processes of the building/engineering projects. However, a review of the literature reveals that no efforts have been directed to the application of BIM for e-procurement. Hence, this paper seeks to provide a new conceptual approach for e-procurement, through the use of the BIM and the convergence of recent technological architectures.

2. Electronic procurement in the AEC sector

2.1. The procurement process

The generic concept of “procurement” supports a delivery-relationship between buyers and sellers. Being a broader scope than “purchasing,” procurement involves strategic activities such as sourcing, negotiating with suppliers, and coordination with R&D \cite{1}. Procurement can be divided into two phases: contracting and settlement. The contracting phase consists of sourcing and availability to promise, and the settlement phase consists of transaction and delivery. Sourcing is the search for requirement information of goods/services, and availability to promise is the information flow with a supply chain, that is, the availability of goods and the shipping arrangement. This information flow usually acts as an exchange of information within the functions of quotation and negotiation. Transaction is the payment of goods/