BIM Analytics for QTO and Planning Management during the Construction Phase

MAURICIO MORALES

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Abstract

During the lifecycle of a construction project, decisions are made by stakeholders in all project stages that will define the path for the development of the building asset. Due to the absence of controlled and centralised information to be accessible for decision-making processes, many of these decisions are not supported with data, but based on the experience and intuition of leaders without a tangible fundament that supports the decisions process. Based on quantity information obtained through digitalization and BIM processes, it is possible to generate structured databases to create automatised analytics to be implemented for a better assessment of the variables involved in a decision and be able to make data-driven decisions to optimise the outcome of these resolutions.

Quantity information can be the link between the technical solution and the construction strategy and associated production costs. This study is focused on the required structure of information needed to implement a complete BIM-based Quantity Take-off (QTO) that can be used to query relevant data and apply BIM Analytics based on quantity information, to support stakeholders to make data-driven decisions. Main challenges, existing standardisation initiatives and solutions offered by software frame a State of the Art presented in this document that intends to give a notion on the level of implementation BIM-based QTO

nowadays. Five professionals involved in decision-making processes for the AECO Industry supported this study with their professional knowledge to identify how quantity information can be used to support data-driven decisions and with proposals to overcome the main challenges in the generation of the structured information. The application of four case studies explains the process to link modelled-based QTO and BIM Analytics based on quantity information focused on four types of decision-making processes: Progress Tracking, Value Engineering, Change Management and E-Procurement. Information requirements, levels of information need, required classification of data and main considerations were framed based on literature review, on the implementation of case studies and on the knowledge of participant professionals to guide stakeholders for the required structurization of information, generation of databases and BIM Analytics to support decision-making and make data-driven decisions.

During this dissertation, the development of an assessment tool was achieved. This tool centralises the most relevant information into controlled and interactive dashboard templates customized for each one of the addressed decision-making processes. By the implementation of this user-friendly and open format tool, stakeholders can assess the variables that influence a decision, in order to make data-driven resolutions that justifies the choices done and optimises results. Moreover, this tool is able to create records and statistics of the decisions done in a project and the information contained in it to be used in future projects. Furthermore, this implementation serves as a basis to continue these kinds of developments in favour of the improvement of Project Management and Business Intelligence for the AECO Industry.

Dissertation:

Link for full text

Presentation video:

https://youtu.be/Rpll9yvd_zs

doi: 10.5281/zenodo.7263283