

Procurement and digitalization for Portuguese construction works contracts: a BIM-integrated analysis

Summary

Public Procurement presents several challenges, such as lack of efficiency, validation of evaluation criteria, lack of innovation, and technical consulting. These gaps are particularly challenging in the procurement of public construction works contracts, where the stakes are high, and the potential impact on public infrastructure is significant. Introducing digitalization, namely through the Building Information Modelling (BIM) methodology, into the construction procurement process can help some of these challenges.

The main objectives of this PhD thesis are to develop a multicriteria decision analysis process, based on the MACBETH method, to support the evaluation of public tenders, including BIM criteria (objective 1); to explore the introduction of BIM requirements in Portuguese tender documentation for public and private construction works (objective 2); and to suggest improvements to the procurement of construction works guidelines, specially focusing on innovation/digitalization (objective 3). For objective 1, a multi-criteria decision analysis process for evaluating public tenders that incorporates BIM criteria will be developed. This will be achieved through a comprehensive literature review, identifying key criteria through a Delphi study and expert interviews, developing a framework for evaluating tenders that combines quantitative and qualitative measures, using MACBETH to support multi-criteria decision analysis, testing the framework with real-world case studies, and making recommendations for future cases. For objective 2, a literature review on BIM implementation in construction procurement processes, ISO 19650, and other relevant international standards will be conducted. Practical experiences of BIM implementation in construction projects will be assessed, and recommendations for the best practices in integrating BIM requirements in tender documentation will be provided. For objective 3, a comprehensive literature review and data collection through case studies and interviews with relevant stakeholders will be conducted. The collected data will be analyzed, and gaps in European and Portuguese public procurement implementation will be identified, along with recommendations for potential improvements.

The study's results are replicable for private procurement, where public procurement clauses are frequently used as a reference for documentation, benefiting both the public and private sectors. Conducting a study in this domain is crucial to support decision-making, improve efficiency, and ensure better outcomes for both sectors.

Keywords

Public procurement, construction, digitalization, Building Information Modelling (BIM).



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Period

2023-2025

Funding

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