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Developing a Web-Based Tender Evaluation System Based on Fuzzy Multi-Attributes Group Decision Making for Nigerian Public Sector Tendering

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Abstract : Public sector tendering has traditionally been conducted using manual paper-based processes which are known to be inefficient, less transparent and more prone to manipulations and errors. The advent of the Internet and the World Wide Web has led to the development of numerous e-Tendering systems that addressed some of the problems associated with the manual paper-based tendering system. However, most of these systems rarely support the evaluation of tenders and where they do it is mostly based on the single decision maker which is not suitable in public sector tendering, where for the sake of objectivity, transparency, and fairness, it is required that the evaluation is conducted through a tender evaluation committee. Currently, in Nigeria, the public tendering process in general and the evaluation of tenders, in particular, are largely conducted using manual paper-based processes. Automating these manual-based processes to digital-based processes can help in enhancing the proficiency of public sector tendering in Nigeria. This paper is part of a larger study to develop an electronic tendering system that supports the whole tendering lifecycle based on Nigerian procurement law. Specifically, this paper presents the design and implementation of part of the system that supports group evaluation of tenders based on a technique called fuzzy multi-attributes group decision making. The system was developed using Object-Oriented methodologies and Unified Modelling Language and hypothetically applied in the evaluation of technical and financial proposals submitted by bidders. The system was validated by professionals with extensive experiences in public sector procurement. The results of the validation showed that the system called NPS-eTender has an average rating of 74% with respect to correct and accurate modelling of the existing manual tendering domain and an average rating of 67.6% with respect to its potential to enhance the proficiency of public sector tendering in Nigeria. Thus, based on the results of the validation, the automation of the evaluation process to support tender evaluation committee is achievable and can lead to a more proficient public sector tendering system.

Keywords : e-Tendering, e-Procurement, group decision making, tender evaluation, tender evaluation committee, UML, object-oriented methodologies, system development
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