Abstract

Mohammed Magdy Hamed H. Abdallah

Exploring the Cloud Computing Implementation Drivers for Sustainable Construction Projects—A Structural Equation Modeling Approach

Sustainability aspects should be adopted during all the decision-making stages of executing construction projects to gain maximum benefits without compromising the objective of such projects. Cloud computing has been a valuable tool for sustainable construction success in several countries over the last two decades. Cloud computing and its drivers have undoubtedly improved the sustainable success target of cost, quality, and time. However, cloud computing implementation in Nigeria’s construction industry is minimal. Consequently, the study aims to generate a decision support model to support a cloud computing implementation by looking into the relationship between cloud computing drivers and construction activities in Nigeria. This study’s data was obtained from previous literature and quantitatively augmented with a questionnaire survey. The data was obtained from questionnaires administered to one hundred and four construction practitioners in Lagos State. Thus, exploratory factor analysis (EFA) was used to validate the questionnaire survey results. However, to assess and validate the factors (drivers) constructed and analyze the relationships between cloud computing drivers and construction activities, partial least square structural equation modelling (PLS-SEM) method was used. An analysis of construction project activities was carried out through EFA, and it generated five main components: pre-contract stage, management, design and storage, estimation and communications, and finally, back-office activities. The study indicated that the implementation of cloud computing drivers had a significant impact on construction activities. The findings also revealed a weak relationship between cloud computing implementation and construction activities, with a 0.087 percent impact. Furthermore, the findings indicate that human satisfaction is the primary factor influencing cloud computing deployment, followed by organization, client acceptance, and industry-based factors. The significance of the findings can be used as a reference standard for decision-makers to base their decisions on the cost efficiency of cloud computing and its capability to boost efficiency in the construction sector. This research contributes to current construction engineering management by enhancing knowledge of cloud computing implementation drivers and their implications on construction activities.