Application of decision support tool in design-build projects: a quasi-experiment with novice decision makers

Zheng Ping Lee and Abdul Rahimi Abdul Rahman
Faculty of Civil Engineering Technology, Universiti Malaysia Pahang, Gambang, Malaysia
Shu Ing Doh
College of Engineering, Universiti Malaysia Pahang, Gambang, Malaysia

ABSTRACT

Purpose
Design-Build (DB) is known as the alternative for Design-Bid-Build in the Malaysian construction industry. For DB projects, it is critical to adopt effective decision support tool to ensure the execution of a systematic decision-making technique. This study aimed to examine the impact of a decision support tool for novice decision makers to reject or adopt DB for their construction projects.

Design/methodology/approach
Literature review and qualitative input from experts identified several key-selection factors pertaining to critical success factors and design-build drivers. This resulted in the development of Decision Support Tool for Design-Build (DST-DB). A quasi-experiment, which involved 382 novice decision makers in the construction industry, was conducted to test the DST-DB quantitatively. The participants were required to compare two construction projects using DST-DB and traditional decision-making methods. Multivariate analysis was performed to analyse all collected data.

Findings
The quasi-experiment data suggests that DST-DB enables significantly higher usability, likelihood, precision, confidence and satisfaction rate when compared to the traditional decision-making process. The pre- and post-surveys indicated that the DST-DB is effective in improving decision-making performance through selection factors of client-briefing, maximised resources and sharing expertise. The participants also agreed that DST-DB is easy to use and helps them to gain better understanding of the decision-making process for construction projects.

Originality/value
This research contributes to the existing body of knowledge through the impact of DST on the decisions of novices. The novice decision makers found that DST-DB is practically adaptable and comparatively effective for decision-making process than traditional decision-making methods. This contributes to the practical application of construction companies to provide DST-DB training to the fresh graduate employees to enhance their competencies in the decision-making process.

KEYWORDS: Construction; Decision-making; Design-build; Multivariate analysis; Project management

DOI: https://doi.org/10.1108/BEPAM-06-2021-0085

REFERENCES

Adnan, N., Nordin, S.M., Rahman, I. and Noor, A. (2018), "*The effects of knowledge transfer on farmers decision making toward sustainable agriculture practices: in view of green fertilizer technology*", World Journal of Science, Technology and Sustainable Development, Vol. 15 No. 1, pp. 98-115, doi: 10.1108/WJSTSD-11-2016-0062.

Ahmad, I., Azhar, N. and Chowdhury, A. (2019), "*Enhancement of IPD characteristics as impelled by information and communication technology*", Journal of Management in Engineering, Vol. 35 No. 1, 04018055, doi: 10.1061/(ASCE)ME.1943-5479.0000670.

Alashwal, A.M., Fareed, N.F. and Al-Obaidi, K.M. (2017), "*Determining success criteria and success factors for international construction projects for Malaysian contractors*", Construction Economics and Building, Vol. 17 No. 2, pp. 62-80, doi: 10.3316/informit.947540931153180.

Aljohani, A., Ahiaga-Dagbui, D. and Moore, D. (2017), "*Construction projects cost overrun: what does the literature tell us?*", International Journal of Innovation, Management and Technology, Vol. 8 No. 2, p. 137, doi: 10.18178/ijimt.2017.8.2.717.

Antoine, A.L., Alleman, D. and Molenaar, K.R. (2019), "*Examination of project duration, project intensity, and timing of cost certainty in highway project delivery methods*", Journal of Management in Engineering, Vol. 35 No. 1, 04018049, doi: 10.1061/(ASCE)ME.1943-5479.0000661.