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Lean and value engineering hybrid methodology: establishing a selection framework

Gumede, Nosipho

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Abstract

Background: The evolution of Continuous Improvement methodologies is manifest in several ways: formalisation of activities, spread across disciplines and the formation of hybrid methodologies. The focus of this research was in the third mode of evolution, hybrid methodologies – specifically, the hybrid methodology formed by combining Lean and Value Engineering.

Purpose: This study explored the implementation of Lean and Value Engineering via three types of models, namely Interchangeable Use, Concurrent Use and Integrated Use models. The objectives of this study were to determine the variations of Interchangeable, Concurrent and Integrated Use models that are present in Lean and VE hybrid methodology literature, determine the principles that are associated with these three types of models and establish a model selection framework based on the model principles.

Methodology: The objectives of this study were achieved by employing a Systematic Literature Review Methodology (SLRM). The SLRM search strategy involved the search of both grey and peer-reviewed literature using four search methods (free-text, manual, citation and bibliographic searching) to locate relevant papers from 17 multidisciplinary literature sources. 12 481 retrieved records were screened by title, 292 were screened by abstract and 82 papers were screened using full-text screening methods. The application of a set of the *inclusion/exclusion* criteria resulted in the selection of 24 relevant papers. These papers were analysed and classified by sector, author profession, publisher and document type. Furthermore, the papers were critically appraised based on applicability, validity and reproducibility factors.

Findings: The results analysis revealed that the majority of the included research was conducted in the manufacturing industry and the majority of the papers were written by academics. A total of 26 (2 Concurrent, 3 Interchangeable Use, and 21 Integrated Use) hybrid models were obtained and analysed. The analysis resulted in 31 findings, these findings were utilised to develop a Lean and VE hybrid model selection framework. The established framework does not only guide decision-making but it also indicates the types of initiatives that the models can be *selected* for, the *order* in which Lean and VE model components can be arranged, the areas and conditions in which the models can be *utilised* and the *purpose* that can be achieved through the model application. The framework structure is comprised of coded attributes that make it adaptable to Multi-Criteria Decision Methods and digitalization.

Contribution: This research is valuable to researchers, scholars, and practitioners. It reports on the current state of the body of knowledge on Lean and VE hybrid methodology, it proposes a hybrid selection model that is intended to guide implementation and facilitate empirical research, and it adds structure to Lean and VE hybrid methodology implementation by proposing a systematic approach for hybrid model implementation.