Sustainable Success Framework of Value Management/Value Engineering in Malaysian Public Housing Projects: Research Methodology

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This paper presents the research methodology used in current research to examine how Value Management (VM) or Value Engineering (VE) is applied in the Malaysian construction sector. After scrutinising the methods used by past researchers from 2015-2023, many methods were identified, such as quantitative, qualitative, and mixed methods. To achieve the goals of this study, a quantitative technique is chosen for the research. First, an extensive literature review was done to gather the variables, and semi-structured interview was conducted for the pilot study on developing the main questionnaire. Then, the main survey using questionnaire is carried out to get in-depth information on the VM methodology and its implications for Sustainable Success (SS) in Malaysian public housing projects. Finally, the VM/VE framework is then validated by a questionnaire from experts. A proposed framework for VM/VE that is suggested for usage in the Malaysian context and can be used by the key stakeholders in construction is the anticipated outcome of this research. Thus, by having an appropriate research methodology for the study, the future framework may improve the provision of urban planning and smart cities, focusing on social, economic, and environmental considerations.

1. Introduction

Smart city development has progressed beyond the simple application of intelligent technology and now requires the proper integration of social, economic, and environmental factors to achieve sustainable living. Few studies have looked at happiness as a representation of residents' quality of life, even though it could be the key to sustainability (Chen, 2023). There are requests to increase productivity and measures to reduce costs while raising the quality and improving the sustainability of residential projects, particularly those constructed by the government (Paz et al., 2020). Sustainable housing with a focus on sustainability and affordability aims to meet three primary goals: economic, environmental, and social (Adabre and Chan, 2019). In order to address the housing scarcity issues, Malaysia's government launched a number of public housing programmes, including Rumah Selangorku, Perumahan Rakyat 1 Malaysia (PR1MA), Perumahan Penjawat Awam Malaysia (PPAM), and Rumah Mesra Rakyat (RMR) (CIDB, 2019). However, the government is having trouble achieving sustainability in the development to produce enough public housing (Ibrahim, 2020). In place of this, Kineber et al. (2021) emphasised that VM is widely used and recognised as a useful tool for improving project performance and increasing sustainability for the client. Aghimien et al. (2018) further support the idea that VM may be used as a technique to produce a sustainable early stage of construction. This paper aims to develop a framework for SS in VM/VE with appropriate research methodology. According to Marhani et al. (2018), sustainable construction in Malaysia is very important. Hence, by having a proper research methodology, the outcome of this study is hoped to improve Malaysian urban planning and deliver smart cities to citizens by acting upon the sustainable VM/VE framework.

2. Methodology

This paper focused on the research methodology to provide significant data on VM studies in Malaysian public housing projects. It involved three variables: VM implementation as an independent variable, SS as the dependent variable, and the mediating variable VM CSFs. It explores the research approach used to attain the ongoing study goals.

2.1 Identification of research variables

The systematic literature review method used to find, assess, and summarise current research studies that are pertinent to a particular research question or topic. The keyword of 'value management', 'value engineering', 'sustainable public housing' and 'sustainable construction', and other search filter is used to searches on electronic databases (such as PubMed, Scopus, and Web of Science). To reduce publication bias, it is also crucial to look for grey literature, such as conference proceedings, dissertations, and reports that related to VM/VE studies. All the sources in online database had been filtered and chose from trusted and reliable parties to ensure the quality of the data. Once the variables collected, a pilot survey was undertaken prior to the main questionnaire design to assess the importance and comprehensiveness of the relevant variables (Li et al., 2011). The survey included five participants chosen from Malaysian construction industry that knowledgeable about the research issue. Participants were asked to assess if the compilation of factors comprised an appropriate number of variables and whether other prospective variable factors may be added or removed from the list. After the pilot survey, the relevance factors were checked and finalised.

2.2 Review of recent research methods in VM/VE studies

Recent research from 2015-2023 from previous researchers employed a variety of research methodologies, such as qualitative, mixed methods and quantitative, of specified building projects, as shown in Table 1, 2 and 3. To strengthen the reliability and validity of this research, recent research has been selected. The more recent the references, the more likely it is that they represent the most precise and in-depth comprehension of the subject. A total of 42 past research studies were analysed. As a result, 31 studies have adopted a quantitative methodology based on population and sampling to allow for a more straightforward answer and analysis (Hayatu, 2015). Meanwhile, 5 researchers have used a qualitative method based on a specific group or case study to gain a better knowledge of VM/VE (Yanita and Mochtar, 2018). Furthermore, 6 mixed-method approaches were used to gather more comprehensive data and increase the accuracy of the result (Williamson, 2018).

Table 1: Qualitative research methods by past researchers.

Research Method	Authors	Research Area	Country
Qualitative	Bennett and Mayouf (2021)	Activities	United Kingdom
	Muhammad et al. (2016)	Activities	Malaysia
	Jaapar et al. (2018)	Activities	Malaysia
	Yanita and Mochtar (2018)	Activities	Indonesia
	Aghimien and Oke (2015)	Awareness	Nigeria

Table 2: Mixed method research methods by past researchers.

Research Method	Authors	Research Area	Country
Mixed Method	Sharma and Srikonda (2021)	Activities	India
	Farouk et al. (2021)	CSFs	Egypt
	Kim et al. (2016)	Barriers and CSFs	Malaysia
	Muhammad et al. (2019)	Barriers	Saudi Arabia
	Madushika et al. (2020)	Key Performance Indicators	Sri Lanka
	Kineber (2021)	OPS	Egypt

Table 3: Quantitative research methods by past researchers.

Research Method	Authors	Research Area	Country
Quantitative	Li et al. (2022)	Activities and barriers	China
	Thneibat et al. (2021)	CSFs	Jordan
	Yassin et al. (2022)	Activities	Malaysia
	Hwang et al. (2015)	CSFs and risk	Singapore
	Aghimien et al. (2022)	Barriers	Nigeria
	Lin et al. (2022)	Activities	Malaysia
	Othman et al. (2020)	Activities	Egypt
	Jiya et al. (2023)	Barriers	Nigeria
	Araszkiewicz (2020)	Activities	Poland
	Mohamad et al. (2021)	Activities	Egypt
	Othman and Abdelrahim (2020)	Activities	Egypt
	Kissi and Boateng (2015)	Barriers	Ghana
	Nebojsa Surlan, Zoran Cekic (2016)	CSFs	Western Balkans
	Ganiyu and Jacob (2020)	Barriers	Nigeria
	Aigbavboa et al. (2016)	Barriers and CSFs	South Africa
	Tanko et al. (2018)	Activities and CSFs	Nigeria
	Tanko (2018)	Activities, barriers, and CSFs	Nigeria
	Alsolami (2022)	CSFs	Saudi Arabia
	Hayatu (2015)	Barriers	Nigeria
	Kissi et al. (2016)	Barriers	Ghana
	Mohamad Ramly et al. (2015)	CSFs	Malaysia
	Elhegazy (2020)	CSFs	Egypt
	Ogunsemi (2018)	CSFs	Nigeria
	Aghimien et al. (2018)	Barriers	Nigeria
	Luvara and Mwemezi (2017)	Barriers	Tanzania
	Oke and Aghimien (2018)	CSFs	Nigeria
	Aghimien et al. (2018)	Benefits	Nigeria
	Othman (2015)	Overall Project Success (OPS)	Malaysia
	Abdullah (2018)	OPS	Malaysia
	Khodeir and El (2019)	Barriers	Egypt
	Abd Karim et al. (2017)	Awareness	Malaysia

3. Discussion

The methodology can vary based on the suitability of the study. According to Reiter et al. (2011), the fundamental elements in selecting any research technique are the research questions, the current body of knowledge on the subject researched, and the researcher's access to data. The authors believe that regardless of the method used, it should be appropriate for achieving the goals of the research study. The research strategy for this ongoing research is to overcome the issue of sustainable public housing and may enhance urban planning and smart cities in Malaysia, where public housing in Malaysia will have a balance value of social, economic, and environmental.

3.1 Research design

In the design of this ongoing research, the quantitative method will significantly contribute to developing new knowledge of VM/VE. Methodology trends by past researchers show that many studies adopt quantitative methods as their research design. The choice of method should consider the advantages and disadvantages of methods, the research questions, and the nature of the study. Consequently, this research is divided into two stages; semi-structured interviews for the preliminary study and quantitative for the main surveys. The preliminary study by semi-structured interview is to develop the main survey questions from experts in VM/VE before proceeding to the main survey. According to Williamson (2018), preliminary study interview to develop the main questionnaire is essential because it allows the experts to check the level of accuracy of the survey result and critique the questionnaire's effectiveness. The quantitative technique is efficient and considered a well-structured method for research that consists of variables (Sekaran and Bougie, 2016). However, Queiros et al. (2017) argued that data reliability for the quantitative method relies highly on the quality of responses and the survey structure. This is where the preliminary study takes part to ensure that the questionnaire structure is

reviewed and altered based on the experts' comments. As a result, a quantitative method is justified for this research.

3.2 Research phases

Figure 1 shows the three phases of research that have been designed to ease the research flow. In the first phase, an extensive literature review was carried out using related keywords to identify past studies' issues, trends and gaps. After that, a preliminary study was conducted using the semi-structured interview with selected experts in VM/VE mainly to gain a better view of VM/VE in the Malaysian construction industry for questionnaire development. In the second phase, the main survey using a well-structured questionnaire is distributed to the respondents. Based on a stratified random sampling design by Sekaran and Bougie (2016), the targeted respondents are registered construction stakeholders such as architects, engineers, quantity surveyors, and others related to the construction industry. The construction stakeholders are considered the person that can give reliable data since they have direct or indirect knowledge of VM/VE and also public housing. After that, the survey data will be analysed using the PLS-SEM software for framework development. According to Hair et al. (2019), PLS-SEM is a modelling strategy approach for analysing route models or frameworks that is already accurate and does not require qualitative data. The VM/VE framework is then validated and expert feedback by using questionnaires. Finally, the improvement or enhancement will be considered based on the group of experts' feedback. The ultimate goal of this research is a framework for VM/VE that is appropriate for the Malaysian context and can be used in public housing projects to improve urban planning and create a better quality of life by acting on the three pillars of sustainability.
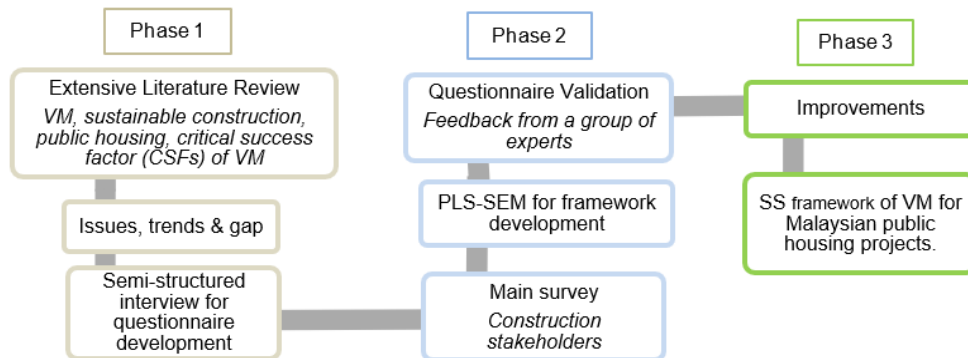

Figure 1: Research Methodology by Phases.

4. Conclusions

This ongoing study is intended to investigate ways to improve urban planning and smart cities in Malaysia by attaining SS in public projects through developing an SS framework for VM/VE. This study has outlined the appropriate approaches to meet the current research's aims. Research methodologies and sampling methods techniques was adequately justified. Based on the analysis of past researchers, most of them, which recorded 31 out of 42 studies, adopted the quantitative method from 2015 until 2023. From the analysis, the quantitative method can be considered a reliable method for this study. Making predictions, establishing facts, and testing already-stated hypotheses are the goals of quantitative research. It looks for evidence that either confirms or refutes an established hypothesis. It examines and supports previously developed hypotheses regarding how and why occurrences occur. Researchers should carefully choose the methodology for their study based on their data and the nature of the study. Hence, this study used a positivist methodology since the data were quantitative and objective. Because it focused on gathering and analysing data in numerical form, a quantitative technique was employed. On the other hand, there are three common methods used in social science research, and there is no right or wrong in choosing the method itself. To better understand the research methodology for creating a framework that might enhance the provision of urban planning and smart cities, more research is required to examine the methodologies involved in other research methods, such as case studies and experiments. Thus, this paper can give a significant contribution to other researchers on what method they want to use based on this study and recent previous studies from many countries.

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