ENHANCING VALUE IN PUBLIC CONSTRUCTION PROJECTS: THE MALAYSIAN JOURNEY

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ABSTRACT

There is a strong demand to improve the capacity and effectiveness of the construction industry. The evidence suggests that VM has become a powerful management tool to identify the best options for achieving a greater value for money. The issuance of EPU Circular No.3 in 2009 imposed mandatory VM as a management tool to achieve value for money for public projects amounting MYR 50 million and above. The purpose of this paper is to unveil the journey in institutionalizing VM in planning and implementation of public construction projects in Malaysia, with emphasis on exploring the achievements of VM workshops. Content analysis was conducted to investigate the level of applications, supported by case studies into five workshops. The case studies involved observations and semi-structured interviews with various stakeholders. To date, a total of 268 VA workshops were conducted, with the total estimated cost of MYR 70 billion for various projects such as healthcare, educational, industrial, and recreational. Next, the paper discusses three major aspects of the workshop's outputs; the gross floor area model, the cost model, and the efficiency model. The outputs represent the optimization and value added achieved by the VA workshops to increase the likelihood of delivering values into public construction projects. The findings presented in this paper not only shed light on the current development of the VM applications but also provide the benchmarking data to improve future VM workshops.

INTRODUCTION

The construction industry development is complex and multidimensional where it's involved various interrelated and multifaceted components (Ofori, 2000). Ofori further argued that the impact of globalization may affect the development of the industry to meet the economic demand for infrastructures and facilities. Hence, there is a strong demand to improve the capacity and effectiveness of the industry with unrelenting challenges on issues such on productivity, quality, and efficiency in dealing with limited resources and labor forces (Ibrahim et al. 2010).

The evidence suggests that Value Management (VM) has become a powerful management tool that is proactive, creative, problem-solving or problem-seeking service that maximizes the functional value of a project by using structured, team-oriented exercises with reference to the client's value system (Male et al. 1998). Another essential point, Fong (2003) claimed that VM may improve accountability, feasibility and thoroughness of a project and achieve greater value for money in project implementation.

The purpose of this paper is to unveil the journey in institutionalizing VM in planning and the implementation of public construction projects in Malaysia. The purpose is achieved by emphasizing and exploring the achievements of VM workshops. Content analysis was conducted to investigate the level of applications, supported by case studies into five workshops. The case studies involved observations and semi-structured interviews with various stakeholders.

The findings shared in this paper are part of research to develop a performance management framework for VM implementation in the construction industry. The framework could benefit stakeholders through performance benchmarking and promoting a learning organization culture.

PUBLIC CONSTRUCTION PROJECTS AND VM IN MALAYSIA

Capital funding is crucial in developing infrastructure that caters to the needs and ensures the wellbeing of the citizenry. However, scarcity of funds has always been the major challenge for the government. With a steady GDP growth of 5.7% in the past five years, Malaysia spent an average of MYR 49.2 billion annually for development expenditures, which accounted for an average of 20% of annual budgetary allocation.

The development of VM within the construction industries of other countries such as the USA, UK, and Australia was supported by each government through public driven projects. Building off this example, VM was introduced by the Malaysian government as part of its initiative to increase the transparency of the public project execution. More importantly, VM enables the government to manage and control capital funding efficiently.

However, practices between countries vary and reflect social and cultural differences, as well as project delivery systems. Within public projects in Malaysia, Mohamad Ramly et al. (2015) reported that VM is applied in three stages: value assessment (VA), value engineering (VE), and value review (VR), at different interventions into the project cycle that is applicable to any project of MYR 50 million or more as specified in the Economic Planning Unit (EPU) Circular No.3, 2009. To complement, VM implementation guidelines were published in 2011 to provide detailed guidance to all stakeholders (EPU, 2011). Two special units were also formalized to oversee the implementations of VM within the EPU and the Public Works Department (PWD). The government had the supported by key players such as the Institute of Value Management Malaysia (IVMM) and the Construction Industry Development Board (CIDB) that were working in together in organizing a series of training venues and conferences to disseminate knowledge about VM theory and practices.

A total of 268 VA workshops with the estimated cost of MYR 70 billion have been conducted so far for various projects such as healthcare, educational, industrial, and recreational. However, the case studies described in this paper involved five VA workshops. Each VA workshop aimed to finalize the project's scope and estimated cost in order for the government to allocate necessary funding for each project. A VA workshop is conducted in six phases: *information*, *function analysis*, *creativity*, *evaluation*, *development*, and *presentation* and lasts for five days (40 hours) as per SAVE VM job plan (SAVE, 2007). All major stakeholders are invited to participate in the workshop, and includes the client, end users, implementing agency, technical departments, local authority, and consultants as well as the contractor (if they have been appointed).

PROJECTS PROFILE

Project one (P1) involved the development of tertiary education facilities for 1200 students by adopting a compact design concept to deal with constraints on the site topography. Project two (P2) is the redevelopment of an aging commercial complex to increase the comfort level and overcome the problem of high maintenance costs. Project three (P3) is the development of a 76-bed district hospital to overcome the shortage of hospital beds within the localities with substantial estimated costs to cater for upgrading surrounding infrastructure facilities. Project four (P4) involved the development of an indoor cycling facility to support development programs for cycling athletes and to host international championships. The construction methods and technology were identified as critical issues because the facilities will be the first of its kind in the region. Finally, project five (P5) involved the development of a manufacturing hub for small and medium size enterprises. Uniquely as compared to others, the proposal for this project has obtained planning permission and building plans have been approved by the local authority.

FINDINGS AND DISCUSSIONS

Data were collected through self-observations and were reaffirmed based on the outputs of each workshop. Three quantitative variables that can provide definite comparison were used to compare the accomplishment of each workshop and are described as follows and summarized in Table 1:

Gross Floor Area (GFA) model

A significant reduction of the GFA was identified in P4 at 66.3% while the GFA for P5 remains. Other projects, P2, P1, and P3 have a reduction of GFA at 35.9%, 27.4%, and 14.7% respectively. Significant reduction in P4 was achieved through consolidation between all stakeholders into the schedule of area (SOA) prepared by the design architect. Input and justifications from the end users helped the workshop to scrutinize the SOA based on the identified functions of each provided area. Although the GFA was reduced significantly, the workshop believed that the remaining floor area can serve the basic functions with necessary secondary functions to ensure the functionality of the facilities.

It was the same observations for the other workshops of P1, P2, and P3. The SOA in each project was revisited based on the agreed project's functions identified during the *function analysis*. As an example, the number of meeting rooms provided in P1 was reduced as the workshop found that the demands of usage are not that high. Hence, the concept of sharing facilities was encouraged to maximize the utilization. P3 adopted the same concept where the staff facilities will be shared by two medical wards and located at a strategic location.

Meanwhile, the detailed designs for P5 were completed prior to the workshop and obtained approval from the local authority. Hence, the workshop decided to not revisit the SOA as it may force the team to submit another application to the LA for the approval.

Cost Model

Estimated cost for P1 and P4 were reduced significantly at 50.7% and 50.4% respectively. Meanwhile, P2 and P5 recorded an acceptable reduction of 15.9% and 8.1% respectively. In contrast to the others, only P3 showed an increase of 2.2% of estimated cost after the workshop.

It was observed that the significant reduction of P1 was due to major changes in the overall concept design, going from a scattered design to a compact design. The new compact design primarily focused on a single academic building with several support buildings. As such, the major costs for infrastructure works were avoided. Meanwhile, a significant reduction of the GFA for P4 as previously discussed contributed to a lower estimated cost. This is because the cost estimate was prepared based on the GFA during the initial design stage.

The revised project's scope, after the *information* phase of the workshop for P3, caused an increase in the estimated cost. The original scope was reinstated and includes the staff quarters and associated works. The workshop was informed by the mechanical and electrical engineering consultant that the insertion of staff quarters may affect not only the GFA, but also the associated cost of mechanical and electrical works, as well as the infrastructure works. Although reinstatement of the quarters has caused an increased GFA and the cost, the overall estimated cost was balanced by the reduction of floor area when the workshop found that the medical planner overestimated the allowance for a circulation area.

Efficiency model

Based on the total time spent during the *creativity* phase recorded during the observations, it was found that each workshop spent an average of 540 minutes for idea generation with an exception for P5.

P2 was found to be the most efficient in idea generation when the participants spent at least 5.3 minutes per generated idea, and 7.8 minutes per evaluated idea. Meanwhile, P5 seemed to be less efficient with 8.2 minutes per generated idea and 12.9 minutes per evaluated idea, probably due to the smallest number of participants of the workshop. Of note is that the generated ideas refer to all ideas suggested by the participants during the given time while evaluated ideas refer to the finalized list of ideas after consolidation to remove any duplicated ideas. The finding may suggest that the higher number of participants may increase the number of ideas to be generated, evaluated, and recommended.

Meanwhile, recommended ideas refer to the ideas that were collectively agreed upon and recommended by all participants for implementation into the project. All recommended ideas have been evaluated through consolidation and supported by their implication to the value in financial or non-financial form. P1 achieved the best performance at 12.4 minutes per recommended idea, followed by P2 (17.8 minutes/idea), P5 (25.7 minutes/idea), and P3 (27.5 minutes/idea). P4 spent the most time at 36.2 minutes per recommended idea.

Apart from that, the quantity and quality of the ideas may be reflected by several factors such as the credibility of the participants, the total number of participants, availability of the information, and workshop facilitation provided by the facilitators. In addition, the brainstorming technique adopted during the *creativity* phase allowed the participants to contribute any ideas without any judgments from the other participants.

CONSLUSIONS

In this paper, practices of VM in planning and implementation of public construction projects in Malaysia was presented. Although it was quite recently introduced in late 2009, there were strong demands and its applications have increased significantly to comply with the circular. This paper is also showcasing how VM has been institutionalized within public organizations to meet the increasing demand for the growth of the country despite the scarcity of public funding.

This paper explored in detail the accomplishment of VM applications based on three quantitative variables that provide definite comparison. The findings suggest that VM has provided more decision space for the project team to revisit the design and to scrutinize the provision of floor area in performing its intended functions. Changes in floor area have a positive relationship with cost, where reduction in floor area will reduce the estimated cost although this will not always be the case.

As for the efficiency, it was found that VM offers a good platform for stakeholders to put their minds together for realizing the project and achieving the intended objectives. The findings also enlighten the importance of teamwork and facilitation by the facilitators to get the best out of the time spent during the *creativity* phase. In addition, the findings also enable the performance benchmarking to improve future workshops. Hence, it can be concluded that the workshop outputs have positively contributed to the value optimization and value added to the projects.

Meanwhile, furthers works have been carried out by measuring and evaluating the overall performance of VM implementations within the public projects in Malaysia. In addition, the challenges in implementing VM were identified to enable the stakeholders to understand the critical issues that they are facing at this time and for the improvement in near future.

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Variable	P1	P2	P3	P4	P5
GFA MODEL					
Differences of GFA (m^2)	(10,240.35)	(8,549.92)	(2,903.00)	(19,900.00)	(0.00)
Differences	(27.4%)	(35.9%)	(14.7%)	(66.3%)	0.0%
COST MODEL					
Differences of cost (MYR)	(152,913,500.00	(10,024,655.00)	3,291,340.00	(79,355,555.00)	(3,792,339.00
Differences (%)	(50.7%)	(15.9%)	2.2%	(50.4%)	(8.1%)
EFFICIENCY MODEL					
Generated ideas	82	107	87	69	22
Evaluated ideas	45	73	44	34	14
Recommended ideas	45	32	20	13	7
Total time	560 min	570 min	550 min	470 min	180 min
Efficiency rate					
Generated ideas	6.8 min/idea	5.3 min/idea	6.3 min/idea	6.8 min/idea	8.2 min/idea
Evaluated ideas	12.4 min/idea	7.8 min/idea	12.5 min/idea	13.8 min/idea	12.9 min/idea
Recommended ideas	12.4 min/idea	17.8 min/idea	27.5 min/idea	36.2 min/idea	25.7 min/idea

Table 1: Comparison of findings between five case studies