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Rethinking Value Management (VM) Integration Within the Strategic Phase of Construction Project Value Chain

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Abstract: This is an attempt of rethinking Value Management (VM) integration within the strategic phase of the Malaysian public construction project value chain. Currently, such strategic VM integration is not evidenced by any value study. The earliest existing VM study intervention, namely Value Assessment (VA), only takes place after the Government approves the project budget. The budget approval activity demarcates that the project has reached the 'decision to construct' point at the end of the strategic phase. This indicates a vacuum of VM integration within the strategic phase of the project value chain. This conceptual study is conducted through retrieving literature review and obtaining consultation from VM experts in the public sector. First, the study has verified the vacuum of VM integration within the strategic phase of the Malaysian public construction project value chain. Secondly, in responding to the vacuum, this study identifies the opportunity of integrating VM within the strategic phase. Ultimately, two (2) opportune VM study interventions within the strategic phase are determined. This finding describes the value studies' characteristics in terms of the study timings, main study objectives and the issues addressed by the respective VM study interventions.

Keywords: Strategic phase, project value chain, VM integration, VM study intervention, study characteristics

1. Introduction

Value Management (VM) is acknowledged as an effective methodological management style for enhancing project value (Male, Kelly, Gronqvist & Graham, 2007) and for achieving greater value for money in construction projects (Mohamad Ramly, Shen, Zahari and Embi, 2015). An intervention of VM study at an opportune timing within a project life cycle is regarded as adding an 'intellectual capital' to project delivery (Standing, 2001). A VM study intervention is capable to either align or re-align the intended value systems of the project (Male, 2006). This value adding capability of VM supports that every value study intervention within the project life cycle represents an integration of VM in the construction project implementation. The greatest value will be added in the early stages of the project life cycle because as a project progresses, its use of resources evolves and the constraints on making changes increase (OGC, 2010).

In the Malaysian Government, VM has been mandated by the Economic Planning Unit (EPU), under the Prime Minister Department since Year 2009 for achieving value for money in public construction projects worth MYR50 million and above (EPUa, 2009; EPUb, 2011; EPUc, 2015). Since a decade of implementation, VM integration exists within the Malaysian public construction projects through VM study interventions which are termed as Value Assessment (VA), Value Engineering (VE) and Value Review (VR) at different stages of a project life cycle. Those VM study interventions are respectively outlined during the project and budget assessment process for VA, at the design development stage for VE and at the operational stage for VR.

This conceptual paper sets the study background on VM integration within the strategic phase of the project value chain framework, as such from the perspective of the Malaysian public construction project implementation. As cited (Standing, 2001; Wong, Cheung and Chan, 2004; Male, 2006; Kelly, Male and Graham, 2015) the ‘value chain’ was originally introduced by Porter (1985), which refers to a series of activities how an organisation creates value for customers of projects, products or services. As adapted and shown in Figure 1.0, the framework indicates three (3) broad phases of a construction project value chain, termed as the strategic phase, tactical phase and operational phase. The framework highlights the flow of the project value chain transitions between the main phases and the linkages between the value chains. Nevertheless, the value chain framework is superimposed on the typical process flow of project activities, by means where each transitional activity is adding value to the project as it progresses (Standing, 2001, Male, 2006).

Illustrated in Figure 1.0, between the three (3) main phases of a single project value chain there are two (2) primary delineations, i.e. between ‘strategic-tactical’ and ‘tactical-operational’, which demarcate primary value transition points across the phases. The strategic phase comprises the client’s value system, while the tactical phase transmits the multi-value system, and the operational phase deals with the user’s value system. In a diverse organisation such as the public sector, a single project value chain is originated from a programme and or a portfolio of projects that inherits the strategic vision, mission and value system that need to be delivered to the client (Male, 2006; Kelly, Male and Graham, 2015). This triggers an attention on the need to strategise the project value chain from the outset (Strategic Phase) and to be kept aligned throughout the project implementation so as to maximise the value delivery in the construction project (OGC, 2010).

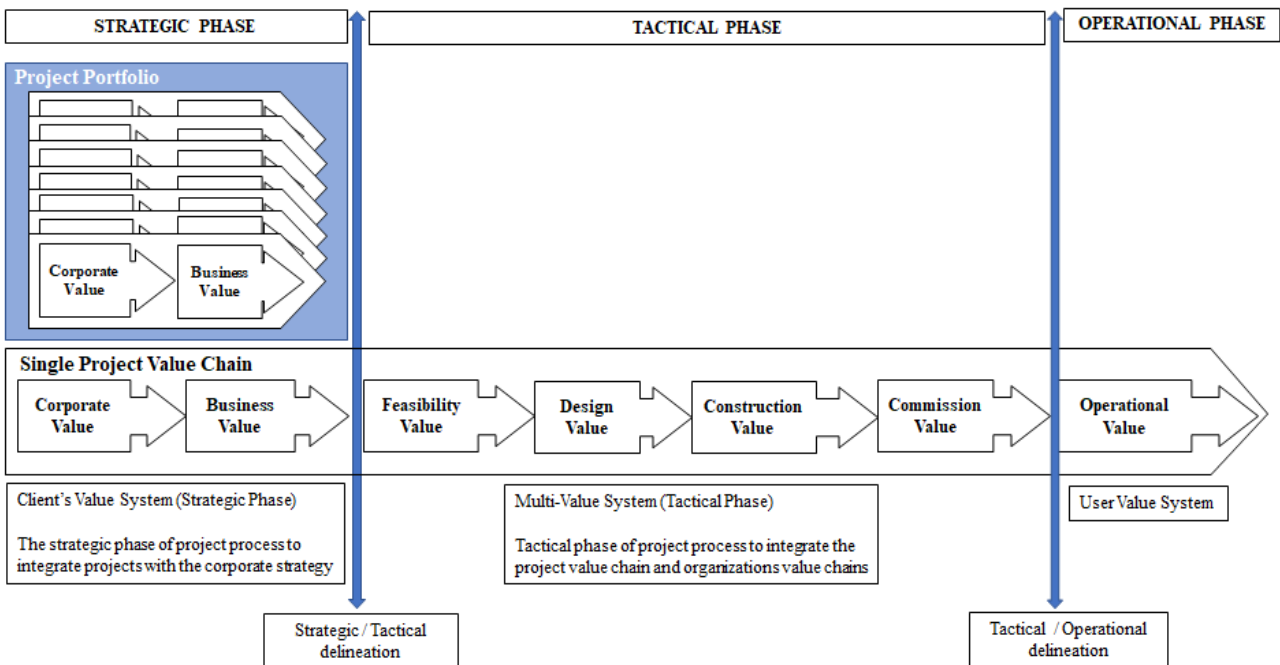


Fig. 1 - Construction project value chain (Source adapted from: Standing, 2001; Male, 2006; Kelly, Male and Graham, 2015)

2. Background

Integrating VM within the strategic phase of the project value chain is linked to the strategising integrity of the client’s value system from the outset. As the client is the primary owner of the strategic value chain, the client’s value system needs to be determined during the strategic phase. Figure 2 (Standing, 2001; Kelly, Male and Graham, 2015) illustrates the internal and external value chains that are form the client’s value system of the strategic phase of a single

project value chain. The absence of VM integration within the strategic phase may lead to an undetermined ‘value thread’ that is to be transmitted and or a misalignment of the value chain when it enters the tactical phase and operational phase. The ‘value thread’ needs to be transmitted, transformed and maintained in the management flow of value in a construction project, whether at portfolio or programme level, or as a single project.

As shown in both Figure 1 and 2, the strategic phase comprises two (2) linkages of value chains, i.e. the corporate value and business value before the ‘value thread’ is transmitted to the tactical phase and be part of the multi-value system. The corporate value often reflects the key requirements, which are to align projects with the corporate strategy within one or more programme or portfolio. It is more holistic and is concerned with its organisational different business units (Langford and Male, 2001), while the business value defines requirements that exist at the business unit level which aligns projects with the business missions and objectives (Standing, 2001; Male, 2006).

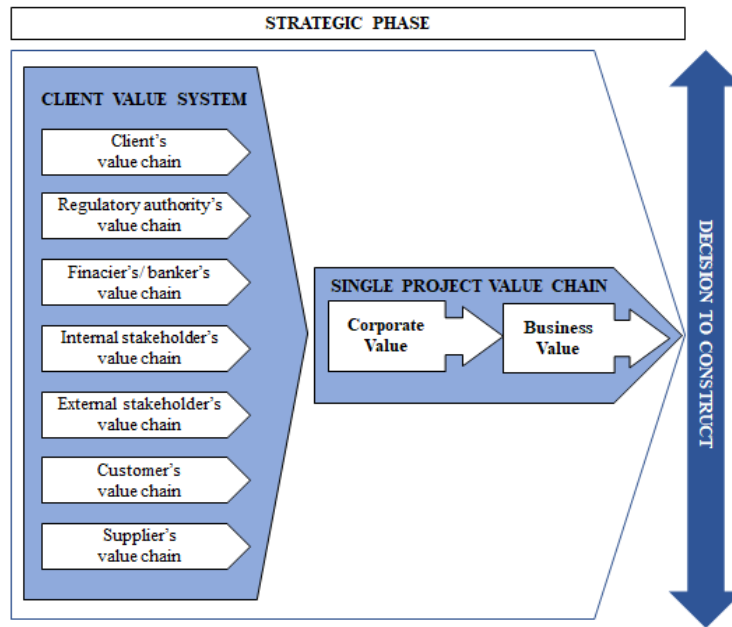


Fig. 2 - Strategic Phase of Project Value Chain (Source adapted from: Standing, 2001; Kelly, Male and Graham, 2015)

In Figure 2, the same ‘strategic-tactical’ transitional point indicates that a single project value chain reaches the ‘decision to construct’ demarcation point (Standing, 2001; Kelly, Male and Graham, 2015). Within the strategic phase, the business value is assessed against the corporate value, which is to sanction the ‘decision to construct’. As has been discussed by the authors, agreeing on the ‘decision to construct’ means a project solution has been justified as viable, as the outcome of the strategic phase and funding is made available as an investment commitment to the client. Nonetheless, the decision may be ‘not to construct’ if a project is not a viable solution to the client’s corporate strategy.

2.1 The Claim and Research Objectives

The rethinking began with investigating if there is any integration of VM within the strategic phase of the Malaysian public construction project value chain. As implemented in the public construction projects, VA study is marked as the earliest VM study intervention in the project life cycle (EPUa, 2009; EPUb, 2011; EPUc, 2015). However, it is argued whether the timing and characteristics of the VA study represent the integration of VM within the strategic phase of the project value chain. Considering the ‘decision to construct’ point as the ‘cut-off’ end of the strategic phase, it is observed that the VA study intervenes later than the demarcation point, when the client (project owner) has already secured the budget approval from the EPU.

At this juncture, it is claimed that any VM study intervention that is later than the demarcation point may have restriction on assessing- on the viability of business needs and the justification of business case (the project or asset solution) to deliver the corporate value and business value. The authors claim that the existing timing of the VA study intervention does not occur within the strategic phase of the project value chain, as has been explained earlier. As stated in the EPU’s directives on VM implementation (EPUa, 2009; EPUb, 2011; EPUc, 2015), the main objectives of the VA study are to re-actively finalise project scopes and project cost within the earlier approved budget limit.

The need of VM integration within the strategic phase of the project value chain is to profoundly strategise and align the client’s value system in accomplishing the corporate value and business value within the strategic phase. Thus, the client’s value system can be transmitted, aligned and re-aligned effectively as the ‘value thread’ throughout the project delivery life cycle. The vacuum of VM integration may indicate that the client’s ‘decision to construct’ and investment

commitment are achieved with a lack of value strategy prior to the decision-making point. Hence it is critical for the clients to integrate VM within the strategic phase of the project value chain, before the project cost budget is committed.

Thus, this conceptual study attempts to introduce a change to the public and private clients, programme or project managers and VM practitioners in integrating VM through opportune VM study intervention(s) within the strategic phase of the project value chain. The primary research objectives of this conceptual study are:

- To verify on the vacuum of VM integration within the strategic phase of the Malaysian public construction project value chain;
- To identify the opportunity of VM integration within the strategic phase of project value chain;
- To determine the characteristics of VM study intervention(s) within the strategic phase of project value chain.

3. Literature Review

Literature review is conducted to provide a better understanding that is pertinent to the study area. However the following theoretical discussions focus on these topics: 1) VM Study interventions within the construction project life cycle, including VM study interventions in the Malaysian public construction project; 2) Strategic phase of the construction project value chain, which is followed by the elaboration on the corporate value and business value, which adds to what is initially discussed under the ‘Introduction’ (Part 1.0) and the ‘Background’ (Part 2.0) of this paper.

3.1 VM Study Interventions within the Construction Project Life Cycle

Relative to this study, the critical theoretical study has focused on the available value opportunities in the construction project environment. Though there is no rigid way in determining VM study interventions within the construction project life cycle, the identifications of value opportunities by various VM documents are always useful to an organisation or a team or even to a VM practitioner who wishes to integrate VM with the management of construction projects. Various documents use different terminologies in outlining VM study intervention points within the project life cycle. In most VM documents (Male et al., 1998a; Male et al., 1998b; Kelly, Male and Graham, 2015; BS EN 12973, 2000; AS/NZ 4183, 2007; Jaapar, 2006; SAVE, 2007), the timings of VM study interventions are within the project life cycle, the study purposes and issues that are addressed have characterised the respective VM studies.

SAVE (2007), Male, et al. (1998a), OGC (2010) have emphasised that the earlier the VM intervenes, the more powerful the study will be in enhancing the project value. However as cited in The Value Management Benchmark document (Male et al., 1998a; and Male et al., 1998b), the opportune VM study may intervene when one or more of the following value opportunities arise in the project life cycle, they are:

- The need for strategic commitment;
- Project uncertainty;
- A need for capital commitment;
- An unstructured problems or opportunity;
- A convergence of information from different parties;
- A need for technical commitment.

As extracted from the various VM documents, it is evidenced that there are available VM study interventions that intend to address the relative value issues that have arisen along the construction project life cycle. In Table 1.0 below, there are various sets of value opportunities that are being presented, with different terminologies for VM study intervention points that are marked within the construction project life cycle. As indicated in the table, the potential VM study interventions within the strategic phase of the construction project value chain are highlighted.

Table 1 - Available VM study interventions (Highlights on the strategic phase’s VM interventions)

Sources:	Source:	Source:
Male et al., (1998a); Male et al., (1998b); Kelly, Male and Graham, (2015)	British European Standards of Value Management (BS EN 12973, 2000)	Jaapar (2006) - “The Prototype Guidelines of Value Management Application for the Malaysian Construction Industry”
Mapped out on the RIBA (Royal Institute of British Architects) and AIA (American Institute of Architects) Plans of Work.	Follows five project stages and adapts the manufacturing process flow in the construction process.	Represents timing or value opportunities along the project life cycle (Adapted and modified on RIBA Plan of Work)
Strategic Phase: • Pre-Brief Workshop • Briefing Workshop	Strategic Phase: • Inception • Concept	Strategic Phase: • VM1 - Pre-Brief Workshop • VM2 - Brief Workshop

<p>Tactical Phase:</p> <ul style="list-style-type: none"> • Concept Design Workshop • Charette • Detail Design Workshop • Operational Study (Construction) 	<p>Tactical Phase:</p> <ul style="list-style-type: none"> • Feasibility • Implementation 	<p>Tactical Phase:</p> <ul style="list-style-type: none"> • VM3 - Concept Design • VM4 - Scheme Design • VM5 - Elemental Design • VM6 - Post Contract Award
<p>Operational Phase:</p> <ul style="list-style-type: none"> • (No intervention) 	<p>Operational Phase:</p> <ul style="list-style-type: none"> • Use 	<p>Operational Phase:</p> <ul style="list-style-type: none"> • Further VM Study

3.1.1 VM Interventions in the Malaysian Public Construction Projects

Since VM is mandated by the Government about a decade ago, its integration in the Malaysian public construction projects is evidenced by three (3) main interventions in the construction projects that are worth MYR50 million and above (EPUa, 2009; EPUb, 2011; EPUc, 2015). They are termed as VA (Value Assessment), VE (Value Engineering) and VR (Value Review), as value opportunities at different stages of the Malaysian public construction project life cycle. VM study integration is also outlined by the Public Works Department's VM document, i.e. Value Engineering Application Guidelines for Public Projects (PWD, 2013).

The Institute of Value Management Malaysia (IVMM) also marks those VM intervention points in their National Value Management Guide (IVMM, 2018). Those VM study interventions within the Malaysian public construction project context are also discussed in other literatures such as those by Jaapar, Maznan, Ahmad Bari and Zawawi (2012) as well as Mohamad Ramly, Shen, Zahari and Embi (2015).

As extracted in the Malaysian Government's circulars and guide documents on VM implementation in public projects (EPUa, 2009; EPUb, 2011; EPUc, 2015 and PWD, 2013), the retrieved characteristics of VA, VE and VR studies are presented in Table 2 below:

Table 2.0 - The characteristics of VA, VE and VR studies

Sources: EPUa, 2009; EPUb, 2011; EPUc, 2015 and PWD, 2013

VM Study - Characteristics	VA Study	VE Study	VR Study
Timing of VM Study Intervention	VA study intervention is marked at the 'strategic planning stage' by the EPU i.e. the central agency that is responsible for approving the budget for public projects.	During development of project designs by the implementing agencies, i.e. mainly the Public Works Department (PWD) and the Drainage and Irrigation Department (DID).	During operation or use stage of the completed project by the government, the National Audit Department.
Remarks on the Timing (Clarifications)	<ul style="list-style-type: none"> The strategic planning stage is referred to the project budget assessment by the EPU, subsequent to project submissions by clients; The assessment mainly makes decision on the project budget approval to clients; VA study is implemented after the project budget approval, but prior to project execution. 	<p>Two (2) options of VE study intervention points, i.e. 1) VE on Concept Design; 2) VE on Detail Design; Or to do both where necessary.</p> <p>The VE study option is subject to the required context by client or project manager; the design development status, as when VE study is requested.</p>	As initially mandated and until further directive by the Government, the National Audit Department is to lead VR study, during use stage of the completed project / the operating asset.
Main VM Study Objectives	Finalises project scopes; and finalises project cost.	Optimises design (mainly on functionality and quality); Optimises project cost within the capped scopes and project cost (by VA decisions).	Assess achievements of the intended project objectives and outcomes; Project delivery performance; Asset usage performance.
Issues Addressed by VM Study	<ul style="list-style-type: none"> Project outcomes verification; Project objectives targets; Client's real needs (versus wants) verification; Functions and deliverables are determined; Project scopes finalisation; Project cost finalisation; Project implementation plan - e.g. Key timelines of work programme; Procurement strategy etc. 	<ul style="list-style-type: none"> Designs optimisation to functional requirements; Performance, quality criteria and technical improvements; Removal of unnecessary functions and or specifications and or costs; Project implementation plan improvements. 	<ul style="list-style-type: none"> Project objectives and outcomes realisation; Project functions and deliverables realisation; Users satisfaction and operational efficiency assessment; Lessons learned realisation; Improvements for future projects and operating asset.

3.2 Strategic Phase of Construction Project Value Chain

As illustrated in Figure 1.0 and 2.0 earlier, the strategic phase of the project value chain operates as an interfacing activity with the organisational portfolios, programmes and multi projects environment. Kelly, Male and Graham (2015) have suggested that a single project often emerges from the portfolio and programme value chains, when the client's organisation needs are to introduce strategic changes that are associated with their policies and strategies. The established client value system at the strategic phase is the primary source of the value thread (as discussed in Part 1.0 and Part 2.0 of this paper). The client's value systems of a single project value chain are concerned with achieving the corporate and business values that are derived from the portfolio, programme and project levels. Hierarchically, it stays in one or more programme that forms the overall strategic investment plan until it is ready to be triggered as a single project solution for delivering the strategic value, as illustrated in Figure 3.0 (Kelly, Male and Graham, 2015).

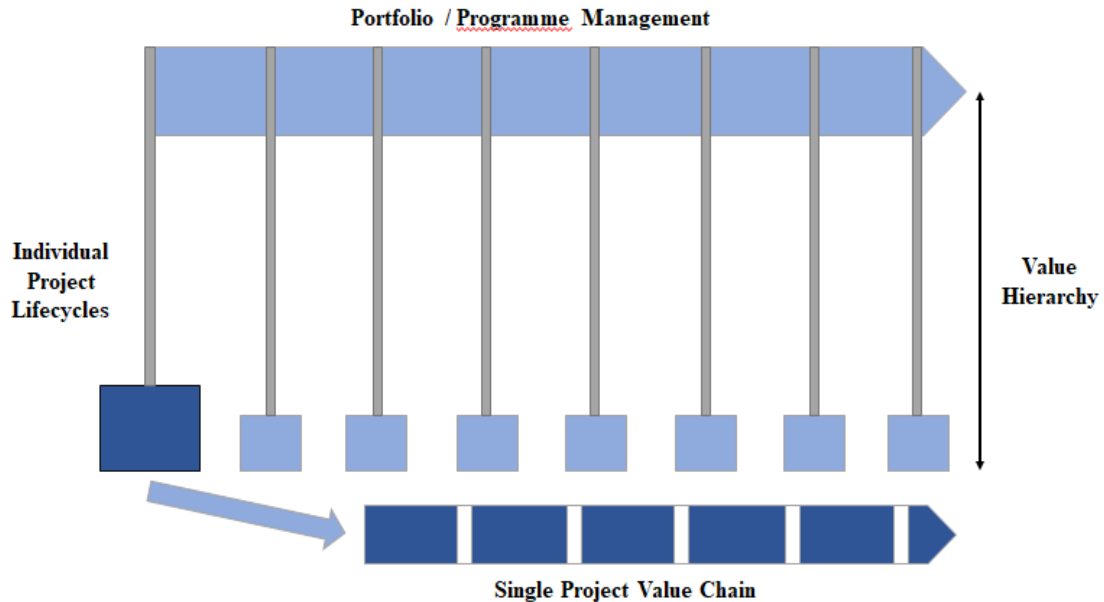


Fig. 3 - Hierarchy of project value chain (Adapted from source: Kelly, Male and Graham, 2015)

3.2.1 Corporate Value

Corporate value represents the organisational corporate objectives and strategic direction of a project. Male (2006) states that in a diverse organisation structure, the corporate value represents the value requirements that exist at the corporate level that stems from across a number of discrete business units or high-profile corporate projects. The key task is to align a project and or multiple projects with the corporate strategic direction, which is represented by the portfolio or programme value chain (as illustrated in Figure 1.0). Standing (2001) suggests that at this 'embryonic' stage, 'a project' remains as a strategic investment plan until it is realised as the solution for business case. A single project proposal should go through a series of assessments on how it can deliver the corporate value.

At this point, a project solution must be justified as viable in achieving the client's corporate strategy. But in the decision-making process, it is always to consider other alternative solutions or even the 'do nothing' option. As have been discussed by Kelly, Male and Graham (2015), the strategic decision on a project solution reflects the asset management planning, in considering whether to have an asset or a non-asset solution as the business case. If it is viable, the project or asset solution will become the client's investment decision towards achieving the corporate value.

3.2.2 Business Value

Business value within a project defines the value requirements that exist at the business unit level, which requires alignment between the project solution with the business unit missions and objectives (Male, 2016). According to Standing (2001), at this stage the project objective is defined to constantly align with the corporate value chain. The role of client's stakeholders is to challenge the initial project brief and it is expected to iterate in establishing the client's needs and requirements for the project. The project briefing is the critical activity that business value is being assessed on. At the end of the business value chain, it has to be decided whether the project is viable or not. This juncture also means that the strategic phase of the project value chain has reached the point of 'decision to construct' for the proposed project (refer Figure 2.0).

4. Research Methodology

The adopted research methodology for this conceptual paper is a combination of Literature review and Expert consultation. First, this approach attempts to achieve an indicative finding towards the rethinking, which is the vacuum of VM integration within the strategic phase of the Malaysian public construction project value chain. Subsequent to the primary finding, an effective VM integration through VM study intervention(s) is proposed within the strategic phase of the project value chain. The proposed VM study interventions are characterised in terms of study timing, main study objectives and issues addressed.

In conducting research for this conceptual paper, three (3) key questions are set as research questions (RQs), they are as follows:

- (RQ1) Is there any existing VM integration within the strategic phase of the Malaysian public construction project value chain?
- (RQ2) Is there any opportunity for integrating VM within the strategic phase of project value chain?
- (RQ3) What are the characteristics of VM study intervention(s) within the strategic phase of project value chain?

4.1 Literature Review

Primarily, literature review is conducted to obtain theoretical understanding on relative topics and to answer the pre-set RQs. In conducting this conceptual study, the literature search was purposive and more focused. Among others, the related topics of literature review that have been focused on are as follows:

- VM application in construction project;
- VM study intervention points within project life cycle;
- VM study interventions in the Malaysian public construction projects;
- Characteristics of available VM study interventions;
- Construction project value chain;
- The strategic phase of project value chain;
- Construction project life cycle activities.

The theoretical understanding from literature review triggers the claim of a vacuum of VM integration within the strategic phase of the Malaysian public construction project value chain. This initial finding sets a basis for investigating and verifying the claim through obtaining consultation from selected VM experts. The attained knowledge from the literature review also supports the rethinking proposal, which this conceptual paper aims to deliver.

4.2 Expert Consultation

The expert consultation method was performed using the same research questions (RQs). This method involved two (2) out of three (3) VM experts (the population), which represent the expert practitioners in the public sector. Based on their VM professional recognition as Certified Value Managers (CVM) by the Institute of Value Management Malaysia (IVMM) and their related working experiences in the public construction projects, they are qualified to provide consultations on answering the pre-set RQs. The profiles of the experts are presented in Table 3 below:

Table 3 - Profiles of VM experts (for expert consultation)

	VM Expert 1	VM Expert 2
1. VM professional recognition	Certified Value Manager (CVM) by the IVMM (Expert Level)	Certified Value Manager (CVM) by the IVMM (Expert Level)
2. VM related experience (years)	Nine (9) years in VM facilitation	Eight (8) years in VM facilitation
3. Professional discipline and recognition	Architect; Registered Graduate Architect with Board of Architects, Malaysia	Civil Engineer; Registered Consulting Engineer with Board of Engineers, Malaysia
4. Highest academic qualification	Advance Diploma in Architecture	Master in Project Management
5. Current designation in Public Sector	Head of Value Management Unit, Public Works Department Malaysia	Head of Technical Transformation Unit, Public Works Department Malaysia

The consultation sessions from the VM experts were performed through face-to-face discussions and followed by telephone calls, emails and text messages communication. During the sessions, the initial study finding from the literature review was discussed and verified. Subsequent to the verification, the experts' consultations were obtained in response to the RQs and in accomplishing the research objectives.

5. Results and Findings

The results from the literature review and expert consultation are presented below. Table 4.0 encapsulates the findings of both literature review and expert consultation:

5.1 Results: Literature Review

Initially, the literature review has clarified the principles of managing the construction project value chain as the background of this study. The clarification focuses on the strategic phase of the project value chain and its demarcation point of 'decision to construct' prior to project moves to the tactical phase. This theoretical evidence is crucial in highlighting the vacuum, which refers to the absence of VM integration within the strategic phase of the Malaysian public construction project. As stated in 'Part 2.1- The Claim and Research Objectives', the timing of VA study intervention indicates that no current VM study is performed within the strategic phase of the project value chain.

The critical review on literature has presented findings from various VM documents, which provides understanding on the available VM study interventions within the construction project value chain. This finding has indicated potential value opportunities within the whole project life cycle. Foremost, it highlights potential VM study interventions that represent integration of VM within the strategic phase of the project value chain. This finding (refer to Table 1.0) supports that VM integration is feasible at the strategic phase of the Malaysian construction project value chain.

Furthermore, the literature review retrieves the comparison between VA, VE and VR studies characteristics (refer to Table 2.0). The existing value opportunities within the Malaysian project life cycle are clarified based on their respective characteristics (e.g. timing, main study objectives, and issues addressed). The characteristics of the VA study do not clearly represent VM integration within the strategic phase of the project value chain, as they are debatable in addressing issues pertaining to corporate value and business value through an effective value study. Thus, this theoretical finding has answered RQ1. The literature review also supports RQ2 and RQ3, i.e. the notion of VM integration within the strategic phase of the project value chain through opportune VM study intervention timings, appropriate value study objectives and relevant value issues to be addressed by the proposed VM studies.

5.2 Results: Expert Consultation

The consultation from VM experts has verified the earlier findings of literature review and also supported the notion of integrating VM within the strategic phase of the Malaysian public construction project value chain. The preset research questions (RQs) have guided the researchers in attaining consultation from the VM experts.

The followings are among the important findings as summarised from the expert consultation method, pertaining to rethinking the current implementation of VM and obtaining guidance on integrating VM within the strategic phase of the construction project value chain:

- Based on the current practice in the Malaysian public construction projects, the earliest VM study intervention, i.e. VA study is implemented at the EPU stage, which is not at the client's stage in developing strategic and or project briefing, prior to submitting projects to the EPU for budget approval.
- If approved, the project budget approval is granted by the EPU to the clients as their investment commitment;
- Subsequent to the project budget approval (indicates the 'decision to construct' demarcation point), VA study is performed (for project that is worth MYR50 million and above) to finalise project scopes and project cost within the approved budget limit.
- There is no evidence of any VM study that has been performed at the earlier point than the EPU's budget approval process or even prior to the project budget submission by clients (project owners);
- In line with the available VM best practices references, there are potential VM study interventions within the strategic phase of the construction project value chain;
- VM integration within the strategic phase can be performed through opportune VM study intervention(s) in addressing relative issues to the strategic value chain.
- VM study characteristics (e.g. opportune timing, study objectives, issues addressed) for VM implementation within the strategic phase can be contextualised to the Malaysian public construction project value chain.
- The proposed VM study interventions represent the feasibility of VM integration within the strategic phase, which are superimposed on the typical project life cycle phases.

5.3 Study Findings

As presented in Table 4.0- Summary of Results and Findings, this study has successfully responded to the pre-determined research questions (RQ1, RQ2 and RQ3) and has accomplished the conceptual project objectives.

Table 4.0 - Summary of study findings

Research Question (RQ)	Results: Literature Review	Results: Expert Consultation	Conceptual Findings
(RQ1) Is there any existing VM integration within the strategic phase of the Malaysian public construction project value chain?	Result: No Evidences: (EPUa, 2009; EPUb, 2011; EPUc, 2015; PWD, 2013) It is mentioned in the literatures that VA study is performed during the ‘strategic planning stage’; but its intervention timing and study characteristics are still debatable in representing VM integration within the strategic phase of project value chain.	Result: No. Evidence (Experts’ views): • There is no evidence of any VM study that occurs earlier than the ‘decision to construct’ demarcation point (or not later than the project budget approval). • The characteristics of VA study (e.g. timing, study objectives, issues addressed) do not appropriately reflect as VM integration within the strategic phase of the project value chain.	Any VM study intervention that takes place later than the ‘decision to construct’ demarcation point does not represent VM integration within the strategic phase of the project value chain.
(RQ2) Is there any opportunity for integrating VM within the strategic phase of the project value chain?	Result: Yes Evidences: (Male et al., 1998a; Male et al., 1998b; BS EN 12973, 2000; Jaapar, 2006; Kelly, Male and Graham, 2015). The available VM study interventions within the strategic phase (derived from various VM literatures) support the opportunity for integrating VM within the strategic phase of the project value chain.	Result: Yes Evidences (Experts’ views): VM integration opportunity within the strategic phase of the project value chain is feasible to be performed for enhancing the corporate value chain and business value chain.	Opportunity for VM integration within the strategic phase of project value chain are identified at two (2) earliest value chains, i.e.: 1) Corporate value chain; 2) Business value chain.
(RQ3) What are the characteristics of VM study intervention(s) within the strategic phase of the project value chain?	Theoretical finding supports the characteristics of VM study intervention(s) within the strategic phase, which include the opportune VM study timings, appropriate study objectives and relevant issues that are addressed. (Male et al., 1998a; Male et al., 1998b; BS EN 12973, 2000; Jaapar, 2006; Kelly, Male and Graham, 2015).	(Experts’ views) Tangible characteristics of VM study are identified, in terms of the opportune timings, appropriate VM study objectives and the related issues that are addressed, for implementing VM studies within the strategic phase of the project value chain.	VM study characteristics within the strategic phase of the project value chain are determined by the followings: • Timings: 1) At strategic briefing; 2) At project briefing. • VM study objectives: (See Part 6.0 - Conceptual Proposal) • Issues addressed: (See Part 6.0 - Conceptual Proposal)

Based on the study findings as presented in Table 4.0, a conceptual rethink is proposed as an effective integration of VM within the strategic phase of the construction project value chain. The re-thinking outlines two (2) opportunities for VM integration, i.e. within the Corporate Value Chain and Business Value Chain. The VM integration within the strategic phase is indicated by two (2) VM study interventions, which are marked similarly on the typical project life cycle activities, i.e. at strategic briefing and at project briefing activities, respectively. These notions are further discussed under Part 6.0- Conceptual Proposal (Table 5.0).

6. Conceptual Proposal

As the outcomes of the rethinking attempt, this conceptual proposal aims to integrate VM effectively within the strategic phase of the project value chain of the Malaysian public construction. The proposed VM integration is indicated in Figure 4.0 and described under Part 6.1 through two (2) opportune timings of VM study interventions within the strategic phase of the project value chain. Also, as indicated in Figure 5.0 below, the timings of both VM studies are superimposed on the typical construction project life cycle activities, where the RIBA Plan of Work (RIBA, 2020) is adopted. Based on the notion, the characteristics of VM study interventions are described by the respective main study objectives and issues that are addressed (as discussed under Part 6.2).

6.1 Proposed VM Study Timing

Two (2) VM study interventions are introduced within the strategic phase to manage the corporate value and business value profoundly at opportune timings, which are most beneficial and appropriate for effective VM integration in construction projects. The proposed VM study interventions are marked in Figure 4.0 within the strategic phase of the project value chain, which are termed as the followings; these given nomenclatures are aimed to match the relevant construction project life cycle activities, and thus are superimposed on the RIBA Plan of Work (RIBA, 2020) as indicated in Figure 5.0:

- VM study at strategic briefing; and
- VM study at project briefing.

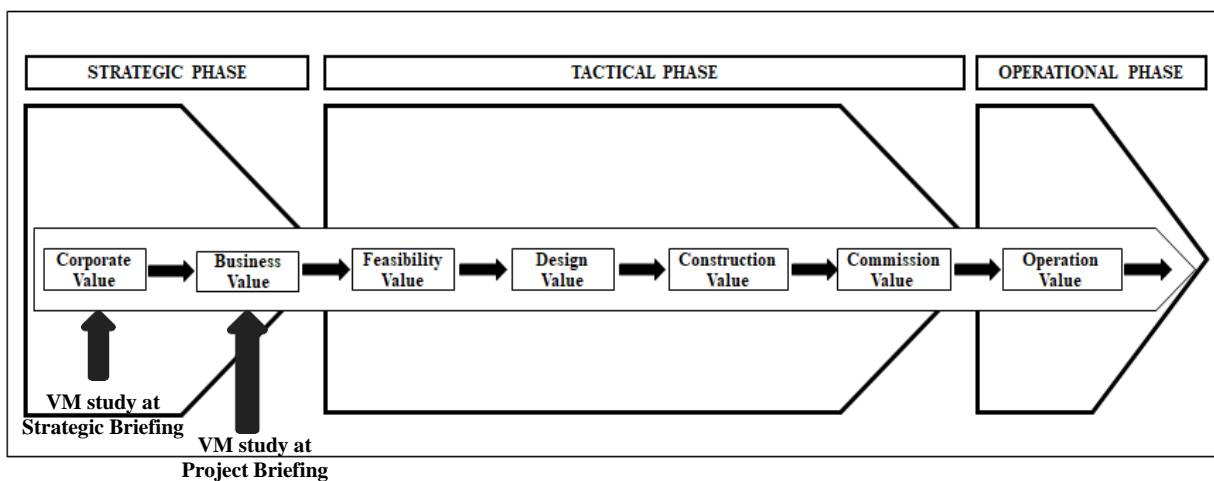


Fig. 4 - Proposed VM study interventions within strategic phase of project value chain (by the authors)

The proposed VM study interventions at the respective opportunity points aim to provide the intellectual inputs in strategising and aligning the project value chain from the outset. Hence, as superimposed on the RIBA Plan of Work (Figure 5.0 below), the proposed VM study interventions are indicated at the respective project life cycle activities, i.e. (0) Strategic Definition and (1) Preparation and Briefing, which would be benefitted by the integration of VM.

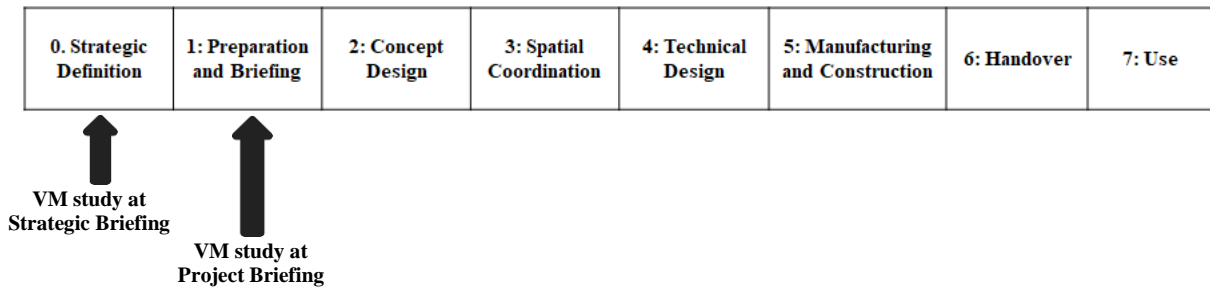


Fig. 5 - Proposed VM study interventions within RIBA plan of work (RIBA, 2020)

6.2 Proposed VM Study Objectives and Issues Addressed

The main study objectives and issues address (among others) the proposed VM study interventions, and are highlighted in the following Table 5.0, respectively. The characteristics of VM studies are derived and adapted from various VM references (Male et al., 1998a; Male et al., 1998b; BS EN 12973, 2000; Jaapar, 2006; Kelly, Male and Graham, 2015) and are also synthesised from the experts’ consultation.

Table 5.0 - Characteristics of VM study interventions within the strategic phase

VM Study at Strategic Briefing	VM Study at Project Briefing
<p>Main Study Objectives:</p> <ul style="list-style-type: none"> • Verifies strategic fit of business needs - establish outcomes; • Establishes required strategic functions; • Determines business case - a project solution or not; • Establish broad cost budget for business case. 	<p>Main Study Objectives:</p> <ul style="list-style-type: none"> • Establishes project outcomes and project objectives - which are linked with the verified business needs; • Determines project functions and performance; • Establishes scopes and elements of project; • Determines outline cost budget for all elements.
<p>Issues Addressed by Study (Among others):</p> <ul style="list-style-type: none"> • Strategic fit of business needs - alignment of corporate strategy; • Options to deliver business needs are sought- always consider ‘do nothing’ or ‘non-physical project’; • Drivers for considering a ‘project solution’ as the business case justification; • Project definition by required functions; never through built solution; • Client’s strategic needs and wants articulation; • Client’s value systems prioritisation; • Project cost budget target and implication on options; • Operating expenditure and whole life costs consideration; • Strategic risks identification and analysis; • Broad programme including phasing plan. 	<p>Issues Addressed by Study (Among others):</p> <ul style="list-style-type: none"> • Strategic decisions translation into construction terms (as project brief inputs); • Project functions and performance models are established; • Linkages between function requirements and project deliverables / design criteria; • Options on development concepts and subsystems are sought and the best option is justified; • ‘Technical project’ and performance requirements of project elements, key spaces, safety and environmental requirements etc. are specified. • Site details, including accessibility, high level flows and spatial relationships are reviewed; • Capacity (size) and configuration of the facilities are determined; • Servicing or operational requirements e.g. security, access, delivery etc. are incorporated; • Initial project cost budget estimation; • Project risk assessment and mitigation; • Options of procurement strategy are sought; • Master project implementation plan is established.

7. Conclusion

This rethinking conceptual paper first claims on the vacuum of VM integration within the strategic phase of the Malaysian public construction project value chain. The claim is fundamental, as the construction project value needs to be managed strategically from the outset of the project life cycle. The study was conducted based on the combination of literature review and expert consultation, and its three (3) study objectives achieved through accomplishing the RQs. Subsequently, the study findings have evidenced the vacuum and ultimately proposed the opportune VM study interventions, which represent the integration of VM within the strategic phase of the construction project value chain. The proposed VM study interventions, i.e. 'VM study at strategic briefing' and 'VM study at project briefing' are introduced, where the opportune VM study timings, main study objectives and issues that are addressed by the respective studies are presented. It is expected that the proposed VM study interventions are adaptable within the strategic phase of the construction project value chain, where the applications could be contextualised into the Malaysian public construction projects environment. Hence in future, this rethink will be materialised and evidenced within the strategic phase of the project value chain and will further enhance the effectiveness of VM implementation in the Malaysian public construction projects.

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