"Enhancing Value Transition Effectiveness within Design & Build (D&B) Procurement Route of the Malaysian Public Construction Projects"

(Main Author) Rohanis Ab Ghani (Sr), Public Works Department of Malaysia;
(Co-authors) Norhanim Zakaria (Dr), University of Malaya; and
Kho Mei Ye (Dr Sr), University of Malaya

Abstract:

Strategizing project procurement is one of the value adding activities along the construction project value chain. In fact, project procurement strategy usually takes place at the critical value transition point from Strategic Phase to Tactical Phase. There is a relationship between the selection of procurement system and the integrity of value transition within a construction project. Design and Build (D&B) procurement system is an increasing option that integrates 'design' and 'construct' elements under the contractor's responsibility. The value transition process within this non-conventional procurement system needs to be contextualized to its variances with the Conventional or Traditional procurement system. Furthermore, the discussion on the management of value in construction projects pertaining to value creation opportunities is more orientated to the conventional procurement route.

Firstly, this paper views the construction project value from the perspective of procurement strategy. Based on the identification of theoretical value concepts has led to the experts' verification of value variables influencing the value dynamic of procurement strategy. This finding is very much associated with the intellectual capital input to procurement strategy selection criteria and decision-making. Secondly, this paper describes the construction project value chain and critical transition points, and the relationship with procurement systems. Finally, sets on the background of Malaysian public construction projects, Value Management (VM) integration is contextualized to D&B procurement route. VM interventions within D&B project are presented as the intellectual capital inputs to stimulate effective value transition within public construction projects. The most viable Value Engineering (VE) intervention within D&B procurement route, i.e. Value Engineering on Request for Proposal ('VE on RFP') is emphasized based on its visible benefits in contributing to critical value transition from the owner/ client entity to the D&B contractor.

Key words: value variables, project value chain, value transition, Design and Build (D&B) procurement system, Value Management (VM) integration, Value Engineering on Request for Proposal ('VE on RFP')

INTRODUCTION

The construction project value chain represents the value adding activities along the project life cycle. There are several critical transition points for maximizing project value delivery the including the procurement strategy decision-making. Originated from the principle of value chain by Porter (1985), the value adding and inter-related activities enhance and/or sustain the competitive advantage of an organization or a project. In dealing with the viability of a proposed construction project, strategizing project procurement is an activity that contributes impact on value transition along the chain (Standing, 2001). There is a relationship between procurement system and how project value is transmitted along the chain. This is affected by variances in the activities along project value chain of different procurement systems; e.g. Conventional or Traditional procurement system, D&B procurement system, Public Private Partnership (PPP), Private Finance Initiative (PFI), and Management-orientated procurement system.

In managing construction project value, it is abundant of discussions orientated to the conventional procurement route. The integration of value study in enhancing value transition within the conventional project process is well applied as outlined by many Value Management (VM) guides and manuals. On the other hand, it is less focused on discussing the subject matter within D&B project procurement route.

This paper highlights the aims, objectives and methodology of the research. The subsequent part describes the identification of value variables as viewed from the perspective of construction PS. This is followed by the discussion on project value chain relative to procurement systems. The subsequent part discusses on VM integration contextualized to D&B procurement route in the Public Works Department (PWD) of Malaysia. The final part focuses on the most viable VM intervention in the PWD D&B project, i.e. Value Engineering on Request for Proposal ('VE on RFP') for effective value transition from the client/owner to the D&B contractor.

AIM AND OBJECTIVES OF THE PAPER

The primary aim of this paper is to present VM integration as contextualized to D&B procurement route of the Malaysian public construction projects, and focusing on the most viable VE intervention, i.e. 'VE on RFP' Study. The VM integration is effective in stimulating the alignment of value transition within construction project value chain. Preceding the discussion, this paper discusses on the link between procurement systems and transition of value within construction project value chain.

In line with the aim, research questions are identified and associated to main objectives:

- How VM is effective in stimulating value transition in D&B procurement route?
  - To contextualize VM study interventions to D&B-based project value chain.

- What are the merits of ‘VE on RFP’ as the most viable VE intervention?
  - To identify and verify benefits of ‘VE on RFP’ Study to D&B projects.

RESEARCH METHODOLOGY

This paper is part of a broader research, which investigates the relationship between value variables with selection criteria of procurement strategy for the Malaysian public construction projects. A qualitative method was employed in verifying theoretical value variables based on the value experts’ opinions. At latter part of this paper, the author’s observation and the preliminary survey involving the participants’ agreement are placed to verify benefits of ‘VE on RFP’ Study in D&B projects.

VALUE PERSPECTIVE OF PROCUREMENT STRATEGY

There is multiple value concepts cited in literatures as a fundamental understanding towards the management of value in construction projects. The concepts are defined by value variables representing their relationships impacting value dynamic of a project. Based on multiple theoretical value concepts adopted in construction projects, generic value variables are first identified from the literatures, i.e. function, quality, cost, satisfaction, benefits, resources, time, risks etc. As those value variables are generic to construction projects, the value experts’ opinions are obtained in verifying the identified value variables from the perspective of procurement strategy.

Ten (10) construction value experts were interviewed (from seventeen (17) identified Malaysian value experts). They are among VM expert practitioners from public and private sectors, Certified Value Managers (CVM) by the Institute of Value Management Malaysia (IVMM) and academicians with project value as their niche area. As analyzed from the interviews, fundamental findings are derived from the experts’ opinions:

- As viewed from the perspective of procurement strategy, eight (8) value variables are verified by the experts, i.e. ‘quality, function, satisfaction, benefits, cost, time, resources and risks’, as listed in Table 1.0.
- Procurement strategy selection could be assessed based on best value potential, as it is part of value transition process along the project value chain.

The verification by the value experts have led to a triangulated research using quantitative method to determine the value variables of procurement strategy, and the relationship with the selection criteria of procurement strategy. Ultimately, the research finding is expected to establish a value-based assessment method for the strategic procurement decision-making, where it contributes as an intellectual capital input sensible to the management of value for strategizing project procurement. A value-based approach to strategizing procurement strategy is essential to ensure effective value transition within project value chain.

Table 1.0 – Value Variables from Procurement Strategy Perspective

Value Variables of Procurement Strategy	Source of Theories (Construction Project Value Concepts)
1) Quality	• Dell 'Isola (1982) • EPU (2011) • Kerzner and Saladis (2009) • M Sc. Eng. ICME (2009)
2) Function	• Dell 'Isola (1982) • SAVE (2007) – SAVE International Standards • EPU (2011)
3) Satisfaction	• BS EN 12973:2000 (2000) • OGC (2010) - MoV Guide
4) Benefits	• Kerzner and Saladis (2009) • OGC (2010) - MoV Guide
5) Cost	• Dell 'Isola (1982) • EPU (2011) • M Sc. Eng. ICME (2009)
6) Time	• OGC (2010) - MoV Guide • M Sc. Eng. ICME (2009)
7) Resources	• SAVE (2007) – SAVE International Standards • BS EN 12973:2000 (2000) • OGC (2010) - MoV Guide
8) Risks	• M Sc. Eng. ICME (2009) • Venkataraman and Pinto (2008)

VALUE TRANSITION WITHIN CONSTRUCTION PROJECT VALUE CHAIN

The project value chain represents project activities superimposed on an organization's usual operating activities that add value through its own processes (Standing, 2001). As illustrated in Diagram 1, a construction project value chain is broadly divided into three (3) distinct phase or value systems namely the Strategic Phase – Client Value System, Tactical Phase – Multi Value System, and Operational Phase - User Value System (Standing, 2001; Kelly, Male and Graham, 2004). This project value chain model aims for effective management at critical transition points and throughout the chain, where project value could be optimized if the transitions could be managed effectively. The broad transition points represent how various entities with their contending value systems must interact between three (3) phases of value systems.

Two (2) most critical or namely Primary Transition Points are; first is between the Strategic Phase and Tactical Phase, and second is between the Tactical Phase and Operational Phase as illustrated in Diagram 1. According to Wong *et al* (2004), the former critical point is where the client deals with procurement strategy upon decision to construct (into the Tactical Phase). The latter critical point deals with the handover, maintenance and marketing policies of the completed facility (into the Operational Phase). There are also other secondary transitional points along the value chain that multiple entities become involved. Discontinuity of value transition can occur resulting from deviations in value systems due to influences of various entities.

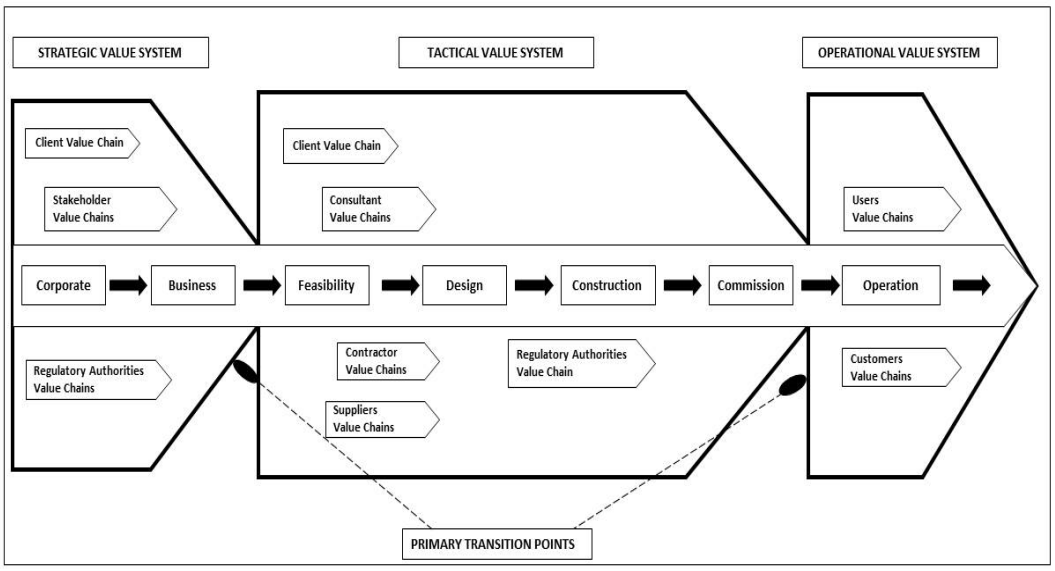

Diagram 1 – Transition Points within Construction Project Value Chain
(Wong *et al*, 2004)

There is a link between the procurement system and the project value chain, which impacting the mechanism for value transition and continuity throughout a project (Standing, 2001; Kelly, Male and Graham, 2004). Each project procurement system has different impact on the value transition activities and the entities involved. Diagram 2 illustrates the variances between three (3) distinct procurement systems impacting the project value chain; i.e. Conventional/Traditional system, D&B and PPP/PFI. As cited, the Conventional procurement system is seen as the most disruptive to the project value chain with a separation between design and construction value. D&B (contractor led design) and PPP/PFI procurement systems are more focused on integrity and continuity of value delivery with greater responsibility and risks given to D&B contractor or PPP/PFI concessionaire. Among the systems, PPP/PFI has an integrated additional requirement and liability of operating and maintaining the completed project.

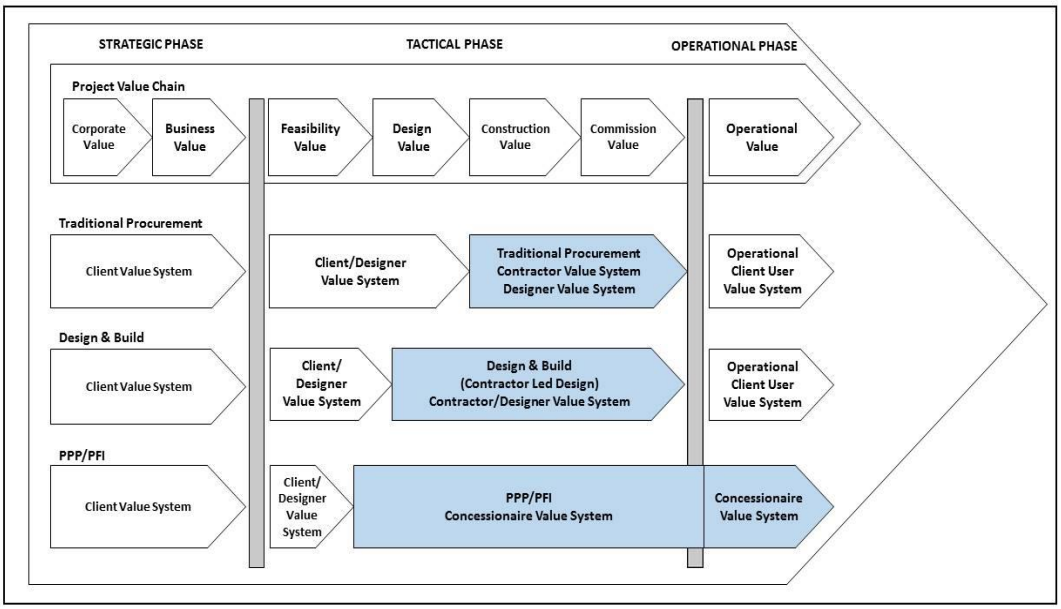

Diagram 2 – A comparison of Procurement Systems Relative to the Project Value Chain (Adapted from Standing, 2001)

VM INTEGRATION IN D&B PROJECTS

VM interventions create opportunities to add value, align and re-align value systems within the project value chain by minimizing the likelihood of a mismatch in the project delivery (Kelly, Male and Graham, 2004). Standing (2001) quoted that a VM intervention will enhance value transition by injecting an intellectual capital during the project development. Thus, based on the advantageous VM integration within project value chain, this part presents VM interventions as contextualized to D&B procurement route of the Malaysian public construction projects.

According to Masterman (2006), D&B procurement system is categorized under the integrated procurement system. This system incorporates all methods of managing the elements of 'design' and 'construct' under one organization's responsibility, usually refers to 'a contractor'. Many discussions on the procurement strategy have led to a notion that fragmented elements between 'design' and 'construct' in the conventional system has not always adequately served the needs of many clients. There are arisen issues of cost overruns, schedule delays, post contract litigation, compromised quality and adversarial atmosphere that often surround the system and have led to a better approach of procuring projects (Kirk, 1998). Thus, among significant factors of why D&B procurement system is selected by clients are its single point of responsibility, guaranteed maximum cost, minimization of design and construction risks, avoidance of conflicts and claims, and improved buildability and innovation (Bennett *et al*, 1996).

As VM application originally sets on the Traditional procurement system background, it is best to contextualize VM integration to the procurement route. Thus, for integrating VM in D&B project, appropriate interventions are contextualized with adaptation of best practices into the D&B project value chain. At critical value transition points, VM interventions will do the interfaces work efficiently and effectively in transmitting the client value system deeper into the project value chain. At Pre Tender Stage of D&B project, an intellectual capital via a VE Study intervention will stimulate the value transition from owner/client to contractor, i.e. 'VE on RFP' to review and refine inputs of needs statements and requirements prior to transmitting to the D&B contractor.

VM/VE INTERVENTIONS IN D&B PROJECT (MALAYSIAN PUBLIC PROJECTS)

Since VM is mandated in the Malaysian public construction projects worth MYR50 million and above (EPU, 2009; EPU, 2011 and EPU, 2015), VM/VE studies have been implemented in both the Conventional/Traditional and D&B procured projects. The PWD Malaysia published 'Value Engineering Application Guidelines for Public Projects' (PWD, 2013) to set standards on VE application as a subset study to VM implementation in the public construction projects. The guidelines have contextualized VE interventions within D&B project process. The following Diagram 3 highlights interventions of Value Assessment (VA)/Value Planning (VP), VE and Value Review (VR) studies within the D&B project life cycle for public construction projects.

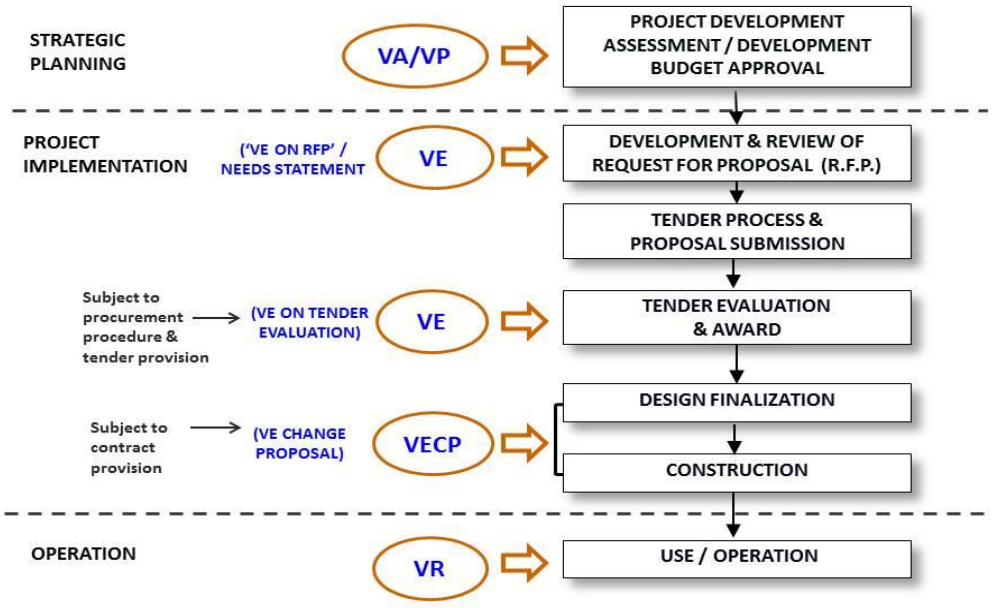

Diagram 3: VM/VE Interventions in D&B Procurement System (PWD Malaysia)
Adapted from: Value Engineering Application Guidelines for Public Projects, (PWD, 2013)

Value Assessment (VA) – Other term for Value Planning (EPU, 2011)

Same as in the Conventional/Traditional PS route, VA study for D&B project is implemented during assessment at the Strategic Planning Stage, mainly aims for project scoping and cost budget capping. In building projects, the finalized scope elements, the capped project cost, and targeted Schedule of Accommodations (SOA) and/or Total Gross Floor Area (GFA) are among VA study outputs. It is practical to include the selection of project procurement system into this strategic VM study.

'VE on RFP' Study

This pre-tender VE study is set to review or refine the D&B RFP or Needs Statement Briefs including the technical and performance requirements, preferably upon completion of RFP draft document. All accepted VE recommendations would be incorporated or updated in the RFP package as tender basis to D&B tenderers (refer the following part for details on 'VE on RFP' Study).

VE on Tender Evaluation

This pre-award VE study is meant to review and refine D&B proposal submitted by the contractor/concessionaire against the given RFP/Needs Statement. However, in ensuring transparency and equality to all competing tenderers, its application requires revision of the existing D&B tender procedure to include specific provision of VE during tender evaluation, and it is made explicit in the instruction to tenderers. The provision permits the client/agent to shortlist tenderers, interact, evaluate and perform VE against the contractor's proposal.

Value Engineering Change Proposal (VECP)

VECP intervention by D&B contractor emerges during design finalization stage and/or construction stage for further improves the cost, time, quality and build ability of the project. VECP requires a specific provision in the conditions of contract used for the tender/contract. It may result in a cost reduction and sharing of the saving between client and contractor is only feasible via a provision of an incentive based clause in the contract.

Value Review (VR)

VR is set at the Use Stage of project process during its operation starting after six (6) to twelve (12) months upon project completion, to assess the realization of intended project objectives and outcomes of government investment. Ultimately, the assessment aims to promote effective and continuous value improvement over the project life cycle and to escalate lessons learned to owners/clients in improving their planning of future projects.

‘VE ON RFP’ STUDY IN D&B PROJECT (MALAYSIAN PUBLIC PROJECTS)

Sets at Pre Tender Stage in D&B procurement route, ‘VE on RFP” Study intervention works effectively as an intellectual capital input to the D&B-based project value chain. As outlined in the ‘Manual of Practice for Value Engineering’, this best practice by Design-Build Institute of America (DBIA, 2013) is referred. Table 2 encapsulates the objective of ‘VE on RFP’ Study is to assure adequate project definition, design criteria and expectations are communicated to D&B tenderers.

Table 2 – Best Practice Reference on ‘VE on RFP’ Study (DBIA, 2013)

	VM/VE Integration in D&B Phase	Responsibility	VM/VE Study Objective
1.	During Planning/Scoping	Owner/Client	Achieve scope validation, needs identification and budgeting
2.	**During Draft of RFQ/RFP**	**Owner/Client**	**Review RFP package; Refine needs and requirements**
3.	After Selection, Before Notice to Proceed	Owner/Client	Finalize scope and price (may offer an incentive to D&B entity)

‘VE on RFP’ Study is centred on the RFP package that involves reviewing, refining and finalizing the document as D&B tender basis, which the RFP package is a substance of ensuring value transition occurs. An RFP may provide a master plan or a zoning layout, or even a concept design. This provision in the RFP involves typical VE session to review the plan/design. ‘VE on RFP’ Study is practical in translating or refining the conceptual needs and requirements into the given plan/design.

The outputs of ‘VE on RFP’ Study are the accepted recommendations that would be incorporated or revised in the RFP package. The document then becomes an improved version of tender basis in stimulating value delivery in the tenderers’ proposals as responses to the given RFP. Thus the transition of client value system to contractor value system in D&B project value chain is effective and efficient.

Benefits of ‘VE on RFP’ Study

At Feasibility Stage of the D&B-based project value chain, ‘VE on RFP’ Study is the most viable VE intervention, where it ensures the client value system is transmitted to the ‘design and construction’ value systems under the D&B contractor’s responsibility. At latter stage of the D&B-based project value chain, other VE interventions would have to deal with some limitations or constraints i.e. ‘VE on Evaluation’ and ‘VECP’ require specific provision or revision on the existing procurement procedure and conditions of contract used. The followings are visible value-adding benefits of ‘VE on RFP’ Study as observed by the author on actual applications in D&B projects (Rohanis, 2017).

- **Clarifies, customizes and aligns descriptions or statements** in the RFP briefs, pertaining scope definition, client/user needs and functional requirements, site planning, design concept, technical standards, tender requirements etc.
- **Identifies, addresses and resolves issues prior to tender,** concerning the project scope, site, master planning, design concept, technical, constructability etc.
- **Identifies and mitigates the uncertainties** that may jeopardize project value in conjunction with the project Risk Management.
- **Optimizes and verifies the project cost allocations** (construction cost and other related costs) due to possible cost implications of VE recommendations.
- **Finalizes the RFP documentation collectively;** engage all parties' responsibilities on final checking, which normally placed on Quantity Surveyor's responsibility.
- **Facilitates the evaluation on tender proposals;** based on the robust tender basis (the improved RFP) and VE recommendations on tender evaluation criteria.
- **Improves communication and issues resolution** among the project stakeholders (central agency, client, users, project team, authorities etc.)
- **Improves the whole project team cooperation and work performance** especially during the planning of D&B procurement tender stage.

Based on the preliminary survey on participants of 'VE on RFP' studies involving 42 participants from 4 client-based project teams, Diagram 4 marks high rate of agreement ("Agreed/Strongly Agreed" at 88% to 98%) by the participants on all listed benefits. The survey result has verified all the observed benefits and indicates that 'VE on RFP' Study is viable in stimulating effective value transition within D&B project value chain.

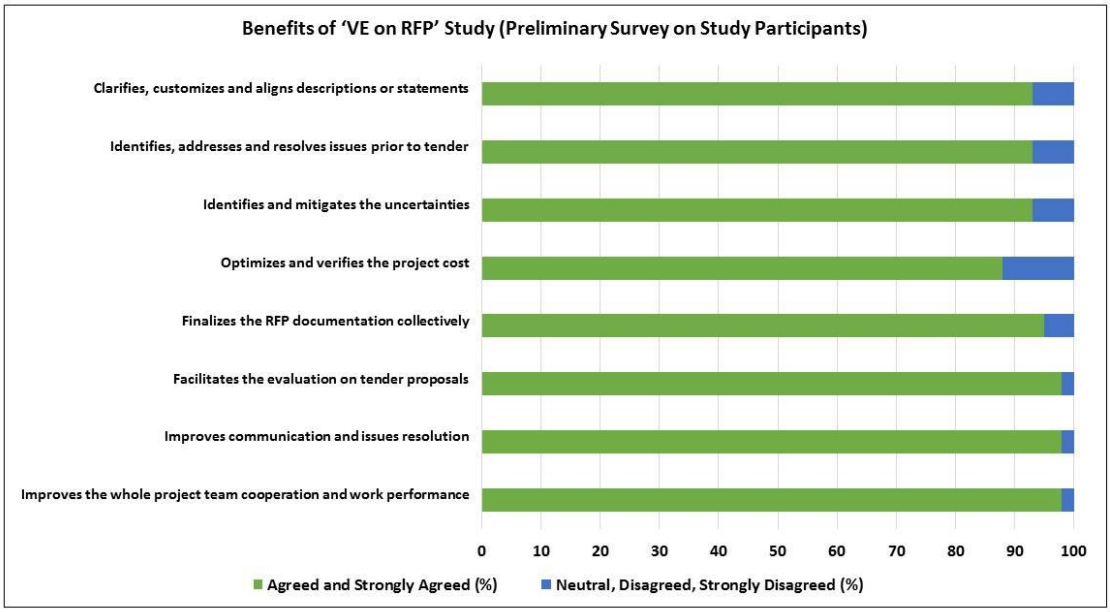

Diagram 4 – Verification of 'VE on RFP' Study Benefits
(Preliminary survey analysis on agreement by 'VE on RFP' Study participants)

SUMMARY AND CONCLUSION

Understanding the concept of value is the key to effective management of value in construction projects. In the first part of this paper, the author presents part of a broader research on the verification of value variables from procurement strategy perspective. The further research is to determine the relationship between the value variables with the procurement strategy selection criteria that leads to the strategic value decision. The ultimate research findings would be an intellectual capital input in the management of procurement strategy. The value-based procurement strategy is essential as value transition within project value chain varies to the choice of procurement system.

This paper further discusses on the project value chain that represents the value adding activities during project development. The project value chain model highlights the critical value transition points between and within three (3) broad phases i.e. Strategic Phase, Tactical Phase and Operational Phase. The client value system must remain in alignment from the Strategic Phase and throughout the value chain. Discontinuity of value transition along the project value chain can occur due to the contending multi value systems between/within the phases. It is also highlighted that the integrity of value transition within project value chain links to the choice of procurement system.

In relation to creating value opportunities within the project value chain, VM integration is the process of injecting intellectual input to stimulate value delivery in project. VM integration aims to add value, align and re-align value systems within project value chain and minimizes the likelihood of a mismatch in the project delivery. As value transition varies between procurement systems, this paper presents the contextualized VM integration to the D&B procurement route in the Malaysian public construction project background. In a D&B project, an efficient and effective transition of client value system is critical as the responsibility to ‘design and construct’ is handed over to the D&B contractor. The most viable VE intervention in the D&B project, i.e. ‘VE on RFP’ at Pre Tender stage is discussed as an effective intellectual capital input at the Feasibility Stage of the project value chain. Set on the Malaysian public construction project background, the observed benefits of ‘VE on RFP’ are verified based on the preliminary survey on agreement by the participants.

In conclusion, project procurement strategy is one of the strategic value decisions. The integrity of value transition, the entities and value systems/chains involved within the project value chain relate with the choice of procurement system. The integration of VM in construction project enhances value creation and stimulates value transition along project value chain. The contextualized VM/VE interventions to D&B procurement route aligns value systems at critical transitional points within the value chain. The ‘VE on RFP’ Study is proved beneficial in transmitting the client value system effectively and efficiently to the D&B contractor value system.

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