CHAPTER ONE

INTRODUCTION

1.1 Background of Study

In recent years, the engineering practices have been placed under great pressure and scrutiny from the general public due to poor management of projects or programmes and poor engineering judgements which have resulted in the lost of human lives and valuable resources. The Highland Towers tragedy that occurred in 1993 which claimed 48 lives, the Jaya Supermarket tragedy in 2009 which claimed 7 lives, the collapse of Sultan Mizan Zainal Abidin Stadium's roof in 2009 barely one year after it was commissioned for use and the Port Klang Free Zone scandal in 2008 which resulted in additional cost overrun of RM 3.5 billion from the initial projected cost of RM 1.85 billion are just a few of the high profile cases that had rocked the nation on top of a substantial number of cases of similar mismanagement and poor practices.

As a result from these, there has been increasing demand from the public with respect to the performance of the engineering projects, capital and operating costs, timeframe required to complete the projects as well as the values to be realised from the projects. Value Management has been known as a project management method that has been successfully implemented in the United States of America, Hong Kong and Singapore which can effectively addressed these concerns. It emphasizes on organised and systematic function-oriented approach aimed at examining the functions of a project, with the intention of enhancing its values by eliminating unnecessary costs while maintaining the integrity of the required performance. This ensures that the project will operate at the lowest project cycle cost during its lifespan (Fong & Shen, 2000).

In 2010, the Minister in the Prime Minister's Department, Tan Sri Nor Mohamed Yakcop announced that Value Management analysis would have to be conducted for all development programmes and projects costing RM50 million and above whereas for projects that are less than RM50 million, the agencies involved would be encouraged to conduct Value Management analysis (Minister: 10MP Requires Value Management Analysis on Programmes, 2010). In order to ensure that the value management is more robust, the Government has further introduced the Project Delivery Partner (PDP) to complement the implementation of value management. A PDP is an experienced contractor that will have a single point of accountability and assume responsibility for delivery of the entire project within the agreed time and cost. Cost overruns and delays in the project completion will be borne by the PDP. The PDP is therefore required to get its hand dirty to ensure project delivery when the contractor involved failed to do so (Making a Rail Impact, 2010).

Alwerfalli and Schaaf (2010) in their studies found Value Management is an effective project management method which complements the engineering projects' management and delivery system. Successful Value Management implementation in engineering projects has been known to be able to reduce project costs up to 20% by eliminating non-vital attributes of the projects. Apart from cost reduction, Value Management also promises opportunities to reduce wastage, ensure better clients' satisfaction through engagement of clients, better quality control as well as contribute to the more effective and efficient processes. In terms of internal synergy, Value Management enables the elimination of work-related conflicts, better time management, improved teamwork and communication, sound design practices and enhanced working morale.

Sensing that Value Management will greatly improve engineering projects' management and delivery system, industry experts along with observers have thrown their support behind this initiative. Master Builders Association Malaysia (MBAM) president, Datuk Ng Kee Leen and Federation of Malaysian Consumer Associations secretary-general, Muhammad Shaani Abdullah both lauded the Government's initiative in launching Value Management analysis for public projects but felt that this initiative could be further fine tuned to be inclusive of all governmental projects regardless of the cost involved (Value Management Analysis Lauded, 2010).

1.2 Problem Statement

Since its introduction in Malaysia, there have been many pilot studies on Value Management conducted in government projects before it was made a mandatory exercise for all government initiated projects or programmes worth RM 50 million and above. Che Mat (n.d.) reported that there have been remarkable achievements in these pilot projects. These pilot projects and their achievements are summarised as in Appendix A.

Che Mat (n.d.) further elaborated that the Economic Planning Unit of Ministry of Finance, Malaysia has developed a Value Management guideline for general application while the Institute of Value Management Malaysia has finalised the proposed draft Value Management Bill 2010 for Economic Planning Unit's review before it is tabled in the Parliament. At the same time, the Construction Industry Development Board along with the Institute of Value Management Malaysia have

initiated an accreditation programme aimed at promoting Value Management and to certify competent Value Management practitioners as “Certified Value Managers”.

Despite all the efforts by the Malaysian government and the Institute of Value Management Malaysia to promote Value Management in Malaysia and evidence of the benefits of Value Management, the receptiveness and acceptance of Value Management remain unenthusiastic in the professional practices particularly. It is only commonly practiced in government projects or programmes worth RM 50 million and above due to the new mandatory requirements and little have been heard about its implementation outside government projects or programmes. The term Value Management remains as a vague term among professionals in Malaysia.

1.3 Purpose and Significance of Study

This study is conducted to provide all stakeholders a better understanding of what are required to better propagate the concept Value Management to the engineering sector where the bulk of the government projects or programmes are directed to for the well-being of the general public. This study is especially vital as there was no previous study conducted on the implementation of Value Management among engineering professionals in Malaysia. As such, this study will probably serves as the fundamental reference to the implementation of Value Management among engineering professionals in Malaysia. It is imperative to promote and encourage this segment of professionals in Malaysia to foremost accept and subsequently adopt Value Management practices as norms for project or programme delivery to ensure that functions are maximised and quality assured at the most optimal costs available possible.

This is even more crucial considering the fact that engineering based projects or programmes are one-off activities, where there will be a single opportunity to deliver the values desired. Any subsequent failures or remedial works from unrealised values will be costly and usually have profound effects on the livelihood on the general public. For example, the engineering failure of MRR2 elevated section at Kepong has resulted in numerous closure since 2004 to 2008 for repair works and cost RM 75 million far exceeding the initially contract price RM 50 million (Jaapar & Torrance, n.d.). It is forecast that by having Value Management implemented, desired values will be realised and failures and cost overruns associated with mismanagement and poor engineering practices will be eliminated.

Before this could materialise, there must be support from the engineering professionals and subsequently broad implementation of Value Management in projects and programmes especially in the Klang Valley region where the major infrastructure and engineering works are concentrated. Therefore, this study will look into the significant factors which are crucial to the engineering professionals inducing them to engage Value Management in their activities.

1.4 Research Questions

This study aims to determine the relationship between various factors that are conjectured to affect the adoption of Value Management among the engineering professionals in the Klang Valley. While there have been substantial studies conducted in Hong Kong, China and Singapore to identify factors that are essential to encourage engineering professionals to adopt Value Management, there is none in Malaysia.

This study will address this gap through the following research questions:

1. How do resources, team dynamics and approach strategy relates to the adoption of Value Management among engineering professionals in the Klang Valley?

2. How does awareness moderate the relationship between resources, team dynamics, approach strategy and adoption of Value Management among engineering professionals in the Klang Valley?

1.5 Research Objectives

Based on the research questions presented above, the research objectives are devised as following:

1. To determine the relationship between resources and adoption of Value Management among engineering professionals in the Klang Valley.

2. To determine the relationship between team dynamics and adoption of Value Management among engineering professionals in the Klang Valley.

3. To determine the relationship between approach strategy and adoption of Value Management among engineering professionals in the Klang Valley.

4. To determine how different levels of awareness moderate the relationship between resources and adoption of Value Management among engineering professionals in the Klang Valley.

5. To determine how different levels of awareness moderate the relationship between team dynamics and adoption of Value Management among engineering professionals in the Klang Valley.

6. To determine how different levels of awareness moderate the relationship between approach strategy and adoption of Value Management among engineering professionals in the Klang Valley.

1.6 Limitations of Study

This study is limited to 105 of total 71,768 engineers registered with the Board of Engineers, Malaysia regardless of the discipline of professional practice. The sample of study is located within the region of Klang Valley and therefore, the findings and conclusion deduced is only representative of the engineers within the Klang Valley region. This study is an exploratory study considering that there have been no prior studies conducted among this segment of the professionals in this country.

1.7 Scope of Study

This study centres on the relationship between resources, team dynamics, approach strategy and adoption of Value Management among engineering professional in Klang Valley. This study will also look into the moderating effects of awareness on

the relationship between resources, team dynamics, approach strategy and adoption of Value Management among engineering professionals in the Klang Valley.

1.8 Organisation of the Study

This study is organised in five (5) chapters with sub-topics in each chapter. Chapter 1 gives an overview of this study, including the problem statement, purpose and significance of study, research questions, research objectives, scope of study, the organisation of this study and summary. Chapter 2 provides in depth reviews of related and relevant literatures of Value Management implementation. Chapter 3 details the research methodology devised, the development of hypotheses, the range of measurement scale adopted in this study, the sampling method, the data compilation procedures and the data analysis methods used in this study.

Chapter 4 presents the results interpreted from the data compiled and findings from the statistical analyses conducted. The last chapter, Chapter 5, presents conclusion and recommendations drawn from this study, potential suggestions for future research and implications of this study to the affected parties involved. Each of the chapter is provided with a brief summary.

1.9 Summary

This chapter provides insight into the underlying principles why this study is conducted, the purpose and significance of this study to the general public, the development of research questions and research objectives as well as the scope of the research and the organisation of the study. The next chapter will examine the literature

review pertaining to factors that may have significant relationship with the adoption of Value Management among engineering professionals in the Klang Valley region.

CHAPTER TWO

LITERATURE REVIEW

This chapter details what is Value Management and how it could be implemented to enhance the management and delivery of engineering projects. It also looks into the significant factors like resources, approach strategy and team dynamics which have been highlighted by other researchers that contribute to the adoption of Value Management.

2.1 Introduction to Value Management

Value Management is an organised and systematic function-oriented approach aimed at investigating the functions of a project, with the intention of maximising its values by eliminating unnecessary costs while maintaining the integrity of the required performance. Value Management in its present form is the evolution of Value Analysis and Value Engineering. Despite the fact that the differences between Value Analysis, Value Engineering and Value Management are not significant and even treated as the same entity by SAVE International, it would be essential in this study to seek out what each of the concept means and how it has evolved to the current Value Management.

Value Analysis (VA)

The initiation concept of Value Management, Value Analysis is a specific, creative and organised approach to function analysis, embodying the use of techniques, skills and knowledge to focus on the specific functions of the process and eliminating unnecessary costs which do not contribute to the function of process (Liu, 2003).

Value Engineering (VE)

Value Engineering is a more comprehensive and improvised technique where it embodies a systematic approach to seek out the best efficient balance between performance, cost and quality of a product or even a project. It can be differentiated that Value Engineering is a wider approach to maximise value as compared to Value Analysis considering that Value Engineering requires broader consideration of the entire project or process rather than specific function required in Value Analysis (Liu, 2003).

Value Management (VM)

Value Management is a broad, proactive and inventive approach to deliver value to the requirements of the clients through capitalising on the functional values central to the clients. The Value Management method emphasizes on decisions appraisal based on values promulgated by the clients from the conception stage to occupancy stage through an orderly and team-oriented approach (Kelly & Male, 1993; Liu, 2003; Michael, 2002).

It is clearly distinctive from the above statement the fundamental concept has shifted from cost-based to value-based, giving project stakeholders a greater and central role in project development and delivery. It means that value for money can only be achieved when design alternatives generated must not only strike the balance of cost, performance and quality but also satisfy the objectives of the project.

2.2 Job Plan of Value Management

While there are numerous approaches to conducting Value Management like the standard 40-hour workshop, the VM audit, contractor's change proposal and other

approaches which are customized to suit the needs of the projects, these studies generally follows the criteria and plan proposed by SAVE International (Luo, Shen, Fan, & Xue, 2010; Zhang, Mao, & AbouRizk, 2009). The systematic job plan being promoted by SAVE International consists of three (3) stages namely, pre-study stage, value study stage and post study stage. The pre-study stage consists of one (1) phase, while the value study stage and post study stage consist of seven (7) phases and one (1) phase respectively (Perera, Hayles, & Kerlin, 2011; Gupta, 2009). The various phases are detailed as below.

Phase 1: Orientation and Diagnostic Phase (Pre-Study Stage)

The initial phase of Value Management, the orientation and diagnostic phase involves commissioning of the Value Management team in preparation for the Value Management study. The project owner along with the respective stakeholders would conduct a kick-off meeting to form the Value Management team along the with the appointment of the team leader. The Value Management team along with the owner and stakeholders will in turn define the goals of the project according to the owner's needs and requirements. The boundaries of the project will also be established at this phase (Davis, 2004; Che Mat, n.d.; Alwerfalli & Schaaf, 2010).

Phase 2: Information Phase (Value Study Stage)

The project background, project scope, current concept, designs and its associated costs will be tabled by the designer at this phase. The design development along with the project schedule will also be presented to ensure that sufficient time will be allocated for the Value Management study. Important data which is vital to the project like design criteria, operation and maintenance requirements, project constructability, project schedule, budget allocation will then be captured for future

reference and analysis (Davis, 2004; Che Mat, n.d.; Alwerfalli & Schaaf, 2010; Liu & Leung, 2002).

Phase 3: Function Phase (Value Study Stage)

The most fundamental and important phase of value study, the function phase utilises a combination of function-logic process to break down the project information into the most simplistic form for analysis. There are two prime objectives that must be fulfilled at this phase; to accentuate developed ideas that are incongruent with the project objectives and laying the platform for creativity phase in the subsequent phase. Project variables will be developed and scrutinised according the specific values that have been spelled out by the owner and stakeholders (Alwerfalli & Schaaf, 2010; Liu & Leung, 2002).

Phase 4: Creative Phase (Value Study Stage)

The creativity phase will employ brainstorming or other similar methods as a mean to generates ideas, processes, methods and designs which are seen as possible alternatives to the pre-defined functions. It must be highlighted that this phase is opened to any and all possible alternatives but comments and judgements will not be taken into consideration at this phase. This phase focus solely on the quantity of the alternatives generated with no emphasis being placed on quality. These alternatives commonly come in the form of substituting materials, revising tolerances, increase standardising instead of customising or altering the construction sequence (Liu & Leung, 2002; Davis, 2004)

Phase 5: Evaluation Phase (Value Study Stage)

The evaluation phase is a succeeding phase of creative phase. In this phase, all alternatives generated in the creative phase will be duly evaluated. First, these

alternatives will be screened for viability of implementation in the project. These alternatives will be subsequently scanned for strategic fit with the project objectives and values expounded by the owner. Then, these alternatives will be tested for other minor criteria like economic viability, life-cycle cost, safety, reliability, environmental impact, social impact, aesthetics, maintainability and other factors which are deemed fit (Davis, 2004; Perera, Hayles, & Kerlin, 2011).

Phase 6: Development Phase (Value Study Stage)

Those viable alternatives that pass the evaluation phase will be developed into workable proposals. These proposals will detail out the description of the recommendation, capital cost and recurrence cost of the recommendation, advantages and disadvantages of the recommendation and other relevant date and supporting information which are critical to the decision making in the later phases (Che Mat, n.d.; Perera, Hayles, & Kerlin, 2011).

Phase 7: Presentation Phase (Value Study Stage)

In this phase, a written report consist of the various proposals will be submitted to the decision makers and the decision makers will be briefed about the recommendations of the Value Management team in an informal briefing. This is mainly to allow decision makers to have an in depth understanding of the findings and raise queries about the recommendations before deciding on the suitable recommendations to be implemented (Alwerfalli & Schaaf, 2010; Perera, Hayles, & Kerlin, 2011).

Phase 8: Implementation Phase (Value Study Stage)

The last phase of the Value Study Stage, the implementation phase requires decision makers to decide of the status of the recommendations. The decision makers can opt to implement any or all of the recommendations being proposed. These recommendations accepted will need to be further developed and transpired to the respective parties involved in its implementation (Alwerfalli & Schaaf, 2010; Gupta, 2009; Davis, 2004).

Phase 9: Post Value Management Study Activities Phase (Post-Study Stage)

The recommendations implemented will be subsequently captured in the records and the values realised will also be recorded. The progress of implementation will be tracked and monitored for subsequent review by the decision makers, Value Management team and the project implementation team (Alwerfalli & Schaaf, 2010).

2.3 Reasons for Applying Value Management

While there are many other techniques and methods which are appropriate for project management purposes like Critical Path Method (CPM), Program Evaluation and Review Technique (PERT) as well as PRINCE2, Value Management tends to fit aptly in the engineering sector as compared to the rest. This is mainly contributed by the attributes of Value Management which complements the objectives of engineering projects, mainly through ensuring that the projects are delivered in a timely, within the specific budget and quality assured manner. Among the significant reasons being highlighted by practitioners are:

Systematic Strategic Thinking - Value Management advocates the needs to think in strategic level, a broader view than tactical level. This means that one needs to

consider the effects of a decision on the project as a whole rather than just zooming into a specific section. This is particularly important during the conception stage where the project design brief will be formulated and finalised for design (Bowen, Jay, Cattell, & Edwards, 2009; Bowen, Cattell, Jay, & Edwards, 2011; Abidin & Pasquire, 2007).

Removal of Unnecessary Costs - Value Management promotes the notion of focusing on specific functions that are central to the owner and that the project team members must achieve these at the most optimum costs possible without sacrificing the required functions, reliability and quality. Thus, unnecessary costs associated with redundant functions which do not contribute values to the project will be eliminated. This will in turn contribute to the total savings of the project (Abidin & Pasquire, 2007; Bowen, Edwards, Cattell, & Jay, 2010a; Bowen, Cattell, Edwards, & Jay, 2010b).

Enhancement of quality - One of the hallmarks of Value Management is the constant focus of the quality of the project delivery. Quality is an essential element in the value equation and in order to realise the potential project values to the owner, quality must be delivered. This is further complemented by the specific functions focus where quality assurance is guaranteed before these specific functions are fulfilled (Davis, 2004; Bowen, Jay, Cattell, & Edwards, 2009).

Clear Establishment of Owner's Needs - Value Management stresses on the needs to implement and deliver a project according to the requirements being outlined by the owner. It will be inevitable for the project team members to clearly establish the needs of the owner in the conception stage before any further project development can take place. All subsequent development stages of the project will be centred on fulfilling these needs (Perera, Hayles, & Kerlin, 2011; Davis, 2004; Abidin & Pasquire, 2007).

Efficient Use of Time - Value Management stresses on the needs to deliver the required values being stipulated by the owner within the required timeframe agreed. This will apply pressure on the project team members to administer their time allocation for each activity prudently to ensure that the project will be delivered on time. Continuous tracking of work progress through Value Management practices in every stage will complement the efficient usage of time (Bowen, Edwards, Cattell, & Jay, 2010a; Bowen, Cattell, Edwards, & Jay, 2010b).

Teamwork and Team Members Development - Involvement and contribution of all team members are promoted under the Value Management practices. Ideas and suggestions contributed by members will be recorded and discussed for implementation. This will allow the establishment of a bond between team members as well as a sense of belonging to the team as a whole. Value Management also provides opportunity for team members to gain knowledge through the exchange of ideas during the creative phase (Perera, Hayles, & Kerlin, 2011; Davis, 2004; Alwerfalli & Schaaf, 2010).

"Partners" relationship - Value Management promotes informal relationship between team members including the owner and stakeholders by engaging the owner and stakeholders in the Value Management activities. These are indirect processes where relationship between the various parties will be improved leading to fewer conflicts in workplace. Practices in Value Management also provide means to eliminate the possibility of adversarial and litigious nature of the industry commonly associated with the traditional delivery system. This is achieved through well-defined mutual goals, better communication and systematic problem definition and resolution

which are engraved in the practices of Value Management (Perera, Hayles, & Kerlin, 2011; Alwerfalli & Schaaf, 2010; Abidin & Pasquire, 2007).

Medium for change - Value Management emphasizes on the needs to generate new, creative and innovative ideas and suggestions which will be scrutinised in the subsequent phases and adopted if these ideas and suggestions proved to be viable. This creates an environment where changes for the better will be constant to maximise the values stipulated. Value Management also provides opportunity to weed out unproductive elements which are detrimental to the project delivery through this change process. This process can be further enhanced as Value Management involves all parties (Bowen, Edwards, Cattell, & Jay, 2010a; Bowen, Cattell, Edwards, & Jay, 2010b).

2.4 Resources to Value Management

In project management, resources are the basic input to the productive process, which need to be accumulated, organised and co-ordinated for functional implementation. Whereas, resources management is the efficient and effective means of deploying the organization's resources to complete a specific project (Project Management Institute, 2008; Zwikael, 2009). Effective allocation of resources has been known to be the single most critical factor that will determine the success of a project or programme implementation. Therefore, the implementation of Value Management is no different. Ample resources need to be allocated for the effective running of the Value Management programme. Wernerfelt (1984) along with De Toni and Tonchia (2003) further described resources and the end products of a project as the two sides of the same coin, each side has direct relationship and affected by the other side. Grant (1991)

categorised these resources into six (6) types, namely, financial, physical, human, technological, reputation and organizational.

Grant (1991) asserted that resources allocation is non-separable from the basic direction of a project's strategy, effectively sketching the path which the project or programme will undergo in the later stages. In fact, the resources which are invested in the project or programme should continuously be available throughout the project life to ensure that the project or programme proceeds smoothly (Nguyen, Ogunlana, & Xuan Lan, 2004; Al-Tmeemy, Rahman, & Harun, 2010). Engwall and Jerbrant (2003) further stressed that the issuance of resources should not be limited to just ensuring the project or programme life but also prioritisation of the resources according to the stages and suitability of the resources involved. It is essential for management then to be proactive to plan ahead and ensure that resources are available for disposal in the project or programme. On the other hand, Hanisch, Lindner, Mueller and Wald (2009) advocated the need to allocate the resources optimally, strictly to the needs of the project or programme instead of blatantly which results in wastage and eventually defeats the concept of Value Management.

Value Management experts and experienced project managers tend to agree that there are prime resources which are essential for the successful Value Management implementation (Chen, Chang, & Huang, 2010; Shen & Chung, 2002; Luo, Shen, Fan, & Xue, 2010). The resources which are highlighted are time, budget and experiences (Pedersen & Rendtorff, 2004; Thiry, 2004; Naaranoja, Haapalainen, & Lonka, 2007; Douglas & Lubbe, 2005).

2.4.1 Time

Time constraint has been known as the main hindrance in any project implementation and Value Management practices. Therefore, there are two major questions which must be answered before the Value Management exercise can be implemented. Has Value Management activities been allocated time in the project schedule? Is the time allocated for Value Management activities sufficient to ensure proper alternatives are generated and considered? Fong (1998) highlighted that the application of Value Management in Hong Kong are perceived to be causing delays to the design processes and project delivery as the Value Management activities are accounted for and requires major re-engineering works. In Taiwan, Chen, Chang and Huang (2010) meanwhile reported that Value Management teams were given tight deliverable schedules in project design and delivery to perform all required studies. McDuff (2001) exerted that it was not uncommon that time schedule allocated for Value Management activities were often devoured by other mainstream project designs and implementation activities as these Value Management activities were considered as non-contribution activities. This was further exasperated by the perception of the project owners that this narrow view of Value Management activities was justified.

Similar to any other project activities, regardless of whether they are critical or non-critical activities, Value Management activities require ample time for preparation, implementation and presentation. It is essential to understand that Value Management activities which are centred on comparison of design alternatives or modifications require development of separate associated estimates from the mainstream project activities (Moyer, 2003). It is more vital that Value Management activities are granted ample time in the project schedule to ensure full implementation of the Value

Management activities and its activities are properly allotted in the project schedule (Naaranoja, Haapalainen, & Lonka, 2007; Kartam, Al-Daihani, & Al-Bahar, 2000). Ample time will also enable project team members to shift and eventually construct their new paradigm of project management in Value Management (Thiry, 2004).

2.4.2 Budget

Effective and efficient budget allocation has been listed as a critical success factor for project management practices. Even in traditional method of project management and delivery system, proper budget allocation and control are essential and have been the key measurement of successful project management and implementation (Engwall & Jerbrant, 2003; Nguyen, Ogunlana, & Xuan Lan, 2004). Nguyen, Ogunlana and Xuan Lan (2004) proposed that adequate funding must be available though the project for functionality of Value Management activities. They emphasized that the project delivery and Value Management team must have the "comfort" of having sufficient budget or funding to ensure the Value Management programmes are not interrupted or halted as a result of lack of financial resources.

Financial resources are obviously imperatives which must be available to the projects or programmes like Value Management for it to be functional. A study conducted by Belassi and Tukel (1996) found that the proper allocation of financial resources has been ranked as the highest as the critical success factor for a project or programme. In reality, securing the financial resources required for successful project or programme implementation from the top management has been a major challenge for programmes like Value Management where the outcomes are difficult to measure (Engwall & Jerbrant, 2003). It is imperative that financial resources be secured prior to

the launching of Value Management to ensure smooth and effective implementation (Fong, 1998; Naaranoja, Haapalainen, & Lonka, 2007; Douglas & Lubbe, 2005; Shehu & Akintoye, 2009).

2.4.3 Relevant Experiences

The relevant understandings and capabilities from a programme or method accumulated from past events are commonly known as experiences and known to be the essential link between team efforts in a project and project success. Information and experiences gathered from past projects serve as the base reference which will be manipulated as the guide for project and programme implementation (Hanisch, Lindner, Mueller, & Wald, 2009). It would be vital for the project team then to seek the management's agreement to engage experts with experiences who can subsequently uplift the implementation of a project or programme (Engwall & Jerbrant, 2003). The implementation of Value Management is no different from the rest of the projects or programmes. It requires inputs and guidance from experts who have the relevant experiences and can participate actively in the activities (Fong & Shen, 2000; Chan, Wong, & Scott, 1999; Kartam, Al-Daihani, & Al-Bahar, 2000).

For Value Management practices, seeking experts who have the relevant experiences and capabilities to ensure smooth implementation of the Value Management has been an uphill task for most of the project teams. In Hong Kong, it was reported by Fong (1998) that insufficient relevant experiences have been listed as one of the prime factor for the limited implementation of Value Management in Hong Kong. This was the same in China as there was a lack of Value Management experts in the field which the project team could source from and effectively contribute to the

Value Management activities (Chan, Wong, & Scott, 1999). Jaapar and Torrance (n.d.) viewed that there was a lack of appropriate contribution from the experts and that these experts have poor facilitation skills during the Value Management activities in Malaysia. More so, the Institute of Value Management Malaysia was established only in 2000 and there are few members who can contribute effectively to the Value Management processes.

2.5 Team Dynamics

Team dynamics refers to concerted efforts and continuous involvement of stakeholders, project team members to ensure the existence of the general agreements and collective ingenuity in a project or organisation towards proper project control and smooth flow of the project (Nguyen, Ogunlana, & Xuan Lan, 2004). In team dynamics, it is essential that stakeholders and project team members should establish the willingness to cooperate with other stakeholders and project team members as well as external parties to ensure that the purpose of the team existence is achieved (Hanisch, Lindner, Mueller, & Wald, 2009). If formed, team dynamics will dictate how a team could react, behave or perform in a situation. It is also known to be an unseen force that can strongly influence the behaviour and communication of the team members and very often the effects and works of team dynamics are complex and not easily explained (Toor & Ogunlana, 2009).

There are pre-requisites for team dynamics to be attained. The team must comprise of experts with the relevant knowledge, experience and proficient communication ability to ensure that team dynamics is possible. Each and every member must be competent in their way and that these competencies are essential part

of the objectives of the project or programme. A strong and competent team leader is also vital for the effectiveness of team dynamics. There have been many studies that have shown that leadership capabilities of the team leader can greatly influence the team dynamics which in turn drives the successful accomplishment of a project or programme (Toor & Ogunlana, 2009).

Team dynamics can be easily distinguished through the characteristics which are displayed in terms of personality styles, roles played by each team member, culture adopted by the team, common tools and technology employed and processes and methodology used in problem solving. The team dynamics established will be a major driving force in holding the Value Management team and project team members together and subsequently ensure Value Management practices remain intact. It must be noted that these characteristics achieved in team dynamics are not permanent features of the team. These characteristics tend to change according to the environment and circumstances which dictate the present situation. Among the most distinct forces which affect the dynamics of the team are owner's participation, teamwork, communication, training and sufficient knowledge of team members (Wideman, 1995; Turner & Muller, 2004; Hall & Andriani, 1998).

2.5.1 Owner's Participation

Being the initiator of a project or programme, the project or programme owner has the crucial role of ensuring continuous commitment towards the goals of the project or programme, drafting clear objectives and scopes which are the guiding light of the project or programme and providing the necessary financial support and empowerment to keep the project or programme on track. Project team members and Value

Management team members should be informed of the owner's desires and direction of the project and programme. This will in turn establish clear objectives, scopes, responsibility and accountability of team members, and eliminating counter-productive effects of individualism when team dynamics is eroded (Nguyen, Ogunlana, & Xuan Lan, 2004; Turner & Muller, 2004).

The owner's participation is even more essential for Value Management as Value Management demands constant contribution from the owner in terms of clear objectives, goals, financial and time allocation as well as decision to maintain the momentum of Value Management activities and ensure attaining the desired values. Previous researches have indicated that the best results from Value Management can only be attained when there is good relationship and cooperation between the project or programme owner and the team members which leads to synergy formation. Apart from this, the owner needs to be updated with relevant information over the entire course of the project or programme to allow the owner to make the necessary amendments and decisions to further enhance the values to be realised from the project or programme (Turner & Muller, 2004; Toor & Ogunlana, 2009).

Toor and Ogunlana (2009) highlighted in their studies that poor performance of the project or programme implementation might not be necessary due to the project team members but can be attributed to the owner itself. They have pointed out that the performance of a project or programme can be significantly affected by the owner before, during and after the project or programme. The owner needs to take cognisance of prevailing situation of the project or programme and responses accordingly to enable the team members to advance with the progress of the project or programme. Therefore, the project or programme owner's active participation in Value Management practices

dictates the attainment of team dynamics and ensures successful Value Management implementation (Fong, 1998; Evans, 2003; Fong & Shen, 2000; Shehu & Akintoye, 2009).

2.5.2 Leadership

Leadership is described as the process of social influence in which one party will seek to solicit other parties' agreement and support aimed at accomplishing a common task. This is commonly done either through the manipulation of knowledge and skills or just plain personality traits. Leaders must be able to manipulate knowledge, skills and personality to build trust and confidence from their team members, communicate effectively the key strategies, objectives and roles of each of the team members as well as sharing relevant information with team members enabling them to achieve the intended goals (Zwikael, 2009).

In Value Management, team leaders have the responsibility to coordinate and integrate Value Management activities between external stakeholders and internal team members. Externally, the team leader must probe and establish the directions of the project or programme's Value Management and the intended goals of the owner. The team leader must then integrate the intended functional requirements of the project into the Value Management team's objectives and coordinates the Value Management team's activities towards accomplishing solutions that will satisfy these functional requirements. In short, values cannot be realised by the owner without the owner's agreement. Internally, it is even vital for the team leader to control the dynamism of the team and coordinates the team activities during the Value Management process. Team leaders should be vigilant about the friction within the team and make all possible

efforts to convert these frictions into constructive creativity (Chen, Chang, & Huang, 2010; Zwikael, 2009; Male, Kelly, Gronqvist, & Graham, 2007).

2.5.3 Teamwork

The involvement of various parties, both technical-based and non-technical-based is a common nature in engineering based projects or programmes. It is essential for all parties involved to play their roles effectively and eventually contribute to the success of the team. Effective selection of team members would be a crucial process which will determine the smooth running of the project or programme and eventually to the success of the project or programme. Team members should shed the individualism mentality for willingness to cooperate with other team members and external parties to ensure effective teamwork before any potential benefits could be generated from the project or programme (Nguyen, Ogunlana, & Xuan Lan, 2004; Hanisch, Lindner, Mueller, & Wald, 2009).

Teamwork will be realised when team members are properly selected, integrated and aligned towards common goals and motivations. It is imperative that the team members are kept to a manageable number and communication between team members is constant (Davis, 2004). Previous researches have indicated that teamwork has failed to realise due to the lack of participation and involvement of team members in Value Management. It was highlighted that team members are caught with the traditional perception where team members are expected to comply strictly with the direction of the team leader without proper engagement of team members in contribution of ideas and comments. This is further compounded by the perception that team members are afraid to speak up fearing being ridiculed by other team members. It must be established

the role of each member in the team and they are encouraged to contribute actively as a team member towards accomplishing the mission of the Value Management practice (Crawford & Pollack, 2004; Douglas & Lubbe, 2005; Kartam, Al-Daihani, & Al-Bahar, 2000).

2.5.4 Communication

Communication has taken central stage in today's information age and gaining increasing importance in project management methods. Rigorous communication is a determining factor in leading and integrating team members into creating team dynamics for successful project implementation. It is thus imperative to have an effective communication channel and information system in place so that all team members have access and share ideas freely. Studies have shown that team members tend to be more involved and committed to the project or programme if the team members are better informed and aware of the progress of the project or programme (Nguyen, Ogunlana, & Xuan Lan, 2004).

In Value Management practices, it is even more essential to have effective communication to channel ideas, thoughts, comments and decisions throughout the process. Turner and Muller (2004) stressed in their study that effective communication lies in three factors, the communication frequency, communication content and media as well as formal and informal form of communication. Communication frequency refers to the number and timings of communication where the number is the regularity of communication while the timings are the respective milestone stages of the project or programme. Communication content refers to the important substances outlined in the project plan, criteria and measures while the communication media refers to the form to

which the conveyance of information is preferred. The formality of the communication often depends on the severity or importance of the content itself where high importance often requires formal means and vice-versa.

To enable team dynamics, appropriate communication is required to build synergistic relationship between team members and external stakeholders. The owner needs to be informed of the project or programme status and the project deliverables according to the functional requirements stated. Also, the owner would be interested to know whether the project or programme has been implemented with the best interest of the owner in mind. The project team in turn needs to understand the owner's requirements before they can design the best way to deliver the intended functional requirements. It is therefore essential to maintain proper communication throughout the Value Management process to ensure successful implementation of the project or programme (Turner & Muller, 2004; Hanisch, Lindner, Mueller, & Wald, 2009; Crawford & Pollack, 2004).

2.5.5 Knowledge

There have been numerous studies which indicate the application of Value Management has been founded on insufficient knowledge about Value Management which often lead to its premature demise. This was particularly evident in Hong Kong (Fong & Shen, 2000; Fong, 1998), China (Shen & Chung, 2002; Liu & Shen, 2004), Malaysia (Jaapar & Torrance, n.d.; Abidin & Pasquire, 2007), Singapore (Ting & Cheah, 2004) and United States of America (Male S. , Kelly, Gronqvist, & Graham, 2007) where poor knowledge of Value Management has hindered the application and

adoption of Value Management (Luo, Shen, Fan, & Xue, 2010; Thiry, 2004; Shehu & Akintoye, 2009).

There were inadequate efforts by parties involved to advocate the awareness about Value Management and subsequently broaden the knowledge of Value Management in each locality. In China, Liu and Shen (2004) highlighted that there was a lack of practical guidance of Value Management due to the lack of knowledge required for successful implementation of Value Management. The Value Management job plan, approaches, performance levels and techniques were incongruent with the local practice and that these job plan, approaches, performance levels and techniques were crafted according to the manufacturing industry. There is a wide gap between theoretical methodologies and practical implementation in the engineering practices and no practical framework aimed at shrinking the gap to which Value Management implementation is viable. It was observed that there was strong resistance towards Value Management due to inaccurate perception and low level of knowledge of Value Management (Liu & Shen, 2004).

In Hong Kong, Liu and Shen (2004) discovered that only a few had comprehensive knowledge about Value Management. Promotion of Value Management by professional institutions was low and the publications of Value Management in the localities were scarce to enable more to become aware and understand Value Management. It would take substantial efforts by international bodies and local professional institutions to collaborate and disseminate information and knowledge to ensure more are aware of Value Management and how it can be performed to suit the project or programme.

2.5.6 Training

Value Management programme is a structured and complex method of project management in which team members need to gain substantial knowledge and information before implementation is possible. It requires high level or coordination between various parties and synergistic relationship between stakeholders which involved conflicting interests in the project or programme. Explicit knowledge, skills and capabilities required in the implementation of Value Management need to be codified and communicated to the team members Project or programme implementation will not be possible if the team members do not possess the required skills or competencies for the role assumed. Training will be then an essential element to ensure that team members build up the skills and capabilities required to perform their roles (Shehu & Akintoye, 2009).

Training of team members extend beyond the “one-size-fit-all” concept. Team members’ present skills and capabilities should be assessed, detailed and compared to the required roles which the team members are supposed to play in the Value Management activities. The training programme will then be crafted to address the shortcomings of team members and means how to train team members to perform their respective roles effectively. Studies have reported that training has often been neglected for team members in favour of cost saving from omitting the training required. This has often resulted in failure of the Value Management programme due to the ineffective performance of the team members (Shehu & Akintoye, 2009; Hanisch, Lindner, Mueller, & Wald, 2009; Hall & Andriani, 1998).

2.6 Approach Strategy

Value Management implementation requires acute strategy, proper planning, accurate approaches and prudent utilisation of necessary resources before it can produce satisfactory results. It is imperative to strategise each move in Value Management implementation to ensure that it is easily acceptable to team members and adopted for practices. De Toni and Tonchia (2003) proposed that there are four (4) critical phases which must be charted out to ease the implementation of a specific programme. First, the team's resources, strengths and weaknesses relative to the required characteristics of the Value Management should be gauged. Secondly, the team's individual competencies in the project should be identified. Thirdly, potentials that can be generated from the resources, strengths and competencies that complement the implementation should be identified. Fourthly, a suitable strategy which can exploit the potentials generated should be selected for implementation. Lastly, there must be continuous efforts to identify the gaps of implementation and devise means to overcome it.

Nonetheless, there are factors which are central to the approach strategy and should be considered when crafting the strategies for implementing Value Management. Among the most common being objectives of the Value Management exercise, organisational culture which dictates the behaviour of the team, perceived benefits that can be realised from the Value Management exercise and the methodologies being employed in the Value Management practices. At present, there are many tools and analysis techniques being proposed to assist and address strategy related issues but this does not discount the need to have an in-depth understanding of the underlying characteristics which control the behaviours, decisions and directions of the team. It would be sensible to first gauge the underlying characteristics of the team and craft the

approach strategy around it (Wideman, 1995; Turner & Muller, 2004; Hall & Andriani, 1998).

2.6.1 Objectives

Clear objectives provide a guide to which what the project or programme intends to achieve upon completion of the project or programme. Team members need clear direction on what they are trying to achieve in the project or programme, expectations raised by the external stakeholders and their respective roles in the project or programme. It also serves as the basis on the resources that need to be allocated and how to align the resources towards achieving these goals. Nonetheless, setting clear objectives requires prior understanding of the project or programme and experiences gained from similar project or programme. Successful objective setting commonly requires three (3) critical elements. First, the goals and priorities of all stakeholders must be clearly defined. Secondly, these desired goals and priorities must be aligned with the project and finally, these goals and priorities must be communicated to the team members (Toor & Ogunlana, 2009; Nguyen, Ogunlana, & Xuan Lan, 2004).

Despite the importance of having clear objectives prior to the commencement of the project or programme, it is a common scenario in engineering practices that the objectives of the project or programme are given least importance in the project development. Previous studies conducted have shown that poorly crafted objectives have hindered progressive development of Value Management. Team members were disillusioned with what were expected to be achieved from the Value Management activities and what were the core values that must be given due attention. When the proposed alternatives were incongruent with the desired values of the owner, team

members were de-motivated perceiving that their efforts were redundant. This has commonly led to resistance from team members to continue pursuing Value Management practices (Chen, Chang, & Huang, 2010; Crawford & Pollack, 2004; Naaranoja, Haapalainen, & Lonka, 2007).

2.6.2 Organisational Culture

Organisational culture has been known as the single most important factor dictating the collective behaviour of a team or organisation. It is built over time and ingrained in each and every member of the team or organisation. Engineering practices are generally established and its administration and management has been built on the conventional model of design and build. Though there are many new concepts of engineering administration and management which are perceived to be more suitable, efficient and effective, its implementation has been hindered by the resistance of team members who preferred to maintain status quo or remain fixated to the culture. This organisational culture is even predominant in Asian countries where culture is well ingrained (Hall & Andriani, 1998; Chan, Wong, & Scott, 1999).

In China and Hong Kong, there have been attempts to introduce current management concepts like Value Management, Design and Build, as well as Build, Operate and Transfer but their implementations have been met with great resistance. There were substantial comments about high costs involved, prolonged completion period and lack of flexibility in the new concepts introduced even though these new management concepts are still in infancy stage of implementation. The traditional method of project or programme management is still preferred by these groups of engineering professionals. The sole reason being identified is the familiarity and

accustomed to the traditional system forming the culture which the team or organisation has adopted. Thus, organisational culture is an essential element which must be overcome before any new concepts or ideas become receptive (Hanisch, Lindner, Mueller, & Wald, 2009; Hall & Andriani, 1998; Toor & Ogunlana, 2009).

2.6.3 Perceived Benefits

Investment and adoption of new project management methods often demands proofs of perceived benefits that can be reaped before these project management methods are given due attention. Owner needs information about how these methods will complement the project or programme and how the values from the project or programme can be enhanced. Likewise, the team members need to be convinced on perceived benefits that the new project management methods promise before they will consider whether it is worthwhile to ditch the old paradigm and migrate to the new techniques. Sustainability of the project and programme has also been thrust into the forefront of the project management issues. It would be an essential consideration then that the benefits generated and values realised are sustainable in the long run (Hill & Zeller, 2008; McDuff, 2001; Crawford & Pollack, 2004).

Bowen, Jay, Cattell and Edwards (2009) in their studies revealed that the implementation of Value Management has enabled cost savings of ten (10) percent and above. This has resulted in greater acceptance of Value Management in South Africa. While it is easier to measure the perceived benefits quantitatively, it is an uphill task to provide tangible proofs of the qualitative benefits. Crawford and Pollack (2004) in their study in Australia found that it is more difficult to measure the qualitative benefits of Value Management. They further reiterated that the impact of qualitative benefits is

significant and cannot be downplayed as an important consideration. There need to be a consistent measure of both qualitative and quantitative benefits to serve as testimony of Value Management success (Kartam, Al-Daihani, & Al-Bahar, 2000; Shehu & Akintoye, 2009).

2.6.4 Methodology

Methodology creates a structured platform for solving a problem, often through a series of phases, tasks or tools. It is also a source of clearly defining the project or programme processes and means to impose control and communication to ensure that the strategy employed is practical. Coincidentally, Value Management itself is a highly structured technique, where there are prescribed phases which are well tested to be followed. SAVE International, the international body for Value Management has developed a broad guideline to assist the implementation of Value Management (Chen, Chang, & Huang, 2010; Fong & Shen, 2000; Male, Kelly, Gronqvist, & Graham, 2007).

Chen, Chang and Huang (2010) revealed in their studies in Taiwan that one of the major failures for Value Management implementation has been attributed to the breakdown of Value Management methodology in the project or programme. It is even more prevalent in the stage where team members did not concentrate on crafting ideas based on criteria and functions set by the owner but instead delved into functions which are of less relevant and desired by the owner. There are clear indications of misconceptions that the proper methodology has been employed and functional analysis has been deployed. It is therefore crucial to have the proper methodology which fits to the project or programme for effective Value Management implementation.

2.7 Awareness

There have been many numerous cases where Value Management has failed to be implemented due to the lack of awareness of what Value Management is, benefits of implementation and the nature of the Value Management activities. This has commonly led to the resistance of the programme by the team members and as a result, scrapping of Value Management from the project or programme. In fact, it has been identified as the pre-requisite for dissemination of information with regards to Value Management and subsequently the implementation of Value Management. Promoting awareness provides a mean to allow prospective management and members to comprehend the nature and significance of the programme. This will in turn command cooperation from the management and members to further implement the programme and adopt the programme as the new organisational culture (Kartam, Al-Daihani, & Al-Bahar, 2000; Shehu & Akintoye, 2009; Perera, Hayles, & Kerlin, 2011).

As the nature of Value Management requires systematic approach to problem solving and often demands substantial involvement of team members, prior dissemination of information and knowledge about Value Management will be essential to gain support from the prospective management and team members for implementation of Value Management. However, promoting awareness itself has been a major obstacle. There must be concerted efforts from both the academia and the industry on ways to disseminate information and the benefits better to the target audiences (Kartam, Al-Daihani, & Al-Bahar, 2000; Shehu & Akintoye, 2009; Perera, Hayles, & Kerlin, 2011). As in Malaysia, the role of promoting Value Management at present lies with the Institute of Value Management of Malaysia and the Malaysian Government.

2.8 Research Framework

Based on the literature review detailed above, it is suggested that the preliminary research framework be defined as Figure 2-1 as shown. This preliminary research framework is adapted from the research framework proposed by Liu and Shen (2004) in their studies in China and Hong Kong. In this preliminary research framework, resources, team dynamics and approach strategy are independent variables while the adoption of Value Management is the dependent variable. The moderating variable is awareness, which is incorporated into the original research framework to reflect the growing effects of awareness in the adoption of Value Management based on the recent literatures produced by other researchers.

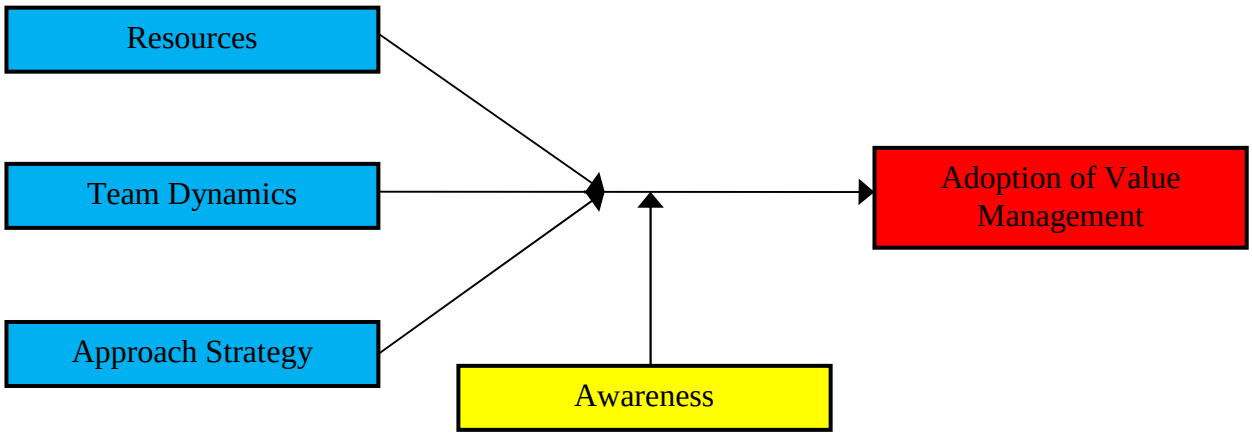

Figure 2-1: Preliminary Research Framework

2.9 Summary

This chapter reviews the variables of Resources, Team Dynamics, Approach Strategy, Awareness and Adoption of Value Management. Research gaps and inconsistencies are discovered. Preliminary research framework is developed for further investigation in the following chapters.